WEATHER MONITORING

APPLICATION BACKGROUND

The World Meteorological Organisation (WMO) guideline no.8 defines the measurement requirements for weather stations. The WMO also defines stringent measurement requirements for a standards compliance weather station, called a Tier 1 weather station. For example, the WMO specifies that all wind measurements must be made at a height of 10 metres, which makes the installation inconvenient.

General purpose weather stations, which do not fully comply with the WMO guidelines, are called Tier 2 weather stations. For Tier 2 weather stations some compromises were made for convenience. For instance, wind speed and direction may be measured at a height of 2 metres rather than specified 10 metres.

As a general rule, weather authorities may have a base set of Tier 1 weather stations which are quite expensive, and they also have a second set of Tier 2 weather stations to supplement measurements, or may be used on a short term / project by project basis. For special purposes, for example a mine site / port facility would typically install a Tier 2 weather station, rather than a fully compliant Tier 1 weather station.

There are also some consumer grade / hobby store weather stations which may provide interesting and inaccurate weather data to home users however these are usually not calibrated and the data cannot be relied on.

APPLICATION DETAIL

Unidata's Weather Stations have a broad range of applications depending on your choice of configuration and instruments.

When considering a weather station purchase, most customers will decide to set up a Tier 2 weather station. Customers then have the choice of using a specialised instrument for each measured parameter or a modern multi parameter instrument, like Vaisala WTX536 weather transmitter or Lufft WS800-UMB smart weather sensor.

Modern multi parameter weather stations use ultrasonic technology and are very convenient to install and maintain as they do not have moving parts. Please see a typical parameter list from the 6501V Vaisala Weather Transmitter below:

1.   Wind Speed - Average

2.   Wind Speed - Maximum (Gust)

3.   Wind Speed - Minimum

4.   Wind Direction - Average

5.   Wind Direction - Maximum

6.   Wind Direction - Minimum

7.   Rainfall

8.   Rain Duration

9.   Rain Intensity

10. Hail

11. Hail Duration

12. Hail Intensity

13. Barometric Pressure

14. Air Temperature

15. Relative Humidity

16-23. Derived channels - e.g. running totals, min max average
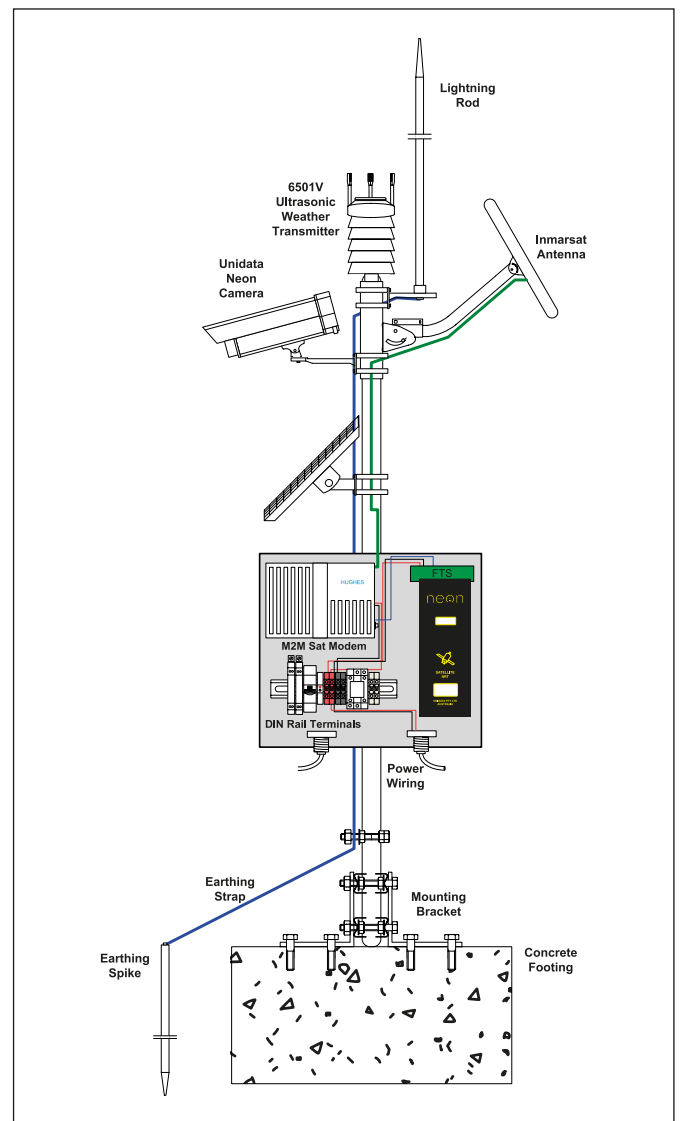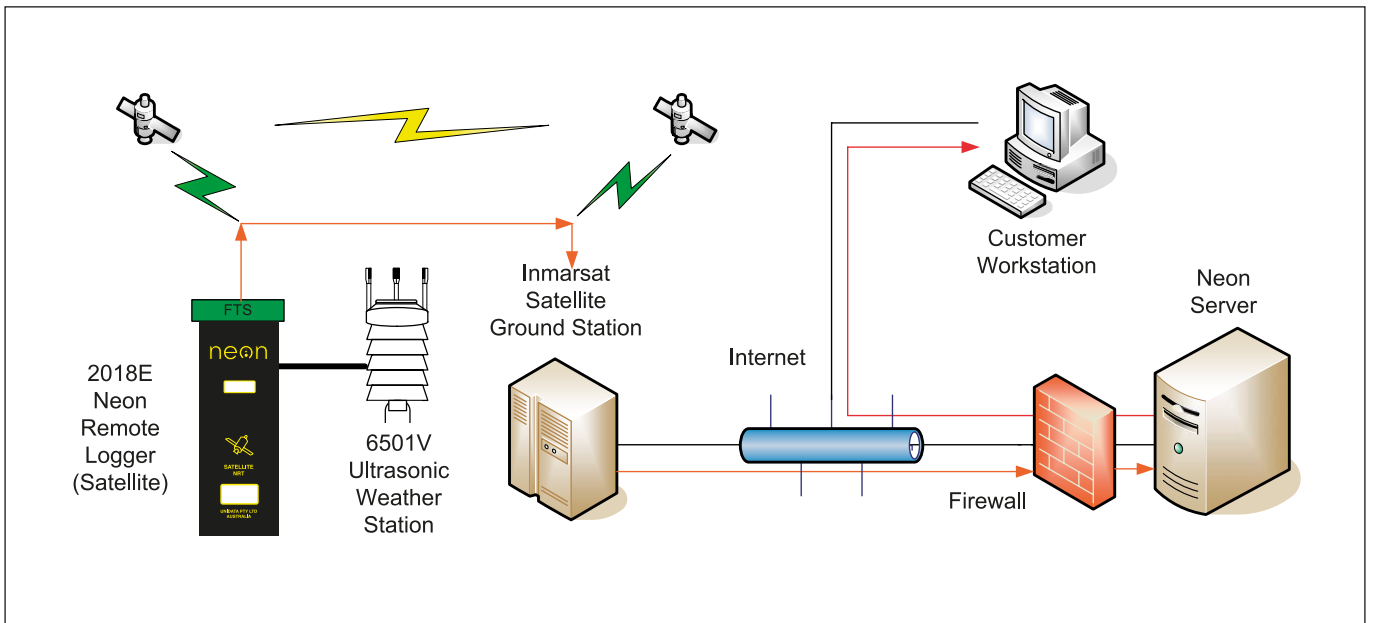
One of our simplest weather stations consists of a temperature and humidity sensor mounted in a double louvred radiation screen and connected to a Neon Remote Logger that is mounted in a weatherproof enclosure.

