



TEST CENTER FOR WIND MEASUREMENTS IN COMPLEX TERRAIN

Fraunhofer IWES

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Please contact us. We will be happy to provide you with further information, pricing and scheduling.

Our services and facilities:

- We perform measurements at your complex terrain site using our wind lidars and provide detailed and sophisticated data analysis and correction
- We test and calibrate your lidar or sodar against our 200 m IEC conform research mast at our complex terrain test site
- We provide independent technical due diligence for your wind resource assessment

Accurate knowledge of wind characteristics is crucial for the design, planning and operation of wind farms. Wind lidar measurements provide this knowledge for:

- Wind farm planners and operators
- Investors and insurers
- Authorities

Turbines with hub heights of up to 160 m are now being erected at onshore sites. In Germany, new wind farm locations are utilized in hilly woodlands. Lidar technology offers the possibility to measure the wind up to high altitudes. Major advantages of wind lidars are:

- Significantly increase accuracy of energy yield estimations
- Reduce uncertainty on vertical extrapolation
- Cover the whole rotor height with measurements up to 250 m
- Easy to use even at remote location

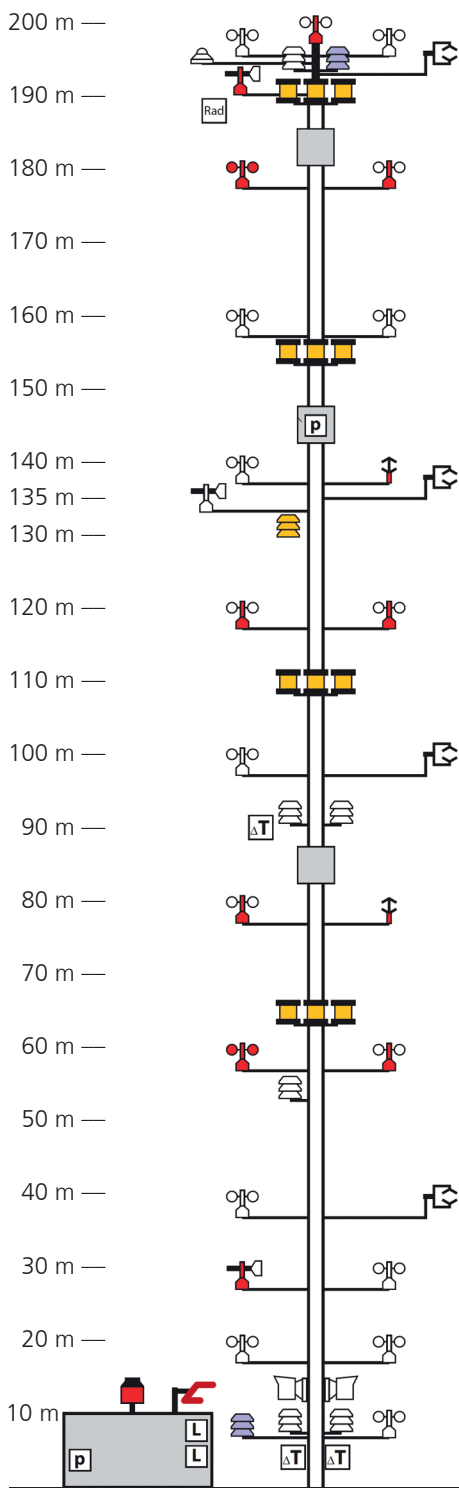
Lidar measurements in complex terrain and the development of correction algorithms are in focus of the research activities at Fraunhofer IWES with the aim to replace high met masts by lidars.

Our Competence

Fraunhofer IWES has more than 20 years experience in measuring and assessing wind conditions.

Since 2012 we operate a unique wind research facility: A 200 m high met mast in complex terrain. The IEC conform mast is equipped with first class cup anemometers, wind vanes, ultrasonic anemometers and further meteorological instruments - altogether about 40 sensors at 13 different heights.

Our test center is complemented by a ceilometer and several wind lidars. The lidars have been applied to diverse scientific measurement campaigns in Germany.



Wind lidar measurements

Wind lidar measurements are a flexible, time and cost saving alternative to erecting high and expensive conventional measurement masts. They can be used as a stand-alone option or to supplement tower-based measurements. This way you can gain accurate information about the wind conditions even up to the rotor's tip height of the planned wind turbine.

The application of lidars in complex terrain is still a topic for research and development and needs a high level of competence and careful implementation. The experience gained in our ongoing research activities is directly applied to all our measurement campaigns. As a research institute, Fraunhofer IWES can offer the scientific foundation to improve cost efficiency and reduce uncertainty of your wind farm project.

Our lidar devices are equipped with autonomous power supplies. This makes them easy to use even at remote locations without grid connection. Setup, monitoring and maintenance are provided by our skilled technicians to ensure high availability and data quality. Monthly reports keep you up-to-date with your measurement campaign. A detailed final report covering data analysis, verification and statistical summaries is issued by our research experts. If your project is located in complex terrain an additional correction of the measured data is carried out.

Validation of lidar performance

Benefit from our experience by testing your wind lidar or sodar at our complex terrain test site which represents a typical site in central Germany.

In a detailed comparison to our 200 m measurement mast the site-specific performance of your remote sensing system is analyzed by our expert researchers. You are provided with an independent, in-depth measurement report that assesses the accuracy of your system compared to cup anemometer and wind vane measurements at multiple heights up to a height of 200 m. Special topics and analysis can be examined at your demand.

- 1, 3, 4, 5 Europe's highest measurement mast
2 Wind lidar measurement devices

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