




Finance Grade Performance

Industry's most validated lidar

Overview

The ZephIR 300, industry's most validated wind lidar, is a ground based, continuous-wave lidar system that provides wind measurements across ten user-defined heights from 10 m to 200 m. The ZephIR 300 has become widely accepted for wind resource assessment, site classification and micro-siting, power performance testing, and operational assessment.

The ZephIR 300 can be synchronized with a hub height meteorological mast or short mast (annex L) during wind turbine power performance testing. A communications package is available for connecting to a datalogger for met and power measurement synchronization as well as to facilitate regional cellular support.

Benefits and Features

- › DNV GL Stage 3 approved finance-grade data in non-complex terrain
- › Natural-power-approved, finance-grade data in complex terrain
- › Performance verification at IEC compliant site
- › Proven extreme operation from -40° to $+50^{\circ}\text{C}$ across 650+ lidar deployments globally
- › True 1 second and averaged 10 minute wind direction, horizontal, and wind speed
- › No annual servicing or annual calibration, 2 year warranty



Description

The ZephIR 300 delivers measurements at heights across the entire rotor-swept area, confirming hub-height resource as well as wind shear, veer and turbulence across the rotor-reducing shear extrapolation bias and uncertainty.

The ZephIR 300 is re-deployable, portable and does not require lengthy planning applications before installation. Data can be col-

lected at multiple points on a site to provide representative measured data for all turbine locations and tuning points for flow models.

SCADA integration is made simple by combining the ZephIR 300 with a Campbell Scientific communications package or by direct Ethernet connection via Modbus.

Measurement Technique

The ZephIR 300 is a coherent lidar system that uses continuous wave technology. Constant sensitivity and 50 measurements at

each height ensures high data availability at each height and in all conditions, even at sites with very clear air or complex terrain.



Communications

The ZephIR 300 has multiple communications options, giving users the flexibility necessary to integrate the ZephIR 300 into their specific applications. Standard in every ZephIR 300 is a built-in Wi-Fi. Users can connect over this Wi-Fi network with their laptops for initial setup, configuration, or data collection.

The ZephIR 300 supports TCP/IP communications and comes standard with an Ethernet port for applications where the ZephIR 300 can be connected to a local network for data collection, or for connection to an external modem.

A Campbell Scientific communications package is available for connecting to a datalogger for met and power measurement synchronization, as well as to facilitate local area cellular support.

ZephIR 300 and Campbell Scientific Dataloggers

Campbell Scientific dataloggers, including the CR6, CR800, CR1000, or CR3000, can be used to integrate and synchronize ZephIR 300 lidar data with data from other instruments, such as instrumentation on a meteorological tower. Using a Campbell Scientific datalogger to gather data from the ZephIR 300 also enables integrated tower and lidar data collection through a

The ZephIR 300 also supports the Modbus protocol, making it compatible with existing SCADA systems on operational wind farms.

