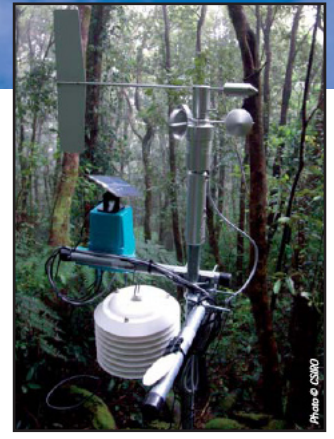


## Datacall<sup>®</sup> Fleck<sup>™</sup>

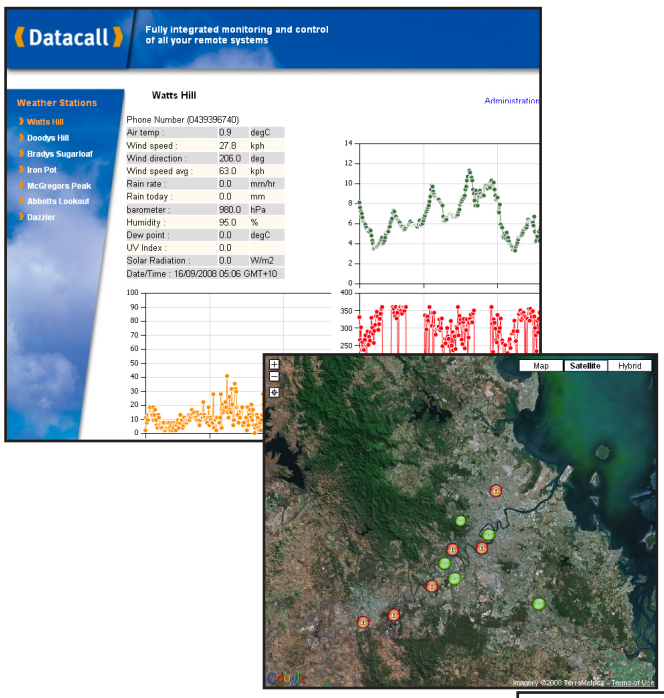


In 2003, the Commonwealth Science and Industrial Research Organisation (CSIRO) recognised a need for an Australian designed wireless sensor network for the future. After many years of use in research vital to three of the flagship research areas Fleck<sup>™</sup> is now being manufactured for commercial use.

The Fleck<sup>™</sup> family of wireless sensor nodes provide high-levels of integration, performance, and reliability. The flexible integration allows for connection of external analogue, digital or RS-232 sensors.

The radio has a range of 700m outdoors using the integrated antenna.

Operate the Fleck<sup>™</sup> family of wireless nodes through the Datacall<sup>™</sup> web application. This online interface provides the ability to view your Wireless Sensor Network on an online map. Integration with Google<sup>™</sup> mapping technology provides you with publicly available satellite imagery for your location.



Fleck<sup>™</sup> has been designed to be self sufficient, running on three AA batteries and powered by its integrated solar panel, the batteries will be constantly charged by sunlight. Additional solar cells or batteries can be integrated.

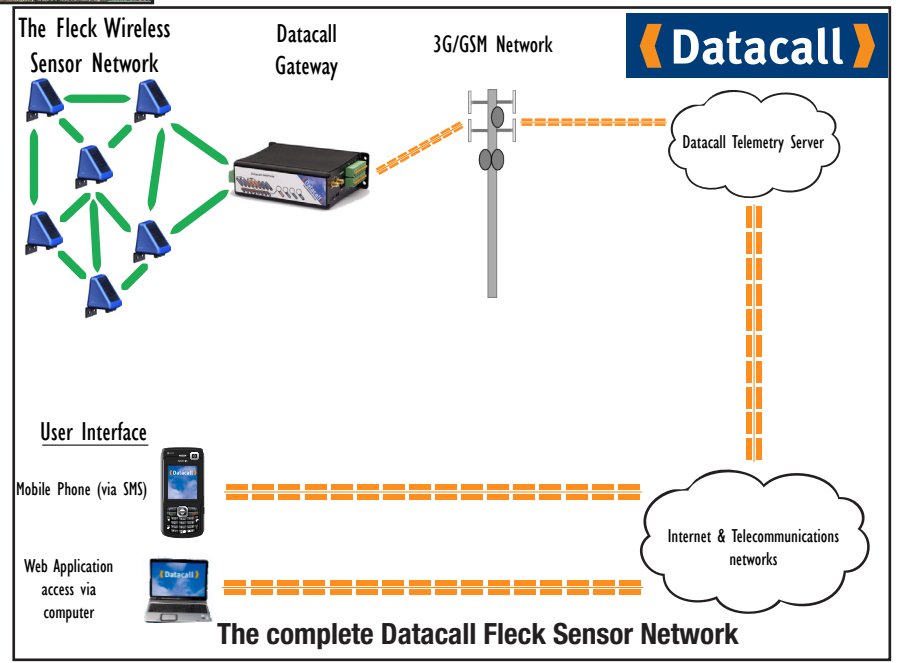
Applications for Fleck<sup>™</sup> and the Datacall<sup>™</sup> Telemetry System are

- Data collection
- Environmental monitoring
  - Frost detection
  - Automated weather stations
  - Agriculture
  - Horticulture and greenhouses
  - Waterways and oceans
  - Tank level monitoring
- Livestock management
- Distributed computing and / or control
- Structural health monitoring
- Water management
- Solar Power Monitoring

The Fleck Sensor Network is based on adhoc wireless mesh networking principles allowing flexibility and rapid installation of the network in the field.

