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UPWIND PROGRESS IN REMOTE SENSING OF THE WIND USING LIDARS AND SODARS (abstract-ID: 464)

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Multi-megawatt wind turbines have created the need to measure the wind speed at 100 m and above includingthe whole rotor .Development of LIDAR and SODARS has made remote sensing an attractive alternative to high met masts and a growing interest for the introduction these techniques in wind energy is therefore present.

The UPWIND EU-project work package 6 deals with remote sensing measurements. The scope is to gather the existing experience in this field, generate new and eventually create the basis for the introduction of these techniques in wind energy.

This paper describes an overview of the progress achieved in the UPWIND EU-project work package 6 after approximately two years.

The UPWIND Remote sensing work package are currently investigating three different types of remote sensing

1) Mono static SODARS
2) Bi static SODARS
3) LIDARs (Qinetiq) in the form if focusing laser Doppler systems

In the investigations of the Mono static SODAR the WISE project have shown that there us an urgent need for a calibration method of SODARS. The alternative otherwise is to supplement the SODAR's with a met-tower for calibration. Salford University has been developing a test and calibration method for the loudspeaker arrays in SODARs for testing signal to noise relations including the beam patterns. An atmospheric model is used to simulate responses for different configurations of SODAR arrays. Part of this work has been finished and investigations are now performed for calculation the signal return for different situations which might enable a real calibration method to be applied for SODAR's.

The Bistatic sodar is under development and theoretical understanding of the system has been achieved. The Bistatic SODARS measures in one volume in contrast to both the lidar and monostatic Sodar systems. This method therefor has an advantage in complex terrain. The progress on the system here reported, showing a much higher sensitivity compared to monstatic SODAR systems.

The focusing LIDAR system Zephir from Qinetiq have been deployed in both flat and complex terrain and compared to met masts. A comprehensive understanding of the LIDAR have been obtained during these campaigns

In the flat terrain experiments comparisons up till 100 m have shown that the cloudcorrection method for signals have biased the measured wind speeds towards a lower wind speed and new method has been developed to corrected the measured signals.

The results from the complex comparisons campaign is reported. Preliminary results show that there is a significant underestimation of the wind speeds which partly is due to the measurement volume compared to a single point measurement. Methods for describing this difference theoretical are currently being developed. Here the size of the estimated systematic error can be calculated giving a terrain, mast and lidar position and measurement height.