**Fulcrum3D Sodar**

**Specifications**

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**design parameters**

- **Phased array:** 3 phased arrays each with 37 Piezoelectric transducers. 100% acoustic fill factor
- **Number of sound beams:** 1 beam per array, 3 beams total. Single beam or simultaneous multi-beam sampling
- **Sound beam tilt:** Physically set at 9° and 12.7° from vertical. Beam tilt independent of frequency and temperature
- **Sound beam frequency:** Range 3.5 – 7.5kHz, nominally 5kHz. Simultaneously sampled beams separated by 500Hz
- **Sound level:** <90dBA at 10m, <70dBA at 50m

**data capture and storage**

- **Sampling rate:** Nominally 2 seconds between pulses
- **Integration time:** Adjustable, default 10 minutes
- **Data upload:** Every 10 minutes (3G/4G/GSM systems)
- **Memory storage:** 32 GB Micro SD card records a minimum of 6 months full noise and signal data. Expandable to 128GB

**wind measurements**

- **Measurement range:** 40 - 200m in 10m height bands centred on nominal height (40, 50m...), user defined heights available within this range.
- **Measurement accuracy:** Typical correlation coefficient >0.98 and <2% bias compared to mast (dependent on site conditions)
- **Horizontal wind speed:** 0 to 40m/s, resolution 0.01m/s
- **Horizontal wind direction:** 0 to 360°, resolution 0.1°
- **Inflow angle / Vertical wind speed:** -20 to +20°, resolution 0.1°; -8.0 to +8.0 m/s, resolution 0.01 m/s
- **Fixed echo removal:** Automatic for wind speeds > 2m/s

**additional sensors**

- **GPS output:** Location (WGS 84) <5m RMS horizontal position accuracy. Altitude (m)
- **Temperature:** Naturally aspirated radiation shield, -40°C to +60°C range with ±0.6°C accuracy
- **Humidity:** ±3% between 10% to 90%, ±5% between 0% to 100%
- **Hardware support:** 1x RS232/422/485, 1x USB, 1x Ethernet

**power and communications**

- **Average power consumption:** 15W operating (single beam sampling) 25W operating (multi-beam sampling)
- **Power supply:** Standard: 1 x 220W solar panel and 3 x 12V 120AH AGM batteries providing in excess of 7 days storage. Optional: Solar expansion pack available for low insolation areas; Mains power supply kit; Fuel cell power kit.
- **Communications:** 3G/4G/GPRS/GSM Optional: Satellite/Wi-Fi/Ethernet

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**environmental conditions**

- **Operating temperature:** Standard: -10° to 50°C. Cold Climate version: -30° to 50°C
- **Lightning protection:** Multi-strike lightning protection fitted to communications equipment. All chassis wiring has transient voltage suppressors, all instruments chassis grounded.
- **Applicable standards:**
  - AS 4086.2:1997: Secondary batteries for use with stand-alone power systems - Installation and maintenance
  - AS 1319:1994: Safety signs for the occupational environment
  - AS/NZS 5033:2005: Installation of photovoltaic (PV) arrays
  - AS/NZS 3000:2007: Electrical installations (known as the Australian/New Zealand Wiring Rules)

**transportation**

- **Dimensions:** Skid mounted: 1000 x 2600 x 1500 mm fully assembled. Trailer mounted: Fits in standard 7’x4’ trailer for transport.
- **Weight:** ~400kg including battery, solar panels and skids (skid mount, excluding trailer)
- **Material:** Marine grade aluminium, resin encased rock-wool acoustic insulation.
- **Transportation:** 7’x4’ trailer with stabilising anchors. Five Fulcrum3D FS1 skid mounted units fit in a standard 20’ shipping container.

**configurations**

- **Standard configuration:** Skid mounted SODAR installed in 7’x4’ box trailer with stabilising anchors. 220W/360Ah solar power supply. Installation tool kit
- **Cold climate version:** 660W/360Ah upgraded solar power supply. Battery heating, thermal management and snow melt capability. 45 / 110 W fuel cell power supply options
- **Options:** Additional sensors (e.g. pressure, rain gauge, solar radiation, pyranometer etc) Solar expansion pack (to 660W) Mains power supply kit. Satellite / WiFi / Ethernet communications

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**Notes:**

1. NIST traceable and NATA calibrated sensors available on request.
2. Actual performance of instrument depends on local atmospheric conditions.
3. These specifications may change without notice.