



September 2018

Details

to the IEA Wind Task 32 Workshop #10 on Turbulence Intensity Measurements with LiDARs - Applications to Loads Verification and Site Suitability

Date: 20th and 21st September 2018

Venue: Ørsted, Gentofte (5 km North of Copenhagen), Denmark

Workshop leader: Ameya Sathe (Ørsted)

Organization team: Eric Simley (NREL), Detlef Stein (Multiversum), David Schlipf (HS Flensburg)

Introduction to the Topic

Site Suitability and Loads Verification are fundamental aspects of developing a wind farm. The goal of site suitability is to assess the environmental conditions, amongst others the Turbulence Intensity (TI), and subsequently take a decision on further development of the wind farm. The goal of loads verification is to assess whether the models used to simulate the loads were/are good enough based on field measurements. TI is one of the inputs in performing such verification. Estimating TI reliably from the measurements is therefore critical to both applications - *or is it?* These topics will be the focus of this workshop.

Objective

To seek answers to the following questions

1. Are there barriers in estimating TI using LiDARs?
2. Do the barriers influence the use of LiDARs for Load Verification and Site Suitability studies of wind turbine(s)/farm(s)?

Concept

The workshop is split in five main sessions:

1. Educational Session: Understanding the problems
2. Identification of barriers for turbulence intensity measurements with lidar
3. Mitigation of barriers for turbulence intensity measurements with lidar
4. Identification of barriers for load verification/site suitability studies with lidar
5. Mitigation of barriers for load verification/site suitability studies with lidar

Expected Outcome

The outcome of the workshop will be

- An exchange of experience in TI measurements and load verification/site suitability studies with lidar
- Creating links between the potential users and the researchers
- A list of barriers and possible solutions to the use of lidar for TI measurements, load verification, and site suitability studies
- Initiation of a working group to write a common paper of the results of the workshop
- Proceedings of the workshop

Expected Participants

All kinds of stakeholders – like lidar and turbine manufacturers, consultants, academics, end users dealing with turbulence intensity measurements and/or load verification/site suitability with lidars.

Practical Arrangements

Registration

For participation in the workshop, please register by filling the online [form](http://www.goo.gl/CVNFDQ) (www.goo.gl/CVNFDQ). Please register before **31.08.2018**. There is a **capacity of only 100 people** in the auditorium, therefore registrations are on a **first-come-first-served** basis. Registration for the workshop is free of charge. Please send **by September 14 one slide per person** (pdf format) with your experience in TI measurements and load verification/site suitability studies with lidar and your expectation for the workshop. The slide will be used for the introduction round (see below) and uploaded to our website (access to the link by password only). Examples can be found [here](#) or [here](#).

Venue Information

The workshop will be held in room Auditorium F0.1a at Ørsted, Nesa Allé 1, 2820 Gentofte, Denmark. **Register in the reception, when you arrive.**



Public transportation time schedules

www.Rejseplanen.dk

Bus

150 S Stops at Brogårdsvej (Lyngbyvej) - Walk about 10 mins to the main entrance of Ørsted. Bus terminates at Nørreport St./Kokkedal St./ Gl. Holte Øverødvej. Fast and frequent bus connection.

15E Stops at Brogårdsvej (Lyngbyvej) - Walk about 10 mins to the main entrance of Ørsted. Bus terminates at Nørreport St./Søhuset, Forskerparken - Superfast Bus connection.

184 Stops at Brogårdsvej / Lyngbyvej and on Lyngbyvej opposite Ørsted - Bus terminates at Nørreport St./Holte St.

176 Emdrup Square - Gentofte st. Stops at Egebjerg nursing homes. 2 min. walk to Hagedornsvej 4.

192 Lyngby st. - Charlottenlund Fort Stops at Egebjerg nursing homes.

S train

S train line E goes to Gentofte and Jægersborg st. Walk along Ørnegårdsvej and use the highway underpass to get to Ørsted.

Car

Helsingør motorway exit 5, both in south and northbound direction.

Motorring 3 northbound exit 18th

Contact Information

Please contact [Ameya Sathe](#) (workshop leader) or [Andrew Clifton](#) (IEA Wind Task 32 Operating Agent) with any questions you may have about the workshop.

Program Details - Day 1

Day 1: Thursday, September 20 th	
9:30	Registration
10:00	Introduction <ul style="list-style-type: none"> • Welcome to Ørsted – Ameya Sathe, Ørsted • Introduction to IEA Task 32, Purpose of the workshop and agenda – David Schlipf, HS Flensburg • Presentation round, based on participant types – all
11:00	Coffee Break
11:15	Educational Session: Understanding the problems <ul style="list-style-type: none"> • Turbulence intensity measurements with lidars - Jakob Mann, DTU Wind energy • Loads verification process - Cameron Brown, Ørsted
12:15	Lunch
13:15	Identification of barriers for turbulence intensity measurements with lidar, Chaired by Eric Simley, NREL <ul style="list-style-type: none"> • IEA Task 32 Wind Expert Report on Lidar Turbulence Measurements - Ameya Sathe, Ørsted • Turbulence characterization from a forward-looking nacelle lidar - Alfredo Pena, DTU Wind Energy • Lidar TI measurements : should we go closer to cup wind or to turbine loads and power? - Paul Mazoyer, Leosphere • TI measurements, CW LiDAR manufacturer's perspective - Scott Wylie, ZepHIR LiDAR • TI sensitivities of DBS and VAD scalar and vector averages - Peter Clive, Woodplc
14:45	Coffee Break and vote on most important barriers
15:15 - 17:00	Mitigation of barriers for turbulence intensity measurements with lidar, Chaired by Detlef Stein, Multiversum <ul style="list-style-type: none"> • Group discussion in small groups • Presentation of results to plenary • Discussion and documentation of results
19:00	Dinner in Copenhagen

Program Details - Day 2

Day 2: Friday, September 21 st	
9:00	Summary of Day 1
09:30	Identification of barriers for Load Verification/Site Suitability with lidar, Chaired by David Schlipf, HS Flensburg <ul style="list-style-type: none"> ● Potential for using floating LiDAR for offshore site assessment - Ben Williams, Carbon Trust ● Turbine Load Assessment: Challenges and Opportunities for Remote Sensing - Zachary Parker, Nordex ● Lidar based load validation: practical experience from the UniTTe project - Nikolay Dimitrov, DTU Wind Energy ● Loads validation using LiDAR TI: Potential and barriers of different correction methods - Jens Riechert, DNVGL ● Alternatives to TI for load estimation (transience statistics) - Peter Clive, Woodplc
10:45	Coffee Break and vote on most important barriers
11.15	Mitigation of barriers for Load Verification/Site Suitability measurements with lidar, Chaired by Ameya Sathe, Ørsted <ul style="list-style-type: none"> ● Group discussion in small groups
12:15	Lunch
13:15	<ul style="list-style-type: none"> ● Group discussion in small groups (continued) ● Presentation of results to plenary ● Discussion and documentation of results
15:00	Coffee Break
15:15	Summary of the Workshop and Follow up
16:00	<ul style="list-style-type: none"> ● Discussion within the working group about documenting the results of the workshop