A weather station more often required, includes instruments that enable you to monitor and record temperature, relative humidity, global solar radiation, wind speed and direction. These instruments are then integrated with Neon Remote Logger. Neon Remote Logger will measure, store and transfer weather data using either cellular, LoRa or various satellite networks. Collected data is sent to a central Neon server to be analysed and displayed on a standard web browser.

Below are some examples of typical weather station screen displays from the Neon Application Software.
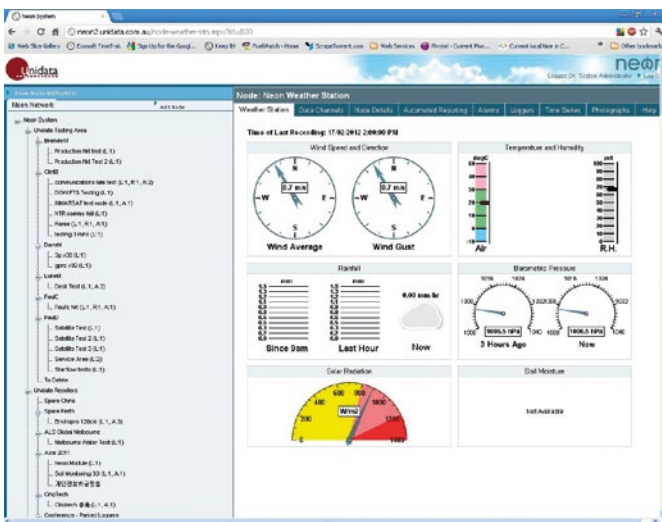
Installing telemetry enabled datalogger reduces the need for time consuming site visits and gives assurance that the weather station is continuing to operate correctly without the need for a site visit.

Other aspects to consider, when designing weather stations, are instrument enclosures, mounting and external power supply.

Unidata offers a wide range of weather proof, UV stable, IP67 or higher rated enclosures that come with weather proof connectors which allow for simple plug and play weather station installation.

Typically, our customers choose to mount weather station enclosure and instruments on a fixed pole but we can also supply a pole with a tripod base for installations that will not be permanent.

