



January 2018

Details 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

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.

Concept

The first day of the workshop serves to create a common understanding of the topic and to present and discuss the challenges for the type certification of LAC. We arranged the following sessions:

1. What is type certification and how is it affected by LAC?
2. What are the challenges for type certification with LAC for the various involved groups?
 - a. Turbine manufacturer
 - b. Lidar manufacturer
 - c. Consultants
 - d. Researchers

On the second day, four working groups will discuss the following topics led by an expert moderator:

1. Lidar system
2. Simulation models and load simulations
3. Control and Protection System
4. Prototype measurements

Every 45 minutes, participants will have the possibility to switch rooms and contribute to other topics. Finally, the results will be presented and discussed in a plenary session.

Expected Outcome

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

Practical Arrangements

Venue Information

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

Please check in at the DNV GL reception on arrival!

More details on how to find the DNV GL Office in Hamburg can be found on pages 5 and 6.

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.

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. Please indicate [here](#) before Friday 19, if you will be able to participate in the optional visit of the Elbphilharmonie.



Program

First Day, Tuesday, January 30	
10:00	Registration
10:30	Welcome and Introduction <ul style="list-style-type: none"> • Welcome to DNV GL (Steffen Haupt, DNV GL), 5 min • Introduction to IEA Wind Task 32 (David Schlipf, SWE), 5 min • Introduction to WS and objectives (Nikolai Hille, DNV GL), 5 min • Introduction to Lidar-Assisted Control (David Schlipf, SWE), 15 min • Presentation round (all participants), 30 min
11:30	<i>Coffee Break</i>
11:45	What is type certification and how is it affected by LAC? <ul style="list-style-type: none"> • Overview of certification (Mike Woebbeking, DNV GL), 30 min • Implications of LAC on the certification of Wind Turbines (Nikolai Hille, DNV GL), 30 min • Introduction to ISO 13849: Safety-related parts of control systems (Reinhard Schleeßelmann, DNV GL), 15 min
13:00	<i>Lunch at DNV GL canteen</i>
14:00	What are the challenges for type certification with LAC for lidar manufacturers? <ul style="list-style-type: none"> • Practical matters affecting the utility of nacelle mounted lidars for turbine loads measurements and control (Chris Slinger, ZephIR), 20 min • Description of realistic lidar modelling and lessons learned from field tests for lidar-assisted turbine control (Shumpei Kameyama, Mitsubishi Electric), 10 min • The necessity of a representative Lidar simulator (Paul Mazoyer, Leosphere), 20 min
14:50	What are the challenges for type certification with LAC for turbine manufacturers? <ul style="list-style-type: none"> • Goldwind EFarm - Lidar Assisted Control Application (Bin Wang, Goldwind), 20 min • An industrial perspective on Lidar-Assisted Control at Envision Energy (Eric Simley, Envision), 20 min
15:30	<i>Coffee Break</i>
15:45	What are the challenges for type certification with LAC for consultants? <ul style="list-style-type: none"> • Considerations in Design Load Cases when using LIDAR Assisted Control (Oscar Hugues Salas, DNV GL), 20 min • Prototype measurements on Wind Turbines - Considering LiDAR Assisted Control (Axel Sachse, DNV GL), 20 min • Cross-tool realistic lidar simulations (Steffen Raach, sowento), 15 min
16:40	What are the challenges for type certification with LAC for researchers? <ul style="list-style-type: none"> • Lessons learned from field testing experience on using lidars with wind turbine controls research (Andrew Scholbrock, NREL), 20 min • Overview of traditional lidar modeling and wind evolution modeling methods (Eric Simley, Envision), 15 min • Turbulent extreme event simulations for LAC (Tim Hagemann, SWE), 15 min
17:30	Split-up in working groups, preparation for day 2, 30 min
19:00	<i>Dinner close to the DNV GL office (see page 6 for details)</i>

Second Day, Wednesday, January 31	
9:00	How should we certify wind turbines with LAC? 4 floating working groups rotating every 45 min with a 10 min break in between
12:30	<i>Lunch at DNV GL canteen</i>
13:30	Presentation/discussion of workshop's results: "Suggestions for Best Practices"
15:30	<i>End of Workshop</i>
16:00	Optional event: Visit of Elbphilharmonie (see page 2)