Communication from the Fleck<sup>™</sup> nodes to your location utilises the Datacall<sup>™</sup> Telemetry System, a cellular based communications system.

**For further information:**  
**Phone:** (03) 6229 0588  
**Web:** [www.datacall.net.au](http://www.datacall.net.au)  
**Email:** [sales@datacall.net.au](mailto:sales@datacall.net.au)



A number of daughterboards are currently being developed for integration with the base board. These daughterboards will increase the capabilities of Fleck™ beyond the current development.

Application hardware is being currently developed for:

- Greenhouse environment (PAR, air temperature and humidity)
- Water quality sensor such as pH and conductivity
- Soil analysis (temperature and moisture)
- GPS
- MMC flash card interface

### Soil Analysis - Gypsum block interface

- MEA gypsum block moisture sensor (GBLite)
- Up to 5 x gypsum block sensors
- Sensor inputs are electrically isolated from each other
- 250 Hz AC excitation to prolong sensor life

### Soil temperature sensor

- Analogue Devices precision temperature sensor (AD592)

### Greenhouse interface - Photosynthetically active radiation (PAR)

- CSIRO sensor based on Hamamatsu photodiodes (G1118)
- LI-COR quantum sensor (LI-190)

### Air temperature & humidity

- Sensirion humidity and temperature sensor (SHT15)

### Soil moisture & temperature

- MEA gypsum block moisture sensor (GBLite)
- Analogue Devices precision temperature sensor (AD592)

### Water quality

- pH (ionode IH20)
- Redox (ionode IH30)
- Water Temp
- Conductivity (TPS)
- Across fresh and salty water ranges

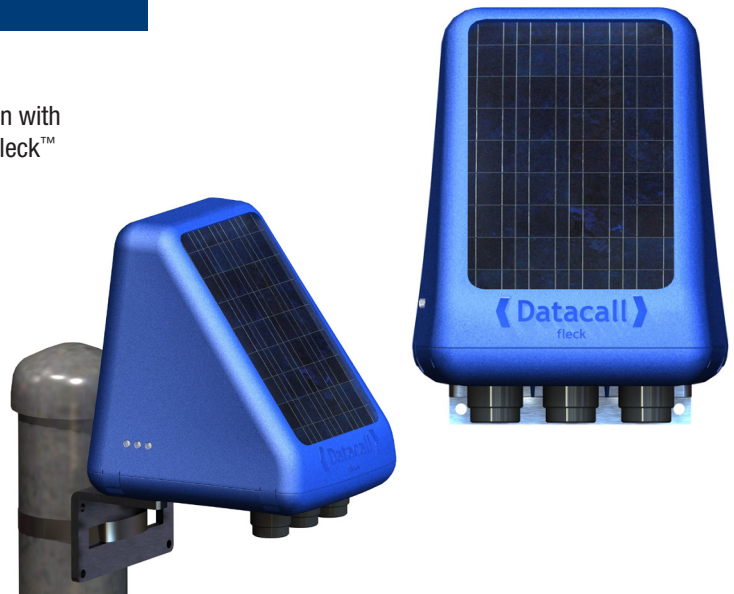
Provides 16bit ADC sampling and functionality of popular industry devices (TPS WP-81)

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### Baseboard Specifications

Processor & Fleck PCB	
Processor Type	Atmel ATmega 1281 Processor
Processor Frequency	8 MHz
Program Memory	128 KB
Data flash memory	1 MB
Configuration EEPROM	4 KB
Serial Communications	1 x RS232 port
Analogue to Digital Converter	3 x 10bit ADCs (0-5V)
Digital Inputs / Outputs	1x pulse counter, 2x inputs, 1x output
Other Interfaces	Stackable expansion boards
Current Draw <sup>1</sup>	5 mA (average)
(sleep mode)	30 $\mu$ A

RF Transceiver	
Frequency band	913 MHz
Receive Sensitivity	-100 dBm
Outdoor Range <sup>2</sup>	700 m
Raw transmit (TX) data rate	72 kbps
Transmit (TX) power	+10 dBm

Electromechanical	
Battery	3 x AA Batteries (NiMH)
External Power	3.5 - 8V
Integrated Solar <sup>3</sup>	900mW
Protection level	IP65
User Interface	Visual web application, 3 x LEDs
Dimensions	108(W)x118(L)x142(D)

<sup>1</sup> Current usage is highly dependant on application.

<sup>2</sup> Range is dependant on environment

<sup>3</sup> Standalone power system maintains batteries