WIND POWER | WEATHER & CLIMATE | AVIATION WEATHER | AIR QUALITY & INDUSTRIAL RISK

WINDCUBE® 100s/200s/400s

Wind & Aerosol 3D Scanning Doppler LIDAR

- SEVERE WEATHER
- AEROSOL TRANSPORT
- PBL STRUCTURE & DYNAMICS
- INDUSTRIAL SAFETY

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WINDCUBE® 100S/200S/400S

3D monitoring of wind, clouds and aerosols in real-time

The WINDCUBE 3D scanning Doppler LIDAR is a versatile tool for recovering accurate real-time wind and aerosol backscatter measurements in any scanning geometry up to 10km. An innovative structure detection algorithm offers the capability to detect and locate clouds and aerosol layers in the troposphere, as well as to monitor the height of the Planetary Boundary Layer (PBL).

Modern meteorology requires advanced remote sensors

Increasing awareness of various weather phenomena and their impacts on populations and economies emphasizes the need for more accurate weather observations. Combined with high resolution Numerical Weather Prediction models and large scale radar and satellite observations, ground based Doppler LIDAR networks can help for a better management of natural disasters. Doppler LIDARs provide wind measurements with unmatched temporal and spatial resolution.

Recent atmospheric hazard events, such as volcanic eruptions, haze and smoke from forest fires emphasized the need to detect, locate and monitor upper clouds and aerosol layers from the ground up to commercial flight levels in order to ensure airspace safety and mitigate the impact of dramatic pollution events. Doppler LIDARs have the double advantage of detecting pollutants travelling in the troposphere (volcanic ashes, smoke, dust, e.g.) and collecting information on their dynamics.

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Scanning the atmosphere with LIDAR technology

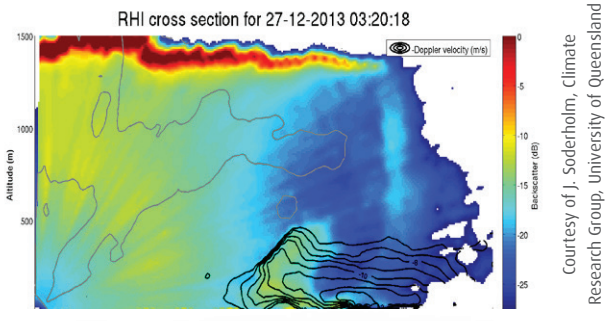
Courtesy of NCAR

The scanning WINDCUBE family is based on LEOSPHERE's coherent pulsed Doppler technology widely used in short range wind profilers for Wind Energy. Based on optical fiber technology, WINDCUBE Scanning LIDARs are designed to run unattended and meet extreme operational requirements.

The scanning WINDCUBE family incorporates a fast endless rotation scanner head that enables capture of highly turbulent local phenomena or scans of a wide area at a high frequency. The embedded software provides with versatile LIDAR configuration possibilities and flexible scanning scenarios to cover a wide variety of applications.

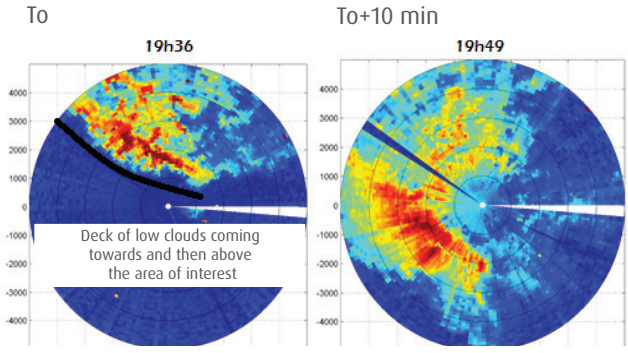
Accurate wind measurement, cloud and aerosol detection

High resolution atmospheric dynamics monitoring



WINDCUBE 100S RHI cross section of a thunderstorm gust front
Ipswich region, Queensland, Australia (Dec. 27th. 2013)

Atmospheric structures monitoring



WINDCUBE 200S full PPI at low elevation
Relative attenuated backscatter measurement

PERFORMANCE & MEASUREMENT PARAMETERS

Maximum wind, cloud and aerosol detection range	14km
Typical Wind measurement range*	• WINCUBE 100S: 3km (100m resolution, 1s accumulation time) • WINDCUBE 200S: 6km (100m resolution, 1s accumulation time) • WINDCUBE 400S: 10km (200m resolution, 1s accumulation time)
Wind velocity range	LOS velocity from -30m/s to +30m/s (PPI, RHI, LOS scenarios) Horizontal wind speed range in DBS** mode depends on elevation angle
Precision of velocity measurements	Better than 0.5m/s
Accumulation time	0.5 to 10s (1s is standard)
Physical range resolution	• WINDCUBE 100S/200S: 25, 50, 75, 100m • WINDCUBE 400S: 75, 100, 150, 200m Up to 320 range gates can be configured individually, with a possible overlap of range gates down to 1m
Output data	• Radial wind velocity and Doppler spectrum broadering • Carrier-to-Noise Ratio (CNR) • 3D wind components (DBS scenario)
Options	• Backscatter profile, cloud and aerosol detection, PBL height • Local meteorological conditions with optional TPH sensor • Additional data and displays with optional Rainbow® 5 license

* The measurement range depends on various parameters such as accumulation time, physical data and display resolution, scanner rotation speed and atmospheric conditions.

** Consisting in 1 vertical LOS and 4 fixed LOS pointing at cardinal directions (with a user programmable elevation angle).

SCANNING FEATURES

Scanning patterns	PPI (Plan Position Indicator) RHI (Range Height Indicator) DBS (Doppler Beam Swinging)** Fixed LOS (Line of Sight)
Scanning angles	Azimuth: 0 to 360° (with 0.01° increment) Elevation: -10° to 90° (with 0.01° increment) Endless rotation
Scanning speed	Up to 30°/s (increment of 0.01°/s) User programmable
Scanning modes	Endless loop User defined scenarios scheduler

HARDWARE

Laser Source	Pulsed laser @ 1.54µm Eye safety: Class 1M (compliant with IEC/EN60825-1 and ANSI-Z136.1-2007)
Outdoor conditions	• IP65 (dust and splash water resistant) • Operating ambient temperature range: -25°C to 45°C (-13°F to 113°F) • Operating humidity: 10% to 100% • Resistant to salty environment (ISO 9227)
Dimensions	(L-W-H) (mm): 1008 x 814 x 1365
Power Consumption	500 W to 1600 W

- 3D Wind measurement up to 10km
- Automatic PBL height, cloud ans aerosol detection
- Versatile and user friendly configuration
- Supported by Meteorological Data Processing software Rainbow®5

For further information about

WINDCUBE® 100s/200s/400s

please contact us: info@leosphere.com

www.leosphere.com

LEOSPHERE is a world leader in LIDAR (laser radar) atmospheric remote observations. The company develops, sells and services new turnkey remote-sensing instruments allowing wind measurement and aerosol (ice, ash, dust, smoke) characterization.

LEOSPHERE has deployed several hundreds of LIDARs throughout the world in severe environments with the same concern of reliability, reduction of operational costs for clients, and dedication to atmospheric hazards control.

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