Participant List

Name	Country	Institution
Andrew Scholbrock	USA	NREL
Ashim Giyanani	Netherlands	TU Delft
Axel Sachse	Germany	DNV GL
Carlo Bottasso	Germany	TU München
Chris Slinger	UK	ZephIR Lidar
Christophe Lepaysan	France	Epsiline
Claudia Meyer	Germany	DNV GL
David Schlipf	Germany	SWE University Stuttgart
Dennis de Bot	Netherlands	Lagerwey Wind
Detlef Stein	Germany	Multiversum
Dominique Philipp Held	Denmark	Windar Photonics
Eric Simley	USA	Envision Energy
Ervin Bossanyi	UK	DNV GL
Fabian Anstock	Germany	HAW Hamburg
Fabrice Guillemin	France	IFP Energie Nouvelles
Florian Haizmann	Germany	SWE University Stuttgart
Francesco Perrone	Germany	GE
Frank Scheurich	Denmark	DNV GL
Gerhard Peters	Germany	Metek
Haimei Zhu	China	Beijing New Energy Technology Co.
Hans-Juergen Kirtzel	Germany	Metek
Holger Fürst	Germany	SWE University Stuttgart
Iñaki Lezaun Mas	Spain	Gamesa
Inga Reinwardt	Germany	HAW Hamburg
Joern Jacobsen	Germany	Enercon
Johan Olaison	Germany	DNV GL
Johel Rodriguez	Spain	Sany
Julen Ortega Rodriguez	Spain	Gamesa
Julian Hieronimus	Germany	M.O.E. GmbH
Lei Liu	China	Goldwind
Liang Dong	China	Envision Energy
Lin Hu	China	Beijing New Energy Technology Co.
Linpeng Wang	China	Envision Energy
Martijn Zijlstra	Netherlands	Lagerwey Wind
Matthieu Boquet	France	Leosphere
Mike Woebbeking	Germany	DNV GL
Mingyuan Jiang	China	Goldwind
Morten Hartvig Hansen	Denmark	University of Southern Denmark
Nikolai Hille	Germany	DNV GL
Nils Gerke	Germany	HAW Hamburg
Oscar Hugues Salas	UK	DNV GL
Paul Mazoyer	France	Leosphere
Piet Markmann	Germany	Metek
Reinhard Schleeßelmann	Germany	DNV GL
Richard Welton	UK	Texo Drone Survey and Inspection
Shumpei Kameyama	Japan	Mitsubishi Electric Corporation
Stefan Löw	Germany	Siemens
Steffen Haupt	Germany	DNV GL
Steffen Raach	Germany	sowento
Tim Hagemann	Germany	SWE University Stuttgart
Theodore Holtom	UK	Wind Farm Analytics
Torben Mikkelsen	Denmark	DTU Wind Energy
Ulf Schaper	Germany	Enercon
Wang Bin	China	Goldwind
Wei Yufeng	China	MingYang
Yago Urroz	Spain	Sany

