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WindCube Scan – 3D scanning Doppler lidar

Long-range, fully flexible wind and aerosol backscatter measurements for air quality monitoring and forecasts

Weather has a direct effect on air quality, and local wind and atmospheric boundary layer (ABL) dynamics are major factors influencing pollution dispersion. The WindCube® Scan series of 3D Doppler lidars provide air quality forecasters with long-range, accurate wind and aerosol backscatter measurements to improve situational awareness of pollutant levels, their travel and their danger to communities.

An accurate understanding of ABL fluctuations provides excellent awareness of pollutant levels. Wind assessment shows the transport of pollutants by wind, local-level recirculation and horizontal dispersion. These factors often drive the dispersion of pollutants, and accurate wind and boundary layer assessments can reduce uncertainty and enable better decision-making.

WindCube Scan performs 24/7, real-time wind and aerosol measurements and high-level data processing. It is a versatile tool for recovering accurate wind and aerosol backscatter measurements in any scanning geometry up to 3km, 6km, or 10km (depending on model).

The state-of-the-art structure detection algorithm offers the capability to detect, locate and classify clouds and aerosol layers in the troposphere, as well as to monitor the height of the ABL. WindCube Scan enables aerosol/dust backscatter profile processing which is also useful for ports, mines and other industrial centers that generate substantial particulate emissions that are carried by the wind in hard-to-predict ways.

Key benefits

Unrivaled situational awareness
Accurate simultaneous wind, boundary layer, clouds and aerosol backscatter measurements — creating a full, essential picture of both atmospheric boundary layer and wind conditions.

Full flexibility
Full 3D scanning with typical ranges up to 10km and multiple scanning patterns that can be tailored for many campaign types: monitoring, atmospheric cross sectioning, wind profiling, and more.

At-a-glance insights
Flexible data management through API requests, FTP server communication or a user-friendly and robust interface.

Easy and reliable operation
Reliable and robust with an onsite maintenance program for high uptime and long lifetime. Can be installed in urban and industrial areas, and moved and repurposed to support different projects.

Supported by the industry leader
Vaisala's decades of experience, scientific leadership and industry standard support services ensure you get the most from your equipment over its full life span.

WindCube Scan at a glance

Applications

- Urban air quality monitoring and forecasting
- Industrial emissions monitoring
- Boundary layer profiling for air quality observation networks
- Weather monitoring and decision support
- Atmospheric sciences and air quality research

Specifications

Wind data provided	Wind speed, wind direction, turbulence intensity, vertical wind speed, data availability
Range	40m to 300m
Simultaneous measurement heights	20 in 1s
Speed accuracy	0.1 m/s
Speed range	0 to 60+ m/s
Speed uncertainty	2-3%
Direction accuracy	2°
Beam geometry	4 inclined beams at 28° + 1 vertical beam
Data storage	120GB industrial disk (10 years of data); WindCube Insights secure cloud-based server
Communication	LAN, USB, 4G modem, Modbus RTU, Wi-Fi
Temperature range	-30°C to 45°C / -22°F to 113°F
Compliance	CE, FCC, ICES
Data sampling rate	1Hz; 1s/1, 2, 5, 10min averaged (user-defined)
Housing classification	IP 67 (inner racks)
Power consumption	45W
Weight	46kg
Dimensions	L55 cm, W56cm, H55 cm
Wind data exports	Radial wind speed, vertical wind profile (in DBS)
Particles data exports	Residual planetary boundary layer; Mixing planetary boundary layer; Aerosols; Clouds

Why Vaisala?

With the right access to the right information, people become more aware, active, and committed. They gain a deeper connection to their environment and new ways of thinking about business and community.

Vaisala is driven by passion, relentless curiosity, and the desire to create a better world, as reflected by our guiding principles for urban weather and environment:

1. **Exceptional products grounded in science and innovation** — Vaisala's scientific leadership and innovation in inventing unrivaled weather and environment products have reflected the spirit of our company for 85 years.

2. **Insight every day** — The combined power of our weather and environmental solutions provide dependable intelligence people can confidently act on; enabling businesses and communities to make better decisions.

3. **Champions for smarter, safer, more sustainable urban communities** — Vaisala empowers businesses and community leaders; helping them to fulfill their operational missions for their cities.

4. **Inspired solutions rooted in the Finnish way** — Finland has boldly demonstrated that a culture of resilience and a connection to nature can create new ways of smarter, sustainable living.

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vaisala.com/airquality

Scan the code for more information