Remember that the instruments you add to weather stations increase the power burden. Solar panel, battery and solar regulator power system is regarded an essential part of Unidata weather stations. Any other form of external power that is available on the site can easily be integrated as well.
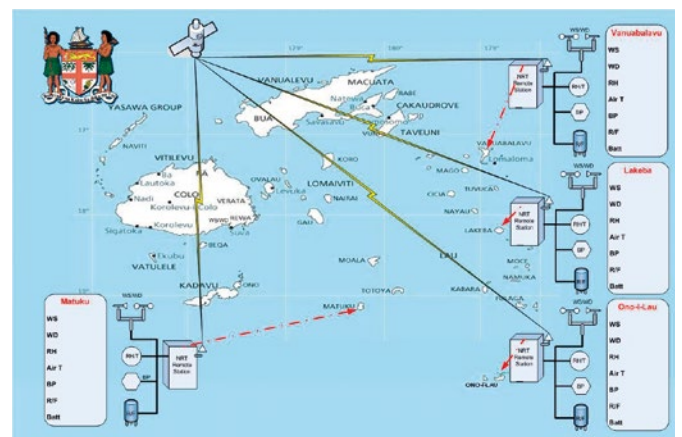
TYPICAL CONFIGURATION

APPLICATION SPECIFIC INSTRUMENTS/INPUTS

Options	Unidata Part Number	Description
WXT536 measures barometric pressure, humidity, precipitation, temperature, wind speed & direction	6501V-H	Vaisala Weather Transmitter RS232/422/485 SDI-12
Temperature Thermistor Probes	6507E	Red Thermistor Probe 3K@25 with requested cable lengths
Linear Temperature Probe	6535A	Temperature Probe LM34 with requested cable lengths
Humidity and Temperature Probe	6539B	Humidity & Temp Probe (5-18V)
Rain Gauge	6506C	Rain Gauge / Tipping Bucket
Mounting Arrangement for Temp Probes	6704A/B	Radiation Gill Screen & Mount
Radiation sensors	7241C-A	Pyranometer Sensor High Output - Apogee
Radiation sensors	7241C-E	Pyranometer Sensor High Output - EKO Instruments
Radiation sensors	7241B	Pyranometer Sensor-PAR sensor, 350 to 750nm
Mounting Arrangement for Pyranometers	7241M	Pyranometer Sensor Instrument Mounting & U Bolts

NEON TELEMETRY - NRL / RTU / FIELD UNITS

Options	Unidata Part Number	Description
Ethernet	3016A-000 / 3008A-000	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Ethernet & 3G/4G	3016A-C00 / 3008A-C00	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Ethernet & 3G/4G and LoRa	3016A-CL0 / 3008A-CL0	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Equatorial Orbit Satellite-Inmarsat	3016A-00I / 3008A-00I	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Equatorial Orbit Satellite-Inmarsat & 3G/4G	3016A-C0I / 3008A-C0I	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Low Earth Orbit Satellite - Globalstar	3016A-00G / 3008A-00G	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Satellite - Iridium Short Burst Data	3016A-00R / 3008A-00R	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Standalone RTU/NRL - Industrial	3004A-00 / 3004A-0L	Neon Remote Logger-4 Analog Ch with or without Touch Screen Display
Cellular RTU/NRL 3G/4G - Industrial	3004AC0 / 3004A-CL	Neon Remote Logger-4 Analog Ch with or without Touch Screen Display
M – Series Standalone RTU/NRL	3004A-M000 / 3004A-M0B0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series Cellular RTU/NRL 3G/4G	3004A-MC00 / 3004A-MCB0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series LoRa RTU/NRL	3004A-ML00 / 3004A-MLB0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series Ethernet RTU/NRL	3004A-MEBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional
M – Series Microsatellite RTU/NRL	3004A-MHBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional
M – Series Iridium Short Burst Data RTU/NRL	3004A-MIBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional

NEON APPLICATION SOFTWARE - CUSTOMER SERVER

Options	Unidata Part Number	Description
Neon Applications Software	2302A	Neon Server Software Licence Incl 5 NAL
Neon Applications Software	2302A-10	Additional 10 NRT Access Licence
Neon Applications Software	2302A-20	Additional 20 NRT Access Licence
Neon Applications Software	2302A-50	Additional 50 NRT Access Licence

NEON HOSTING SERVICE - UNIDATA SERVER

Options	Unidata Part Number	Description
Neon Hosting Service	2301A	Neon Data Initial Subscription Setup Fee
Neon Hosting Service	2301A-01	Neon Data Service Fee for 1-50 NRT
Neon Hosting Service	2301A-02	Neon Data Service Fee for 51-100 NRT
Neon Hosting Service	2301A-10	Neon Data Service Fee Metering

DATALOGGER MANAGEMENT SOFTWARE

Options	Unidata Part Number	Description
Starlog V4 Management Software	6308A-AUE	STARLOG V4 Full Licence Key

AVAILABLE FROM: **Unidata Pty Ltd** | 40 Ladner Street, O'Connor, 6163 Western Australia | Tel: +61 8 9331 8600 | info@unidata.com.au

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