dataTaker

Case Study

Monitoring the Roof of Parliament House

Case Details

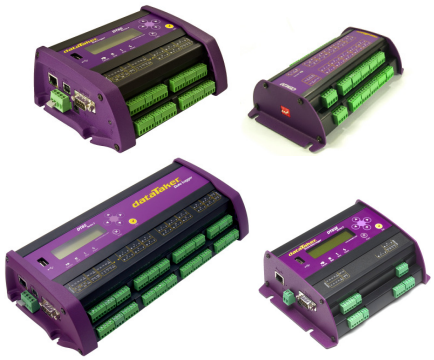
The building authority for the construction of Parliament House in Canberra was unable to estimate the temperature likely to be experienced by the membrane on the roof. The roof is a 'Dagwood sandwich' of many layers: concrete deck, a three-layer bituminous membrane covered by a protection board, a 100mm percolation course of sand, and 400mm of moist soil supporting growing turf. Excessive heat will cause the 7mm thick bituminous membrane to 'slump' or slowly flow down the sloping roof, which would leave insufficient material to do its job. It was thus necessary to call in the CSIRO Division of Building Research.

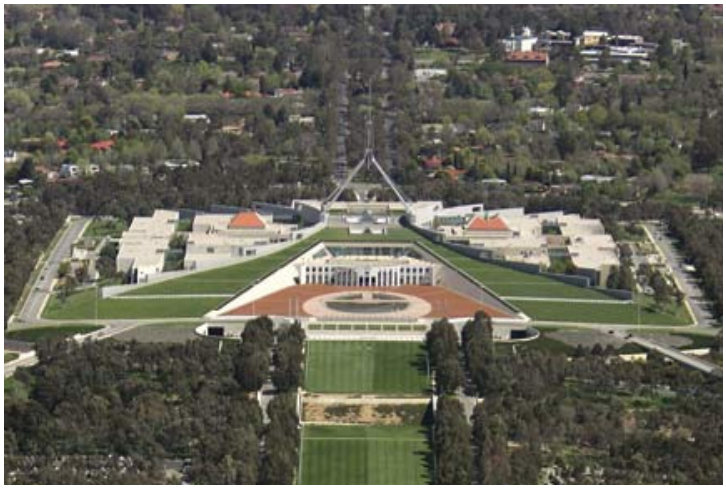
Key Requirements

Modem connectivity
Expandability

dataTaker Data Logging Products

1. Cost effective data logging solutions
2. Capable of measuring and logging DC voltage, current and resistance sources in addition to digital signals
3. Suitable for small to large scale applications
4. Rugged design and construction provides reliable operation under extreme conditions
5. Designed and manufactured in Australia to the highest quality standards





Parliament House: The famous 'green' roof is covered in turf and was designed to blend into the hill and nearby greenery.

dataTaker Solution

Equipment

dataTaker DT500 data logger
Channel Expansion Module (CEM)
Modem

Sensors

Copper and Constantan Thermocouples
Thermocouples
Solid state linear temperature sensor

Implementation Notes

36 copper vs. constantan thermocouples were installed on a prototype roof section on the site in Canberra and monitored for 110 days over summer. The research team located in Melbourne chose the *dataTaker* DT500 data logger to collect the information. Requiring a large built-in memory, ease of programming and ease of connection to a modem, made *dataTaker* DT500 the ideal choice. The DT500 was located in a weatherproof enclosure close to the test patch.

All thermocouples used were made form one batch of wire, five samples were returned to the lab and calibrated separately. The reference temperature for the thermocouple was obtained by measuring the voltage across an LM355 solid state linear temperature sensor, located inside the thermocouple terminal box. The LM335 had in turn been calibrated against a quartz oscillator type digital thermometer. This procedure yields results that are reproducible to better than half a degree.

The voltages registered on all thermocouples and LM335 were measured every 15 seconds, and the temperatures calculated. These readings were then averaged at half-hourly intervals and logged to the *dataTaker's* internal memory.
Every three days the stored data was transferred to a lab computer in Melbourne via modem.