WINDCUBE WATCH

N° 1

Features

From the Editor

As the wind energy industry continues to grow, the need for more accurate and sophisticated wind data has also grown. Remote sensors, particularly lidars, have advanced steadily in their capacity to deliver this information in a reliable and easy-to-use manner that is increasingly accepted by financial lenders.

During the site assessment phase, the fast acquisition of «bankable» data reduces uncertainty and increases return on investment. The «all weather-all terrain» operational performance of the WINDCUBE® lidar remote sensor has accelerated the data collection process, which in turn, has helped to accelerate the financing of wind projects. Other pieces of the development process, including power curve verification at hub heights and turbine wake analysis, are starting to experience operational or financial returns from the use of lidars. The exploration of more challenging wind locations such as ridgelines, oceans, lakes, and forested areas also benefit from the use of lidars.

The offshore wind energy market is extremely promising. Europe alone has a pipeline of 19 gigawatts of offshore development. Lidars provide a low-cost and immediate solution to offshore siting by providing bankable 200-meter wind measurement capacity, unique deployment, and easy-to-use power supply.

Lidars are also effective in complex terrain. Aided by computational fluid dynamic (CFD) software, lidars have proven their ability to provide data that is highly correlated to traditional anemometry data.

Windcube Watch is the first edition of our biannual newsletter, which is aimed at helping the wind industry better understand the impact of lidar technology.

NRG SYSTEMS LEOSPHERE Lidar Environmental Observations

Global Partners in Lidar Wind Technologies

One year operating WINDCUBE® OFFSHORE by DEWI at FINO1

Fino 1 is a German offshore research platform that was erected in the North Sea in 2003. Its main purpose is to be used for a technical and biological measuring campaign in order to gather available data to reduce the existing risks in the design and operation of offshore wind turbines. It provides one of the highest continuous wind measurements in the offshore area. A 100 m lattice tower has been installed on the platform, it is equipped with cup and ultrasonic anemometers at different heights to measure the wind speed and wind directions. DEWI being in charge of the technical measurement has added a WINDCUBE on the platform to carry out a long term (1 year) data comparison between lidar and mast data. The results are showing a good agreement between both data sets when comparing 10 min average measurements, especially in terms of wind direction an availability was 98% at 100m and 91% at 200m, the decrease of availability is due to the decrease of the signal to noise ratio with height. However, those values confirm that the WINDCUBE can be operated under harsh offshore conditions while giving data which are in high correlation with the FINO1 met mast. More detailed information about this one year deep analysis can be found on the DEWI website. The increasing importance of the offshore market and the need for small, compact, fast to deploy measurement tools allow to enlarge the scope of the lidar technology to offshore applications showing its huge potential and cost saving in comparison the expensive erection of a tall mast on a platform.

Please refer to the DEWI magazine N°38 to know more on the project following the link below
http://www.dewi.de/dewi/index.php?id=46

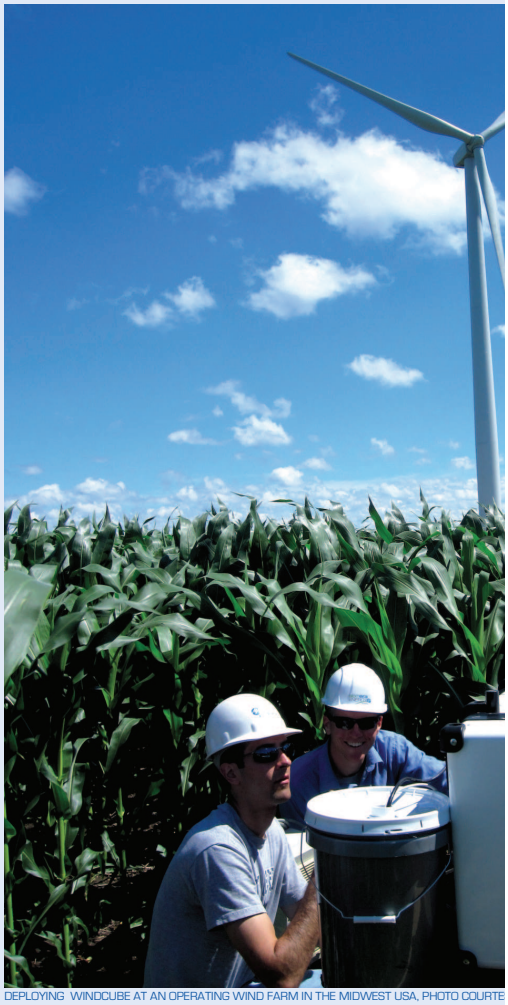
Beyond simple terrain: Advancing the "bankability" of WINDCUBE® in all site and climate conditions

The WINDCUBE®v2 Lidar remote sensor offers significant promise for wind energy developers through the reduction in wind measurement uncertainty and the associated financial risks. While there is a strong body of evidence to suggest that measurements of horizontal wind speed and direction recorded by WINDCUBE in simple terrain are as accurate as those recorded by industry-standard cup anemometers, a number of WINDCUBE-mast comparisons taken in complex terrain sites over the years have shown a clear and consistent bias in horizontal wind speed measurements. This is due to the variation in wind flow across the volume of air measured by Windcube, a common problem among all remote sensors. In order for WINDCUBE to be considered "bankable" as a standalone device in complex wind sites and severe climate regimes, the accuracy of this technology needs to be measured in complex flows and through harsh weather conditions.

