IEA Wind TCP Task 52:
Large-Scale Deployment of Wind Lidar

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Summary

Wind lidar technology allows the remote measurement of wind data across the whole wind turbine rotor disk, across the entire wind plant, or even for several kilometres up- or downwind. As a result, it is a key enabling technology for the future of wind energy, opening the way to larger turbines that use less materials to produce more energy, more reliably. Wind lidar was first commercialized in the early 2000s and since then has become accepted for many applications in the wind energy industry, particularly in resource assessment on land and offshore. Until today and in particular for those applications, wind lidar has displaced traditional anemometry, and additionally has enabled entirely new applications such as the use of upwind data for wind turbine control.

Since 2012 IEA Wind Task 32 has supported the development of wind lidar technology and applications in the wind industry by fostering collaborative R&D amongst its partners. During its nine years organized in three phases wind lidar has rapidly become a standard equipment for the wind energy industry; alone for the last three years it was estimated that the number of wind lidar units in use worldwide has increased by approximately a factor of five. But some open tasks have remained, and the increasing use of wind lidar has also identified some new challenge – both are now being addressed in IEA Wind Task 52, which is the relaunch of Task 32 and was kicked off in mid 2022

Key facts

Start date: May 2022

Duration: 4 years

Participants so far: 100+ individuals from 60+ institutions / companies

Website: https://iea-wind.org/task52/

Mission / Vision / Objectives

Task 52's mission is that its members work together on research to make wind lidar the best and preferred wind measurement tool for wind energy applications.

With this, the vision is that in the future using wind lidar will be easy and will bring advantages and opportunities that enable the [large-scale] deployment of wind energy.

Central objectives are

- to support the large-scale deployment of wind lidar by addressing key themes and achieving relevant deliverables,

- integrating both industry and academia for most innovative solutions and application-oriented training of young researchers,

- and a strong collaboration with other Tasks to share our knowledge with other applications within the industry.

Key topics of Task 52

Task 52 is organized around the four central themes

(1) Universal inflow characterization

(2) Replacing met masts

(3) Connecting wind lidar

(4) Accelerating offshore wind deployment

Key deliverables will address knowledge gaps which are in the focus of the [currently eight active] working groups – these are

(within Theme 1)
Turbulence Intensity [TI] from lidar, and Lidar Assisted Control [LAC];

(within Theme 2)
specific challenges in Complex Terrain as well as Cold Climate;

(within Theme 3)
digitalization / digital lidar workflows and a wind lidar ontology;

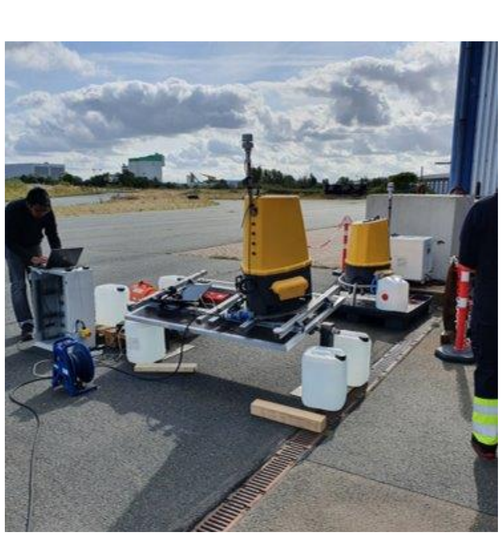
(within Theme 4)
application of (offshore) scanning lidar and floating lidar.

Contents of paper

Our paper, as part of the conference proceedings, discusses how the four key themes and (8) focus topics contribute to the vision of Task 52 (→ Large-scale deployment of wind lidar enabling further [large-scale] deployment of wind energy onshore and offshore).

For each focus topic, we present the state-of-the-art, including the size and specifics of the addressed part of the wind lidar market, and show perspectives for a 5-10 years horizon. We also discuss the main challenges and opportunities and give an overview of pre-normative and normative guidance already available and in preparation, respectively.

With this, we not just want to inform about the progress made within and through IEA Wind Task 52 but also encourage further stakeholders to contribute to the programme.



Further reading:

https://iea-wind.org/task52/
https://www.linkedin.com/showcase/iea-wind-task-52/
https://zenodo.org/communities/ieawindtask52

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