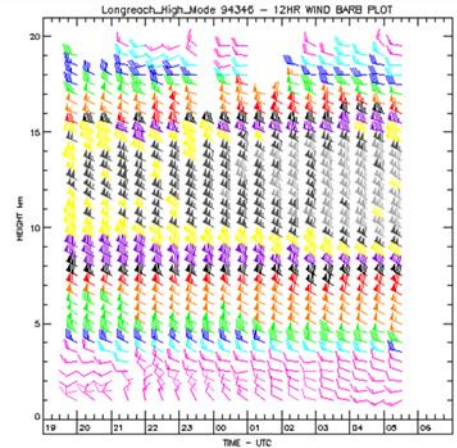


ATRAD wind profilers provide a highly cost-effective solution with a very low total cost of ownership. Ongoing maintenance requirements are minimal, operation is unattended and there are no recurring consumable costs. BUFR output is provided for easy data assimilation. Any number of radars may be remotely controlled from a central location. ATRAD has provided more than 20 STP radars or major radar sub-systems, the latest 4 of which are operational radars for the Australian Bureau of Meteorology. The UK Met Office also runs an ATRAD STP radar at South Uist.

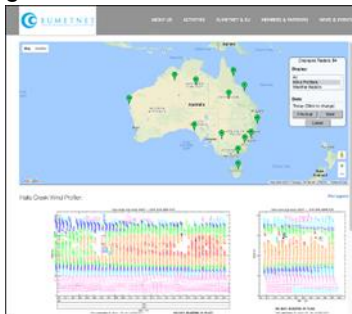


(Above) The Tennant Creek STP, alongside the weather watch radar. The STP system is an 80-kW peak power, 144 Yagi antenna array, single receive channel radar, which operates in DBS mode. The antenna array covers an area of 40m x 40m. Data are provided by a 30-min BUFR data stream for weather forecasting and numerical weather model assimilation. Higher resolution data are available for basic research purposes



(Above) Typical wind results from 12-h of operation of the Longreach STP. Plot from the EUMETNET site (<http://eumetnet.eu/activities/observations-programme/current-activities/e-profile/radar-wind-profilers/>)

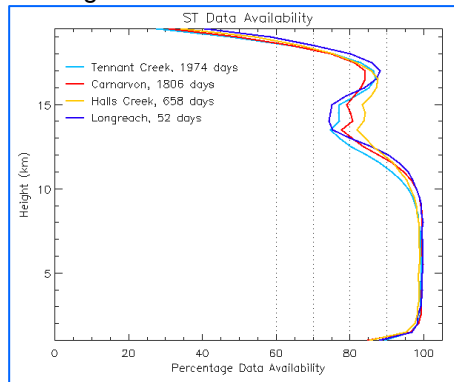
The ATRAD STP uses Doppler Beam Steering (DBS) techniques to provide real-time vertical profiles of horizontal wind speed and direction at heights of up to 20 km above ground level.



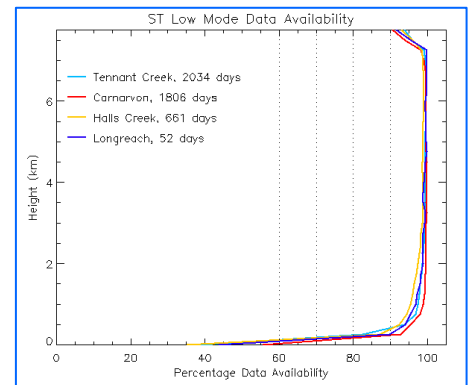
(Above) ATRAD Windprofilers in Australia. (see the EUMETNET site).

