IRPWND ScanFlow project

Hasager, Charlotte Bay; Mikkelsen, Torben Krogh; Angelou, Nikolas; Pena Diaz, Alfredo; Giebel, Gregor; Andreasen, Steen; Wagenaar, Jan Willem

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
ScanFlow
The ScanFlow project is short for the full project title: "High-resolution full-scale wind field measurements of the ECN's 2.5 MW aerodynamic research wind turbine using DTU's 3D WindScanner and SpinnerLidar for IRPWind's and EERA's benchmark".

Objective
The objective of ScanFlow is to establish a unique turbine power performance and induction zone benchmark experiment.

Methodology
The methodology is to operate a DTU developed high-resolution nacelle 2D SpinnerLidar installed at a research wind turbine at ECN and, concurrently, operate three DTU ground-based short-range WindScanner lidars to perform 3D wind velocity field observations.

The scientific progress beyond previous experiments will be to achieve data from three vertical planes 10-minute averages of all three wind components. Furthermore, we will also observe turbulence along one horizontal transect from 1Hz data. The baseline inflow i.e. when the turbine is not in operation and the induction zone from the operating row of turbines will be observed and quantified by a novel solution.

Furthermore, the rotor plane equivalent wind speed can be reverse-calculated to wind speed from wind power production at 1Hz fast production data and compared to WindScanner turbulence observations as well as turbulence data from the meteorological mast.

Test site
The ECN Wind turbine Test site allows for full scale wind turbine and wind farm related research, development and technology. The test site consists of flat, agricultural terrain with single farm houses and occasionally rows of trees. The average wind speed at 80m is 7.5 m/s and the main wind direction is South-West. The site comprises 5 modern, full scale research turbines (Nordex) with a hub height and rotor diameter of 80m and rated power of 2.5MW. The area is shown below.

Measurements
The observations with the SpinnerLidar started early December 2016 and will end late January 2017. During January 2017 the three short-range lidars will measure.

Data access
www.irpwind-scanflow.eu
Please see Poster G62 for further information!

Acknowledgement: “The work described here has received support from IRPWind 609795, a project that has received funding from the European Union’s Seventh Programme for Research, Technological development and Demonstration”