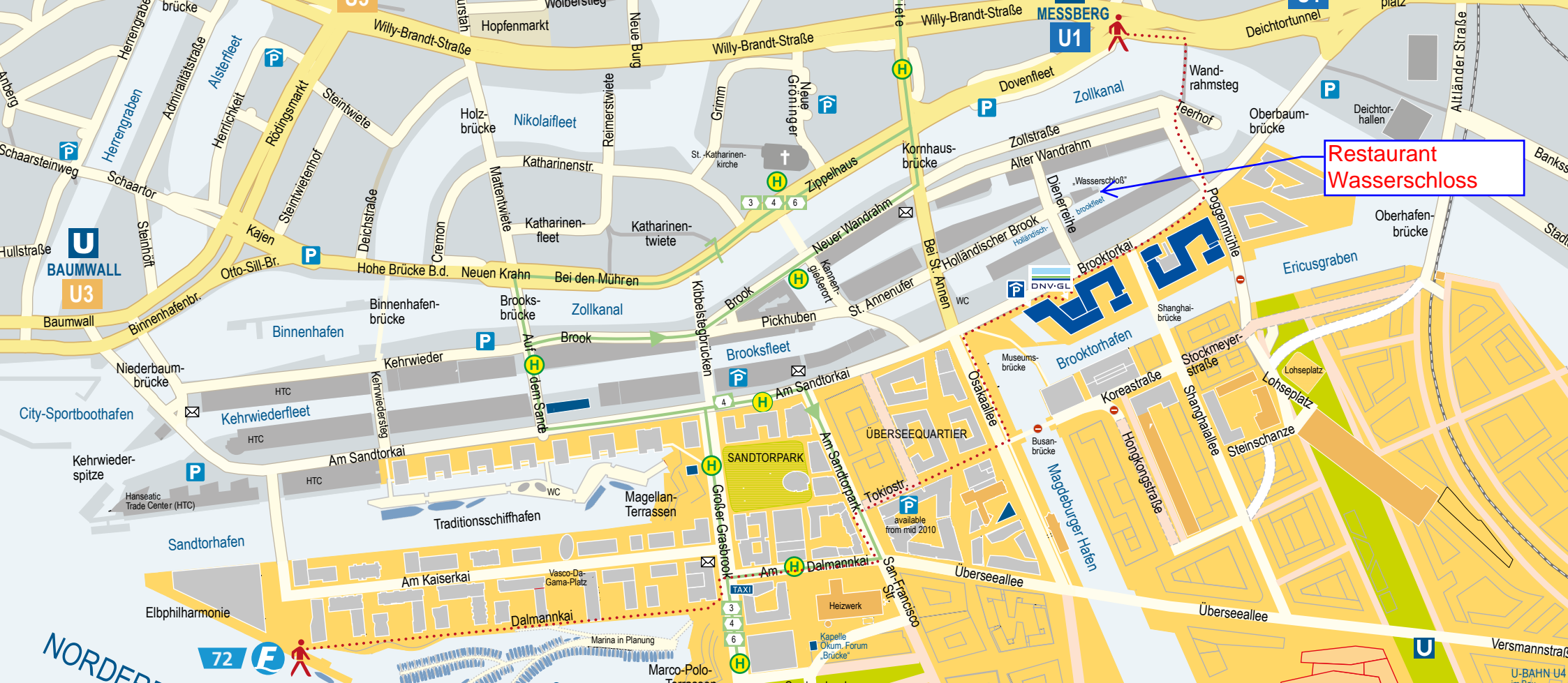


How to find the DNV GL Office in Hamburg

By air

From the airport, take the S1 railway towards Hamburg-Ohlsdorf. At Ohlsdorf change for the U1 underground railway towards Farmsen / Großhansdorf / Ohlstedt and get off at Meßberg.

DNV GL SE
Brooktorkai 18 · 20457 Hamburg, Germany
Phone: +49 40 36149-0
www.dnvgl.com



By car

Flensburg A7/E45

Take the Hamburg-Stellingen exit (26) via Kieler Straße and the B4 towards Zentrum/HafenCity

Lübeck A1/E22

At the Hamburg Ost junction, head towards Jenfeld and the Horner Kreisel (exit 1), then head towards Zentrum/Hafen City

Bremen A1/E22:

At the Hamburg Süd junction, follow the A255 to HH-Veddel and take the B4/B75 over the Elbe bridges (Elbbrücken) towards Zentrum/HafenCity

Berlin A24/E26

At the Hamburg Ost junction, continue on the A24 towards the Horner Kreisel (exit 1), then head towards Zentrum/HafenCity

Hannover A7/E45

At the Horster Dreieck junction, take the A1 towards Hamburg Süd, then follow the A255 to HH-Veddel and take the B4/B75 over the Elbe bridges (Elbbrücken) towards Zentrum/HafenCity

Please note that you should approach DNV GL from a westerly direction (Am Sandtorkai/Osakaallee) to enter our underground parking. There are designated parking spaces available for our customers. Just follow the signs.

By train

At the main station (Hauptbahnhof), take the U1 underground railway towards Ochsenzoll / Norderstedt Mitte and get off at Meßberg.

By ferry

Take the line 72, Landungsbrücken - Elbphilharmonie and get off at Elbphilharmonie. Take a stroll through Hamburg's "HafenCity", along "Dalmannkai - Am Dalmannkai - Am Sandtorpark - Tokiostraße - Osakaallee" until you reach the "Brooktorkai" where the DNV GL office is located.