



Press release

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NEL deploys ZephIR 300 to steer industry guidance on power curve measurements, turbine micro-siting with CFD modelling, and to verify load measurements on key wind turbine components

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NEL, an independent test and research organisation working at the forefront of engineering development and innovation for more than 60 years, has deployed a ZephIR 300 within two of its major research projects. The studies, supported by the UK Government's National Measurement System (NMS), are investigating the use of ground based and turbine mounted continuous-wave (CW) Lidar (light detection and ranging) to measure the incoming wind conditions and wakes of wind turbines.

The research is being carried out at the National Wind Energy Centre run by NEL from its Myres Hill test site. The site, which is located in the heart of Europe's largest onshore wind farm, utilises two NEG Micon 950kW wind turbines (54m rotor diameter) for the purpose of undertaking wind metrology research.



Figure 1: ZephIR 300 installed on NEG Micon with NEL

Since project commencement, ground based measurements have been performed comparing the performance of ZephIR 300 to traditional met mast mounted cup and ultrasonic anemometers up to 30m. Regression plots have produced correlations that fall within the limits defined by Banks' Engineers GL Garrad Hassan and Natural Power when either company performs a performance verification of a ZephIR system at the UK Lidar and Sodar Test Site (UK-LSTS), Worcestershire. Following the ground based measurements the ZephIR 300 was then positioned adjacent to NEL's 80m met mast to measure the disturbed wind profile in the wake of the two 950kW NEG Micon machines, at 3.55D and 2.55D, dependent on wind direction. Further measurements of the wake will be performed at a range of rotor diameters downstream from the turbines; this data will be used to verify and validate CFD modelling of the site previously carried out by NEL. The aim is to then use the corrected and then validated CFD model to investigate turbine spacing for wind farm layout optimisation.

As part of the second stage of research, the ZephIR 300 was mounted on the nacelle of the NEG Micon North turbine and commissioned to forecast the wind conditions in advance of the rotor. This phase of the project is investigating techniques for using turbine-mounted Lidar to measure incoming wind conditions to



perform power curve measurements, optimise turbine alignment and better understand the impacts of loads on critical components. Working in collaboration with NEL on the project is Beran Instruments Ltd who specialise in condition monitoring systems for rotating machinery.

Andrew Kay, leading the research at NEL commented: “This is an extremely interesting and exciting piece of research aimed at advancing the state-of-the-art in large wind metrology. Lidar provides a high degree of sophistication and flexibility over traditional methods and helps to provide more intelligent monitoring and control systems designed to enhance overall turbine efficiency and performance. Coupled with other techniques, such as CFD modelling Lidar can also be used to better inform micro-siting decisions for wind farms. I am very pleased with the progress of the measurement campaign so far, the ZephIR 300 is providing us with a reliable, real-time picture of the wind conditions on site.”

Ian Locker, Managing Director at ZephIR Lidar commented: “NEL is one of the leading lights on research in to wind flow, and the ultimate application of research into the commercial world. Given ZephIR’s heritage in innovation, the combination on this project is particularly strong. ZephIR 300 offers two significant advantages in this field – CW Lidar is already accepted as the most appropriate for turbine mounted applications due to its full rotor scanning, and in addition we are able to provide both ground based measurements and turbine mounted measurements from a single platform – we are pleased that NEL is already benefiting from this and we look forward to working closely with them in this important research and standards area.”

Notes for Editors

About Zephir Ltd.

“Celebrating 10 years of wind lidar excellence”

In 2003 we released the first commercial wind lidar, ZephIR®, exploiting decades of research at UK government Research & Development establishment QinetiQ. Designed specifically for the wind industry ZephIR has paved the way for many of the remote sensing devices seen in the market today. Our original lidar technology continues to innovate with world firsts such as taking measurements from a wind turbine spinner and being the first to deploy an offshore wind lidar, both fixed and floating. ZephIR has also now amassed more than 3.5 million hours of operation across 650+ deployments globally spanning a decade of commercial experience. For wind measurements onshore, offshore and in turbine-mounted applications, ZephIR provides accurate, reliable finance-grade wind data.

Zephir Ltd. is a wholly owned subsidiary of Fred. Olsen Ltd. - established in the UK in 1963 with business interests primarily focussed on renewable energy, including ZephIR.

Visit www.zephirlidar.com for more information.

About NEL

NEL is a leading independent, international technology services organisation. It delivers a range of world-class research, development, modelling, calibration, measurement and testing services to clients across many sectors including energy, environmental, and government. NEL is a global centre of excellence for flow measurement and fluid flow systems, and is the custodian of the UK’s National Standard for Flow Measurement.

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NEL is a trading name of TUV SUD Ltd, a parent company, [TÜV SÜD](#), is an international service organisation, employing over 18,800 people in over 800 locations worldwide.

NEL has operated Myres Hill, a remote wind turbine test site located 10 km from its offices in East Kilbride, since the early 1980's. The test site provides a unique base with excellent wind resource and facilities to undertake development and type testing of small and medium wind turbines. With its complex terrain, accessible large wind turbines, and neighbouring wind farms, the site also plays host to research and development activities for large wind metrology. NEL has made significant technical contributions to the development of renewable energy technologies, including wind standards development.

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Visit www.tuvnel.com for more information

About the UK National Measurement System

The National Measurement System is the UK's national infrastructure of measurement laboratories, which deliver world-class measurement science and technology through its National Measurement Institutes (NMIs): NEL, LGC, NPL, the National Measurement Office (NMO) and the National Gear Metrology Laboratory. It provides traceable and accurate standards of measurement for use in industry, academia and government.

For more information on the NMS visit www.tuvnel.com/tuvnel/national_measurement_system/