



# Scanning wind lidar

A powerful solution to measure offshore wind



## Scanning lidar is ideal for offshore wind measurement

Scanning wind lidar systems offer the possibility to measure the wind remotely, up to several kilometers, and are the preferred equipment to measure offshore wind. The flexibility and its compact size makes scanner lidars easy to deploy on fixed offshore platforms, on nacelles and transition pieces of offshore wind turbines at any stage of a wind farm project, from prospecting to operation.

### How lidar is used in offshore wind measurement

To determine a three-dimensional wind field in an offshore location a lidar is commonly used to scan different directions at a fixed elevation above the device. The wind speed and direction is calculated mathematically, delivering wind profiles for up to 200 m above ground which is comparable to a conventional met mast at that position.

Scanning lidar is ideal for offshore wind measurement because it is able to fulfill customizable scan patterns. The patterns can have a vertical or horizontal variation, which provide information on wind speeds over a wider area in height and direction. From those scan patterns a virtual mast can be constructed at several locations of interest and at a distance up to several kilometers from the device. Virtual met masts are only one example how to benefit from the latest lidar technology. Customized lidar scans can also give insight into local wind flow.

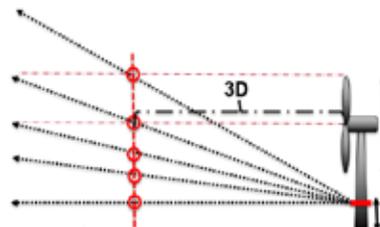


Fig. 1: Virtual mast sketch example as measured with a scanning lidar ( $D$  = rotor diameter).





*UL has been involved in several wind energy projects using long range scanning wind lidars in wind resource assessments and wake analysis.*

## What you can expect from UL's scanning lidar-based measurement services

### Traditional wind resource assessment

A scanning lidar is able to deliver local information of the wind resource at defined virtual met masts in a surrounding area of about 2 km.

### Advanced wind resource assessment

A scanning lidar is able to analyze the spatial distribution of wind speeds in complex flow situations like near-coastal offshore sites.

### Energy yield assessments for on and offshore wind farms

Energy assessments based on either of the above measurement types or in combination with traditional wind measurement sources such as met masts.

### Power curve evaluation from the offshore wind turbine transition piece

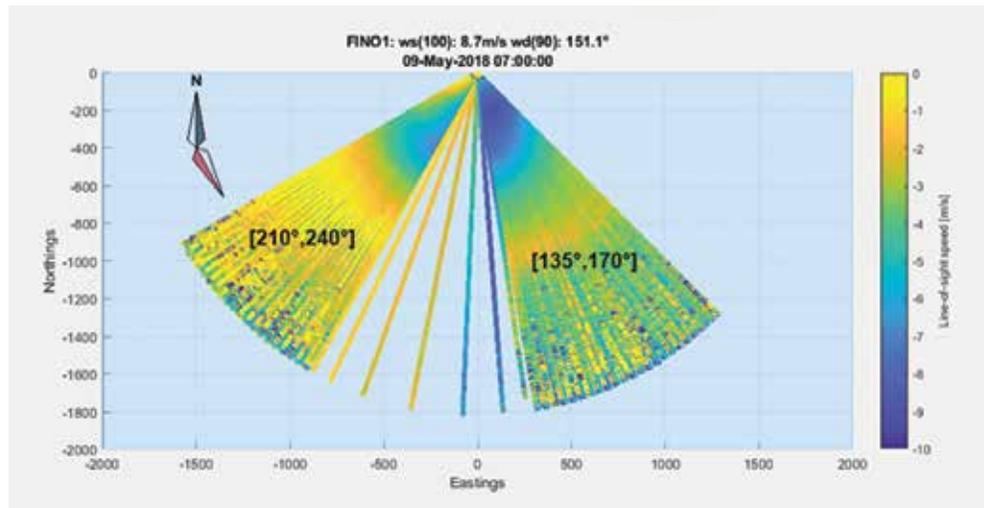
A virtual met mast of a scanning lidar is used as input for power curve evaluations.

### Wake analysis

Details of the wake field can be revealed by scanning the wake at different positions and distances.

### System performance check

We add value to your campaign by checking the performance of the scanning lidar against our IEC conforming met mast before or after the measurement campaign.



*Fig. 2: Example of two scan sectors measured at a maximum distance of 1.8 km from the transition piece of a turbine in the vicinity of FINO1 platform.*

The success of a scanning lidar campaign not only depends on the hardware, but on optimized planning, robust deployment/dismantling of the system, experience monitoring the operation, advanced data analysis tools and comprehensive reporting. Feel free to contact our team of experts.

**Contact us for more information at [renewableenergyservices@ul.com](mailto:renewableenergyservices@ul.com) or learn more at [UL.com/renewables](http://UL.com/renewables).**



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