



September 2017

Invitation to the IEA Wind Task 32 Workshop #8 on

Certification of Lidar-Assisted Control Applications

Date: 30. – 31. January 2018
Venue: DNV GL, Hamburg, Germany
Workshop leader: Nikolai Hille, DNV GL

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](#).

Objectives of the Workshop

- Gain basic understanding of Type Certification of wind turbines (WT) and what makes certification special with Lidar Assisted Control (LAC).
- Bridge the gap between the different parties (i.e., WT manufacturers, Lidar manufacturers, research institutes and certification bodies) to gain a common understanding of each other's perspectives on certification with LAC. Collect ideas to understand, adapt and improve system interfaces to ease integration of the different components and processes.
- Use the expertise of WT and Lidar manufacturers, researchers and certification bodies to identify ideas for supplements that should be made to the existing design standards to account for LAC.
- Discuss and develop appropriate approaches in component modelling and verification for certification. The aim is to address this by identifying:
 - Appropriate Lidar system modeling requirements for design evaluation
 - Suggested modifications to and clarification of turbulent and deterministic wind field definitions used in the design evaluation so that preview measurements of the wind can be obtained with realistic characteristics
 - Suggested modifications to the design load cases to account for the inclusion of LAC

- Suggested modifications to the procedures for calculating extreme and fatigue loads as well as power performance during the design evaluation to account for imperfect Lidar availability
- Suggestions for verifying the performance of Lidar systems assumed during the design evaluation
- Suggestions for verifying the extreme and fatigue loads using LAC that were determined during the design evaluation
- Ideas for addressing other gaps that are identified during the course of the workshop

Concept

The first day of the workshop (WS) will begin with a short introduction into Type Certification by DNV GL. It will be highlighted how wind turbines with LAC challenge the Type Certification process according to existing standards because experience with such turbines is missing and appropriate technical requirements for the verification process have not been set up yet. Invited presentations of participants from wind turbine manufacturers, Lidar suppliers and research institutes will follow, contributing to topics in the following areas:

- 1.) Simulation model: Lidar, wind evolution
- 2.) DLC definition, fatigue and extreme loads
- 3.) Control and Protection System
- 4.) Prototype measurements

On the second day, four working groups will be formed by the participants based on their specific expert background. The working groups will contribute to the previously listed four topics. In each working group the participants will discuss and develop approaches which aim to solve the present technical challenges in the verification and certification of wind turbines with LAC.

An appropriate safety level for the wind turbines with LAC will be considered. At the same time the approaches using this new technology must be economically attractive and technical compromises might be necessary.

Finally, the developed approaches will be drafted into text and thus requirements defined in a concerted way between the participants of the workshop.

Expected Outcome

- Develop approaches and drafted text for a best practice document as basis to certify WT with LAC.
- The drafted text from the workshop will be edited by IEA Wind Task 32 to form a document “Best Practices for Certification of Lidar-Assisted Control Applications”. The document will be distributed to the participants and made available to the public on the IEA Wind Task 32 website.
- The contents of this document will be incorporated into DNV GL’s guidelines on WT certification with LAC planned for 2018.

Expected Participants

Engineers from wind turbine manufacturers and developers, engineers and scientists from nacelle-Lidar manufacturers, researchers and academics, and certification bodies with LAC experience.

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
- Your stakeholder role (e.g., wind turbine manufacturer, Lidar supplier, academic, consultant, developer, certification body, etc.)
- One slide to be presented during the introduction round, which describes your experience with LAC

Please register before 15th December 2017. Prior to the workshop, registered participants will receive additional workshop details as well as a pre-workshop survey.

Registration for the workshop is free of charge.

If you would like to **present at the workshop** please submit a short proposal (no more than 300 words) to the Workshop Leader, [Nikolai Hille](#) or the IEA Wind Task 32 Operating Agent, [David Schlipf](#), by **Monday 1st November 2017**.

Attendance of participants is expected on both days of the workshop to guarantee equally shared input to the knowledge pool and input to the Best Practice draft document.

What specific topics would you like to see discussed at the workshop? Your input to the workshop program and content is welcome! Please contact [Nikolai Hille](#) (workshop leader) or [David Schlipf](#) (IEA Wind Task 32 Operating Agent)

Venue Information

DNV GL Office Hamburg
--- Media Room ---
Brooktorkai 18
D-20457 Hamburg
Germany

Contact Information

Please contact [Nikolai Hille](#) (workshop leader), [Eric Simley](#) (IEA Wind Task 32 Advisory Board member for loads and control) or [David Schlipf](#) (IEA Wind Task 32 Operating Agent) with any questions you may have about the workshop.

Program Draft

Tuesday 30.01.2018

10:00 Registration

10:30 Welcome and presentations

- Welcome to DNV GL (Steffen Haupt, DNV GL, 5 minutes)
- Introduction to IEA Wind Task 32 (IEA Wind Task 32 Operating Agent David Schlipf, 10 minutes)
- Introduction to WS and objectives (WS host, 10 minutes)
- Introduction to LAC (researcher/academic, 20 minutes)
- Overview of the type certification process for wind turbines (DNV GL, ½ hour)
- 1-minute slides of participants on their personal experience with LAC (participants, ¾ hour)

- Summary of which parts of the certification process could be affected by LAC (DNV GL, ½ hour)

13:00 Lunch at DNV GL canteen

14:00 Presentations

- Summary of questions and ideas wind turbine manufacturers and developers have about including LAC in the certification process (wind turbine manufacturer(s), split between ½ hour time slots)
- Summary of state of art of Lidar-assisted control simulation models (Lidar and wind evolution models etc.) (researcher/academic, split between ½ hour time slots)
- Coffee break (15 minutes)
- Description of realistic Lidar modeling approaches that can be used in LAC simulations (availability, blade blockage, measurement quality) (Lidar manufacturer(s), split between ½ hour time slots)
- Summary of lessons learned from field tests, how they can be applied in the verification stage and how they can be used to make the design evaluation stage more realistic (researchers, Lidar manufacturer(s), turbine manufacturer(s), split between ½ hour time slots)

17:30 Split-up in working groups, preparation of day 2

18:30 Walk to restaurant

19:00 Dinner

Wednesday 31.01.2018

9:00 Working groups

12:30 Lunch at DNV GL canteen

13:30 Presentation / discussion of workshop's results collecting the "Suggestions for Best Practices"

15:30 End of Workshop

Optional side event (16:00 – 17:30):

After the workshop all participants are invited to join a nice stroll of about 20-30 min from the DNV GL office through the modern harbour city district to the new Elbphilharmonie concert hall. There, we will visit its open air panorama terrace which gives a marvellous view over the harbour and parts of Hamburg and also have an impression of the extraordinary building itself.