KEY FEATURES

- Typical sampling range 0.3–20 km
- Real-time Wind Profiles
- Doppler Beam Steering (DBS) Operation
- BUFR output for easy data assimilation
- Unaffected by tropical conditions, precipitation and bird or insect migrations
- Remote monitoring and control
- Adopted by the Australian Bureau of Meteorology
- Low operating costs
- Fully automated
- Unattended operation
- **5-year warranty on power amplifiers**
- Extremely reliable



(Above) Data availability in high mode for the 4 STP radars in the Australian Wind Profiler Network with 500-m range resolution. The radars are situated in northern Australia, and subject to monsoonal conditions. Their performance has been validated against several hundred (collocated) radiosonde launches.



(Above) Data availability in low mode for the 4 STP radars in the Australian Wind Profiler Network with 250-m range resolution. The radars provide winds from 500-m to 20 km with excellent (50 % or greater) data availability.

APPLICATIONS

- Alternative to meteorological balloon stations
- Synoptic and mesoscale analysis and forecasting
- Climate change research
- Rocket and artillery range support

Transceiver (Digital receiver)



Transmitter (80 kW transmitter + beam steering the 3 racks on left)



Antenna Array (View of Yagi antennas and feeds)



General Description

16-bit Digital Transceiver incorporating receiver and exciter

Solid-state, modular transmitter, expandable in 20 kW increments

Doppler Beam Steering Array

Specifications

Receiver: Single channel, 16-bit

Exciter: Single channel, 16-bit

Typical Sounding Range: 300-20000 m

Range Resolution: 100 – 4,000 m (software selectable)

Range Gates: Up to 6,000

Operating Modes: Doppler Beam Steering

Remote access: Remote monitoring and control via satellite, 3G/4G, ethernet or dialup.

Frequency: 55 MHz (Fixed at factory. 30-65 MHz available)

Transmitter Power: 80 kW (other powers available)

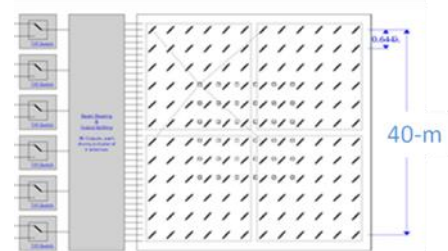
Combiner Method: Transmitter module outputs combined and then split; provides improved phase matching and allows for graceful degradation.

Transmit/Receive

Switching: T/R Switches integrated in combiner/splitter unit

AC Mains Power: 220-240V AC or 110-120V AC, 3-Phase

Array Configuration:



Antenna Array Configuration: 144 3-element Yagi antennas arranged in a 12 x 12 square array

Antenna Array Footprint: Frequency dependent (~ 40 m x 40 m at 55 MHz)

Beam steering:

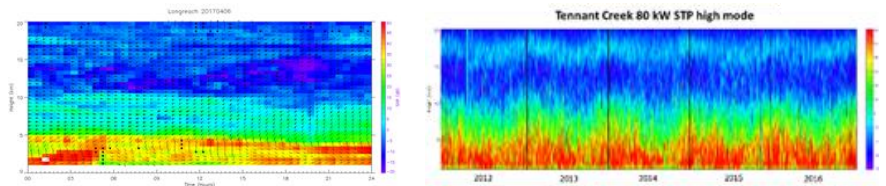
- Four 15° off-zenith beams in NESW directions + vertical beam
- Relay-switched phase delays

Display and Analysis Software

QC: modified Weber and Wuertz (see Dolman, B.K. and I.M. Reid (2014), <http://dx.doi.org/10.1016/j.iastp.2014.02.009i>)



Data output: Wind barb, wind field, wind profile, signal-to-noise ratio (SNR), power



(Left) One day of wind observations from the Longreach STP with overplotted wind barbs, and 5 years of SNRs from the Tennant Creek STP

Data Output Formats: BUFR, AtrRAD Data Format (ADF), user requested

Options

GPS Reference

Antenna Guying

Precipitation Software

Turbulence Software

Tropopause Software

UPS

GPS disciplined oscillator (GPSDO) / GPS locked time and frequency
For high-wind locations (> 20m/s)

Measure rain rate

Estimate of turbulence intensity

Measure the height of the radar tropopause

Uninterruptible Power Supply