October 2017

Invitation
to the IEA Wind Task 32 Workshop #7 on

Lidar Campaigns in Complex Terrain

Date: 8th November 2017
Immediately preceding the General Meeting
Venue: Hotel campus.guest, University of Stuttgart, Germany
Workshop leader: Andrew Clifton, WindForS

Introduction to IEA Wind Task 32

The main objective of the Task 32 is to identify and mitigate barriers to the use of lidar technology in wind energy applications such as site assessment, power performance, loads & control, and complex flow. One yearly workshop is organized for each of the four applications focusing on one specific problem, and with a well-defined program and tangible outcome.

More details can be found on the task website.

Background to the Workshop

At the 2016 IEA Wind Task 32 General Meeting in Glasgow, participants identified the practical aspects of lidar campaigns in complex terrain as a major barrier to the further deployment of wind lidar.

There are three main barriers to the use of lidar in complex terrain:

1. **Operations**. Sites may be remote, which makes setting up and operating the lidar challenging.
2. **Data**. Data may be incomplete because of power or other issues, and may be difficult to interpret because of inhomogeneous flow conditions.
3. **Guidelines**. Existing recommended practices and standards do not explain what should be done to achieve satisfactory measurements in complex terrain.

The background to many of the challenges is described in a previous IEA Wind Task 32 report[1].

[1] See A. Clifton, M. Boquet, E. B. D. Roziers, A. Westerhellweg, M. Hofsäß, T. Klaas, K. Vogstad, P. Clive, M. Harris, S. Wylie, E. Osler, B. Banta, A. Choukulkar, J. Lundquist, and M. Aitken, "Remote sensing of complex flows by doppler wind lidar: issues and preliminary recommendations," NREL, NREL/TP-5000-64634, 2015.

Objective

This workshop will provide practitioners in the field of lidar remote sensing

1. An overview of the state-of-the-industry and state-of-the-art in wind measurements in complex terrain.
2. A set of worked examples for planning measurement campaigns in complex terrain

Concept

The workshop will be a combination of

1. Presentations about past measurement campaigns, including both positive and negative experiences.
2. Case studies of planning for successful future measurements based on material provided by participants
3. Identifying gaps (and solutions) in existing products, services, or supporting recommended practices and standards

Expected Outcome

Presentations and minutes of discussions that describe

1. Experience with the use of lidar in complex terrain for selected use cases
2. Examples of how to plan for a campaign in complex terrain
3. Identified issues with the current generation of products, services, recommended practices and standards, and suggested solutions

Expected Participants

This workshop is oriented towards wind plant developers and wind energy consultants currently using wind lidar to support wind plant developments or planning on starting to use lidar in the next year. Lidar manufacturers and suppliers and consultants who offer lidar-related services are also encouraged to take part.

The workshop will be limited to 30 places to enable active participation in the case studies.

Practical Arrangements

Registration

For participation in the workshop, please register by sending an email to the Operating Agent Representative David Schlipf. Your registration email should include:

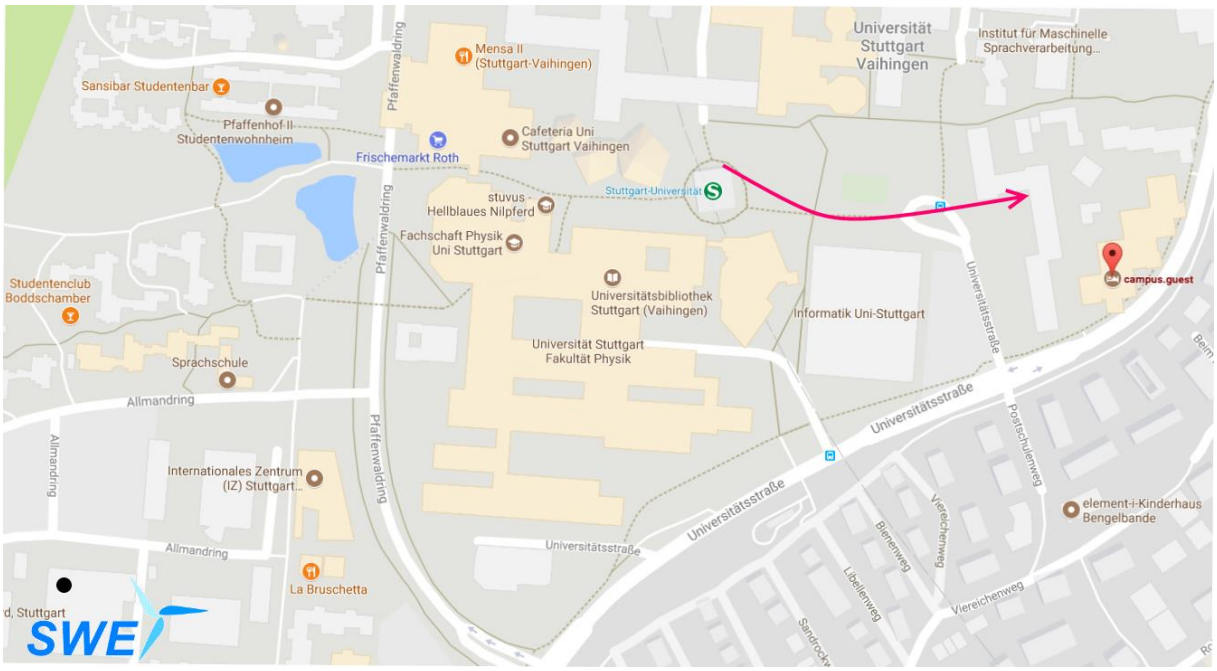
- Name and institution, member country
- Please describe your stakeholder role (e.g., wind turbine manufacturer, lidar supplier, academic, consultant, developer, utility, etc.)
- A slide to be presented during the introduction round, which describes your experience with lidar measurements and/or wind models and your expectation from the workshop

Please register before **Friday 13th October 2017**. Prior to the workshop, registered participants will receive the updated agenda and participant list. Registration to the meeting is free of charge for participants from member countries.

Venue Information

The workshop will be held on November 8 prior to the General Meeting at the Hotel campus.guest, which is conveniently placed in 3 min walking distance from the local train station "Suttgart Universität".

Hotel campus.guest (previously known as the "Hotel Commundo")
Universitätsstraße 34
70569 Stuttgart
Germany



Accommodation

You can book your room at the campus.guest directly via reservierung@campus-guest.de.

Further Information

More information about Stuttgart can be found at https://www.stuttgart-tourist.de/en.

Contact Information

Please contact Andrew Clifton (workshop leader) or David Schlipf (IEA Wind Task 32 Operating Agent) with any questions you may have about the workshop.

Program Draft

Start	
09:00	Arrival and registration
09:30	Introduction • Workshop goals • Introductions
10:00	**Experiences in Complex Terrain** • Invited presentation by a wind energy industry professional about the issues they experience (20 mins) • Summary of issues (10 mins, moderator)
10:30	**Making it work** Examples of measurements in complex terrain conditions: • … by a developer of a successful use of remote sensing in complex terrain (15 mins) • … by a consultant of an actionable use of remote sensing in complex terrain (15 minutes) • Fraunhofer IWES: Multi-lidar remote sensing measurements at Kassel as part of NEWA (15 minutes).

11:30	Introduction to afternoon sessions
	• Description of what will be done in the afternoon session
	• Description of case studies (5 minutes / case study):
	  ○ Resource assessment
	  ○ Power performance test
	  ○ Plant monitoring
	  ○ Multi-lidar (IWES + DTU)
	• Formation of groups of 5-6 and first discussions

12:15	Lunch

13:15	**Working session**
	In groups of 5-6, develop solutions for each case study.
	• Practical solutions to:
	  ○ Site access
	  ○ Power and communications
	  ○ Operational monitoring
	  ○ Maintenance and local support
	  ○ Retrieval
	  ○ Analysis,
	  ○ Etc.
	• Identify gaps in current products, services, RP and standards
	• Suggest solutions for gaps / prioritize required research and development
	• Prepare short summary for the rest of the workshop

14:15	Break
14:45	**Results** • Presentation of results from the working session with discussion (20 minutes / group)
15:45	Break
16:00	**Next steps** • Summary of prioritized gaps and solutions • Suggested roadmap
17:00	End
18:30	Dinner

A note on case studies

Case studies will be based on material provided by participants. This material should include

- Measurement goals
- List of equipment, including remote sensing devices, power, communications
- Maps, photos, and other information to provide a feel for the site and challenges
- Information about the wind climate at each location

Material for the case studies can be “representative”, i.e. not actually for a specific location or campaign. This could mean providing exemplary maps, photos, and challenges that allow the group to relate to the problem but preserve commercial confidentiality.

The results from the case studies will be made public.