Leosphere and NRG Systems have partnered with GL Garrad Hassan, Technocentre éolien (TCE), Cartier Wind Energy and École de Technologie Supérieure to undertake a study at a climatically harsh and topographically complex location within a wind farm owned and operated by Cartier Wind Energy in Gaspé, Quebec, Canada. The study will seek to understanding of WINDCUBE performance in complex terrain, but also to develop standard methodology for utilizing computational fluid dynamics (CFD) to increase accuracy and reduce overall uncertainty.

The harsh winter conditions of the Gaspé Peninsula also offer an excellent chance to test WINDCUBE's ability to operate in snow and cold. According to Frédéric Côté, TCE General Manager, "The partnership will serve to improve practical and scientific knowledge of the performance of the Windcube in these conditions and should lead to broader use of this technology to assess the wind resource".

A similar study is currently underway in partnership with DNV Renewables at a complex site near the Columbia River Gorge in Oregon. Preliminary results from both studies are expected to be presented at the European Wind Energy Conference in Brussels, Belgium, in March, 2011, with final reports published later in the year.



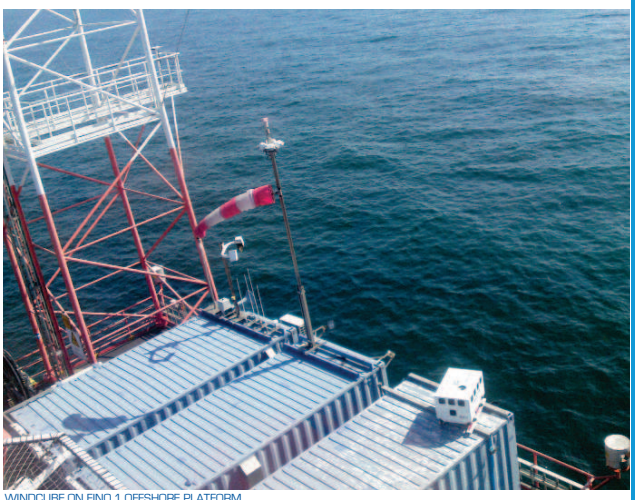
DEPLOYING WINDCUBE AT AN OPERATING WIND FARM IN THE MIDWEST USA, PHOTO COURTE

Profile of a WINDCUBE® user: Professor Julie Lundquist, University of Colorado

As an atmospheric scientist focusing on boundary layer meteorology, University of Colorado professor Julie Lundquist understands the importance of advancing scientific understanding of the wind resource through the swept area of modern wind turbine rotors and beyond. Her ongoing areas of study include wind turbine wake development and impacts, representations of turbines in weather models, surface-atmosphere interaction and urban airflow.

In early 2010, Dr. Lundquist purchased a WINDCUBE to shed light on the wind profile up to 200m with a high degree of accuracy. WINDCUBE's versatility was especially appealing to her. "For our research, portability is critical," said Lundquist. "We need to be able to move and operate the remote sensor in dense crops or complex terrain with as few as two people." A similar principle applies to her work in urban meteorology where having a sensor that can operate in noisy environments in a range of atmospheric conditions is important. During a measurement campaign which took place in July 2010 at an operating windfarm in the midwest of the United States, WINDCUBE was able to document several nocturnal low level jets and observe "bites" taken out of the wind profile downwind of turbines, consistent with the increased turbulence and decreased wind speeds to be expected in turbine wakes. Some preliminary results of this research were presented at the 91st annual meeting of the American Meteorological Society (AMS) in January 2011. University of Colorado graduate student and Lundquist Research Group member Matthew Aitken received an AMS Outstanding Student Poster Award for his work on documenting WINDCUBE's performance in various atmospheric conditions.

SY OF JULIE LUNDQUIST (University of Colorado)



WINDCUBE ON FINO 1 OFFSHORE PLATFORM

WINDCUBE V2 IN GASPE, QUEBEC

WINDCUBE
WATCH

Employee Introduction

Sébastien Dubois,
Customer Support Supervisor,
Leosphere

Why did you choose to work at LEOSPHERE?
I was attracted to Leosphere for several reasons: by its focus on renewable energy, which I consider crucial to long-term energy sustainability; its high-technology products, which draw upon my scientific education; its fast-paced growth and opportunities for progress; and its international focus which allows my team and I to travel worldwide.

