

How we do it

Best monitoring solutions - focused on plant water use, plant water potential and soil moisture management.

Scientific instrumentation developed for scientists by scientists.

ICT International's products are specifically designed to be deployed in rugged field environments, featuring low-power use, wireless communications and internet connection; with firmware and software for detailed and sophisticated measurement and data processing in the field. In this regard they are totally ground-breaking, state of the art and unique. There are no other products on the market today with the same functionality or application. This unique family of digital sensors and data loggers grew out of an R&D innovation program which ICT International commenced in 2006. ICT International committed a large percentage of its annual turnover to the innovation program, which involved product research and design, cutting edge engineering design and active engagement and collaboration with leading scientists in Australia and internationally. ICT International has produced new scientific instrumentation needed by scientists to better understand how plants respond to the ever increasing problem of water shortage in our natural environment. The practical outcome being the accurate measurement of key plant and soil parameters for the advancement of plant and soils research, in order to address plant physiology limitations with regard to water availability, climate change, evaluation of plant genetics/breeding programs and the fundamental understanding of plant function. An environmentally sealed, low-power data logging platform forms the basis of ICT International's technology for environmental monitoring and control applications. The products of ICT International that have all been developed with the data logging platform. [SFM1](#) Sap Flow Meter for continuous monitoring of plant water use. [PSY1](#) Stem Psychrometer for continuous monitoring of plant water potential and leaf water potential. [HFD](#) Heat Field Deformation Sap Flow Meter for measurement of radial sap flow profiles, hydraulic redistribution and hydraulic lift in response to plant water potential gradients. [SFT](#) Sap Flow Tool specialist software for processing and displaying plant water use and hydraulic redistribution. [SMM](#) Soil Moisture Meter for measuring Volumetric Soil Water (%). [STM](#) Soil Tension Meter for measuring Soil Water Potential. [SOM](#) Soil Oxygen Meter for measuring Soil Oxygen Content (%). [AML](#) Advanced Multifunction Logger and the AWS Automatic Weather Station. See www.ictinternational.com for case studies where instruments utilising this logging platform are being deployed from the Arctic permafrost to the Amazon and the deserts of the Middle East. A thorough and detailed understanding of plant response to water and the environment was developed by Dr Peter Cull during his years of working as a scientist and cotton consultant. Subsequent interaction with scientists around the world further developed this understanding. This field experience and the appreciation of its scientific and commercial value has been transferred into instrumentation by engaging with the leading scientists in this field, in Australia and internationally, and with experienced Australian engineers to develop the products. The applications knowledge and experience of ICT International, combined with scientific collaboration, builds solutions that are recognised as the world's best - and hence sought after by leading scientists worldwide. What makes this unique product line innovative? The innovation behind the family of ICT International products is the underlying data logging platform, software, and firmware protocols to interface an extensive sensor library both in terms of measurement parameter and output protocol. The wireless communications protocols allow the user to transmit data locally or internationally across any communications network. This technologically advanced data logging platform has been proven to function in environmental extremes using low-power. The need to measure sensors within a range of both relative and absolute terms, depending upon the fundamental physical property of measurement, is paramount for high accuracy, repeatability and precision. In order to achieve satisfactory levels of resolution, from μV to nanovolt, complex signal processing algorithms are included in on-board sensor microchips, requiring sophisticated output protocols to transmit the data to dedicated all-in-one logging solutions. The data logging solutions eliminate analogue signal noise caused by cable resistance and provide on-board signal conditioning and noise filtering to achieve the highly stable thermal noise conditions under which a measurement requiring nanovolt resolution can be resolved under ambient field conditions. The ICT International data logging platform has been designed to accommodate all levels of sensor design, complexity, and measurement principle, by integrating all input variables from simple analogue millivolt inputs through to complex measurement principles requiring standalone, point of measurement data processing and logging instruments. It can seamlessly synthesise all of them into a single CSV file or MySQL database using a low power, unlicensed wireless protocol and GSM mobile telemetry solution. The competitive innovative advantage of the encapsulated field experience, scientific knowledge and engineering detail has resulted in instruments which are sought by plant scientists worldwide. In fact, the continuous monitoring of plant water potential and leaf water potential, as measured by the PSY1 digital stem psychrometer has been sought by the plant science community for more than 40 years. The ability to measure low flow and reverse flow by the SFM1 digital sap flow meter is a world first and is enabling new discoveries of plant adaption to the environment. Typical research topics include; hydraulic redistribution of water in trees in the Czech Republic; to measuring sap flow to determine water use of the different tree species in the Brazilian Atlantic Rainforest and investigating tree recovery from drought in the USA.