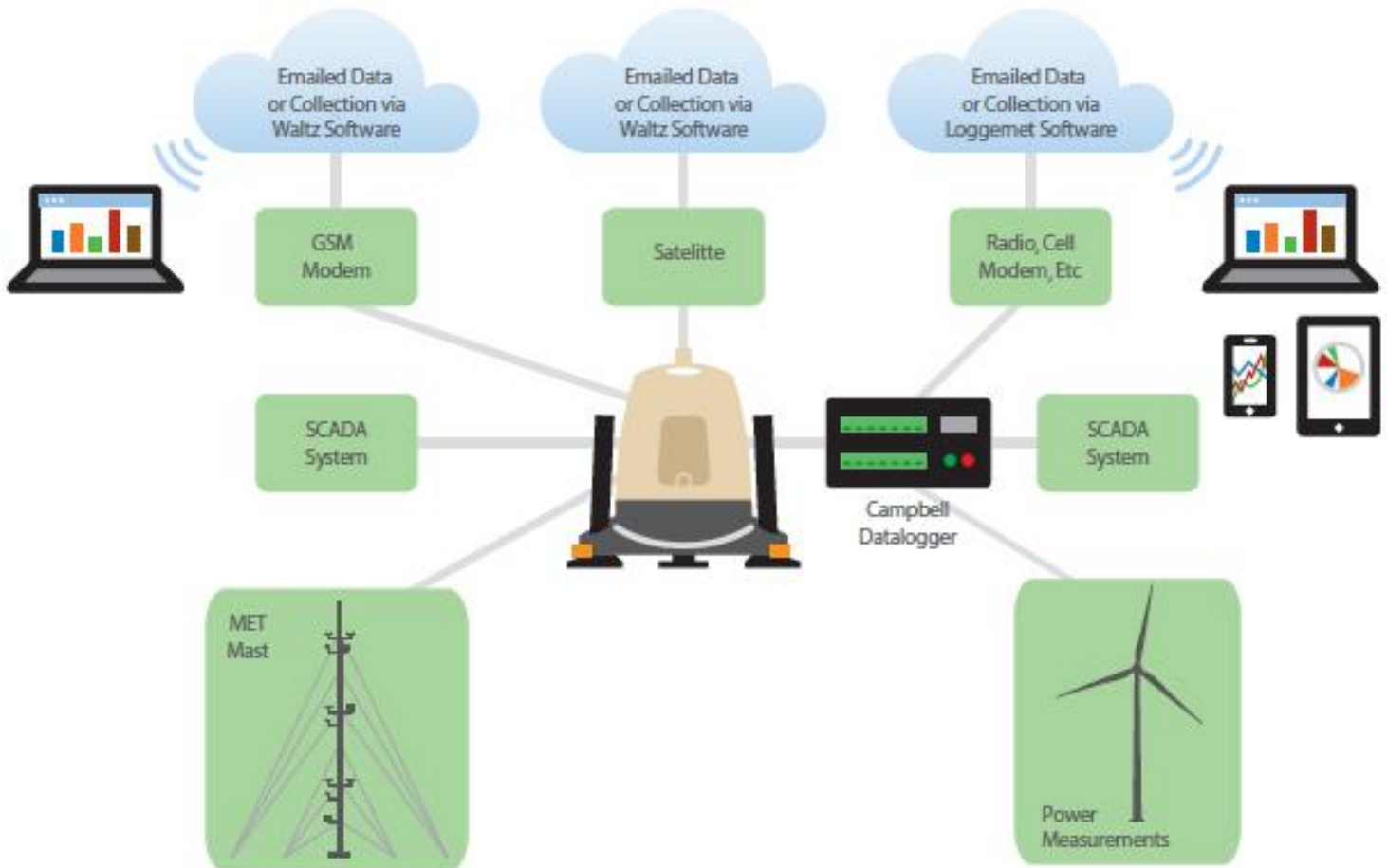
Data Retrieval Methods/Protocols:

- › Waltz Software
- › Modbus

Data Retrieval Methods when Routed through Campbell Datalogger:

- › Loggernet
- › Modbus
- › FTP(S)
- › Pakbus
- › DNP3
- › XML/JSON

single gateway via an external cell phone modem, radio, or direct connection. Campbell Scientific dataloggers support multiple protocols such as Modbus, Pakbus, DNP3, XML, JSON, FTP(S), HTTP, and many other M2M protocols, giving users maximum flexibility and customization of data retrieval methods.



ZephIR 300M

The ZephIR 300M is fully-marine version of the ZephIR 300, designed specifically for offshore fixed platform measurement campaigns. Rugged housing, marine grade connectors, stainless steel framing, silicone wiper blade, and IP68 rated.

Campbell Scientific offers a modified ZephIR 300M for operation in Class 1, Division 2 environments.



ZephIR DM

The ZephIR DM is a turbine-mounted lidar, used on operational wind farms to assess turbine performance and highlight the potential production increases or O&M strategy refinements to extend turbine life or reduce wind farm operating costs. Yaw misalignment and other sensor calibration issues can be detected.

Combined with a Campbell Scientific Communications Package allows for MET tower synchronization over RF or Ethernet.



ZephIR 300 Specifications

Operations

- › Temperature Range: -40° to +50°C
- › Power Consumption: 69 W
- › Input Power Range: 9.5 to 13.5 Vdc or 90 to 264 Vac
- › Weight: 55 kg (121.3 lb)

Performance

- › Measurement Height Range: 10 m to 200 m (33 ft to 656 ft)
- › Number of Measurement Heights: 10, user configurable
- › Sampling Rate: 50 Hz
- › Averaging Period: 1 second upwards (user configurable)
- › Scanning Cone Angle: 30°
- › Wind Speed Accuracy: <0.5% (as measured against a calibrated moving target)
- › Wind Speed Range: < 1 m/s to 70 m/s
- › Wind Direction Accuracy: < 0.5°

Probe Length

- › At 10 m (33 ft) measurement height: 0.07 m (0.23 ft)
- › At 100 m (328 ft) measurement height: 7.70 m (25.26 ft)

Data

- › 10 minute Averaged Data: 80 kB/day
- › 3 second Data: 3 MB/day

Safety

- › Laser Classification: Class 1
- › Eye Safety Standard: IEC 60825-1
- › IP Rating: IP67 (excludes external fans)

EMC Compliance

- › EEN55022 Class A, EN61326 Industrial
- › FCC Radiated and Conducted Emissions