What do you like most about your job as a customer support supervisor?
My main satisfaction comes from working closely with our customers. Their satisfaction with our company and products is of utmost importance - it's the organizing principle of our entire team. Our goals are responsiveness, expertise, commitment and quality of services. I also love to travel and experience different people and cultures; this job gives me the opportunity to see the world.

How do you perceive the evolution of the customer service in the next years?
Services in general are one of the main strategy objectives at LEOSPHERE. Providing high-technology instruments comes along with high-quality services if you want to make a clear difference with your competitors. In the following years, among other fundamentals, opening new branches around the world would help us to be even closer to our customers who are global companies.

Where is the most interesting destination you've traveled to in the last year to commission a Windcube?
I had the chance to travel to New Zealand to commission the first system deployed in this country such a far away and exciting trip together with the sheeps!

Recent WINDCUBE v2 installations :

RWE, UK - Feb. 2011
Gamesa, Spain - Feb. 2011
Energie Werkstatt, Austria - Feb. 2011
SOL-E, Switzerland - Jan. 2011
ECN, Netherlands - Jan. 2011
Fraunhofer IWS, Germany - Jan. 2011
TechnoCentre éolien, Canada - Jan. 2011
SOMA, Turquey - Jan. 2011
3E, Belgium - Dec. 2010
GEOSEA, Belgium - Dec. 2010
DNV Renewables, USA - Dec. 2010

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Meet us

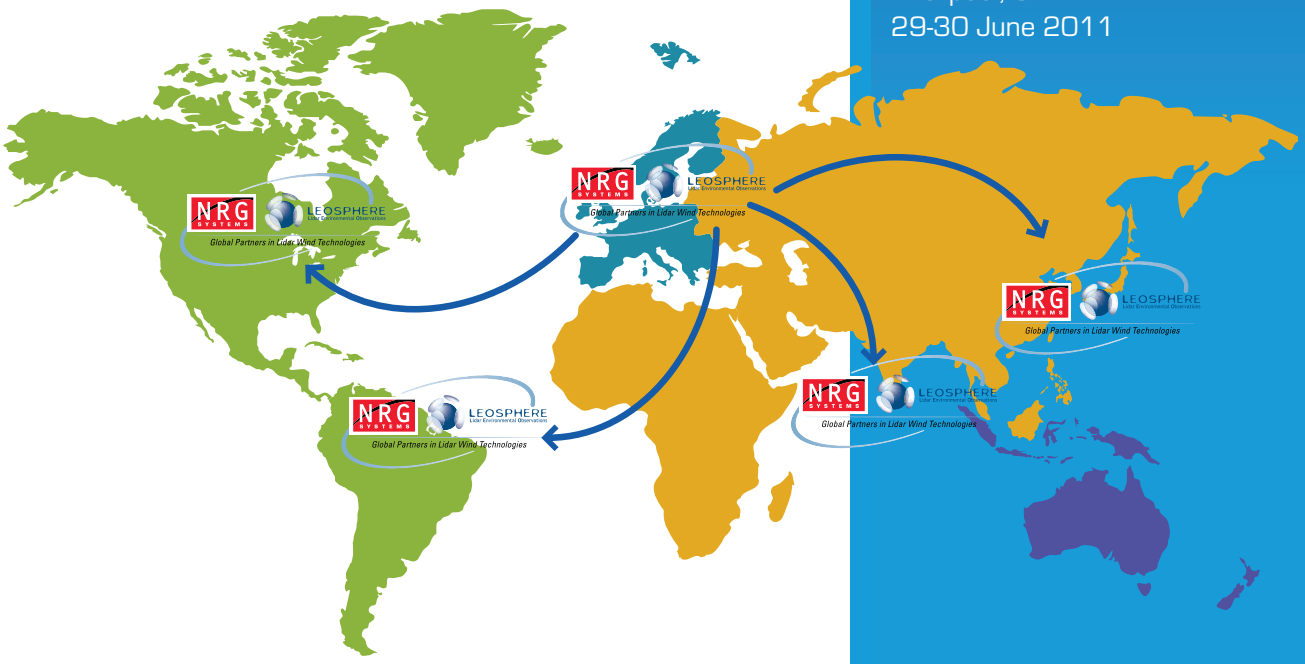
EWEA
Brussels, Belgium
14-17 March 2011

WINDPOWER INDIA
Chennai, India
7-9 April 2011

WINDPOWER
Anaheim, CA, USA
22-25 May 2011

WINDPOWER ASIA
Beijing, China
22-24 June 2011

RENEWABLE UK OFFSHORE WIND
Liverpool, UK
29-30 June 2011



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