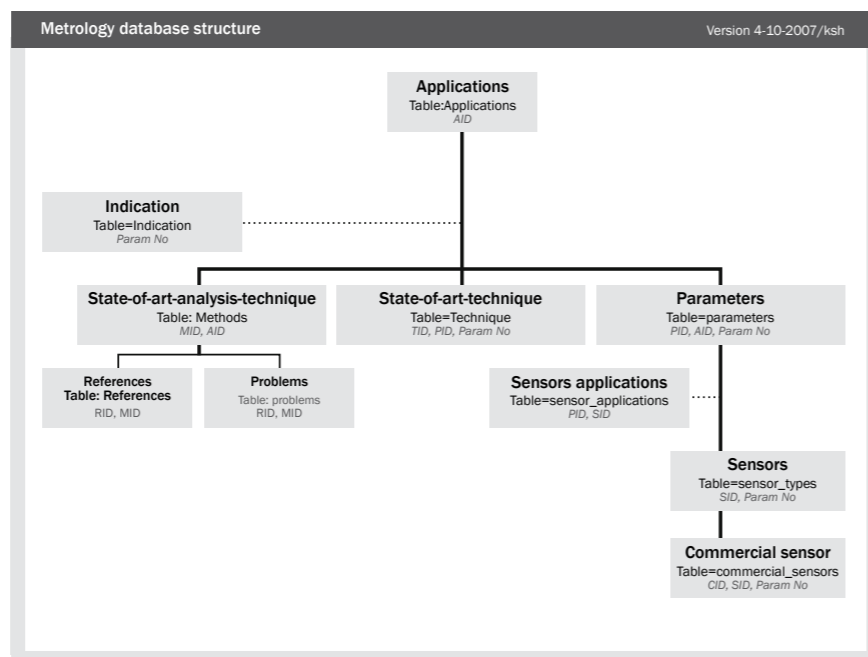




RESULTS AND EXPECTATIONS

The objective of the WP Metrology is to develop ways to significantly enhance the quality of measurement and testing techniques for wind energy applications. The specifications of measurement systems become more and more severe as the sizes of the wind turbines increase, the project developers require more security of their investments (warranty of maximum performance during the wind turbine's entire lifetime) and the amount of investment increase.

Results of this WP can be downloaded from the UpWind website.



Metrology

THE CHALLENGE

The development of wind energy is hindered by measurement problems. Therefore, the metrology problems connected to wind turbine technology are the focus of this work package. In particular the fluctuating wind speed introduces large uncertainties as sensors, such as cup anemometers, often do not respond linearly. Wind fluctuations are experienced throughout the entire wind turbine. Loads are proportional to the wind speed squared and power to the wind speed cubed.

An example of a problem through measurement uncertainties is that it is almost impossible to confirm anticipated small performance improvements resulting from design modifications by means of field tests. As long as convincing field tests have not confirmed the actual improvement, the industry will be hesitant in investing in turbine design improvements.

The concept improvements resulting from the research activities of the UpWind project will require validation which is based on reliable and appropriate measurements.

THE RESEARCH ACTIVITIES

The first task towards a development of metrology tools in wind energy in order to significantly enhance the quality of measurement and testing techniques is the establishment of a list of parameters that need to be measured.

This has been done by:

- Identifying all relevant measurements within the wind energy community;
- Describing their definition in detail;
- Identifying all relevant influence parameters;
- Quantifying their systematic influence on measurements;
- Specifying traceability;
- Applying advanced uncertainty analysis methods.

The report that presents a state of the art assessment to identify all relevant measurements can be downloaded from the UpWind website. The required accuracies and required sampling frequencies are stated from the perspective of the users of the data.

The second task is to identify the state-of-the-art measurement and analysis techniques together with the available measurement instruments. This analysis also addresses the possible attainable accuracies of the instruments and known operational behaviour.

WP1A1

WP1A2

WP1A3

WP1B1

WP1B2

WP1B3

WP1B4

WP2

WP3

WP4

WP5

WP6

WP7

WP8

WP9

UpWind


SIXTH FRAMEWORK PROGRAMME

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