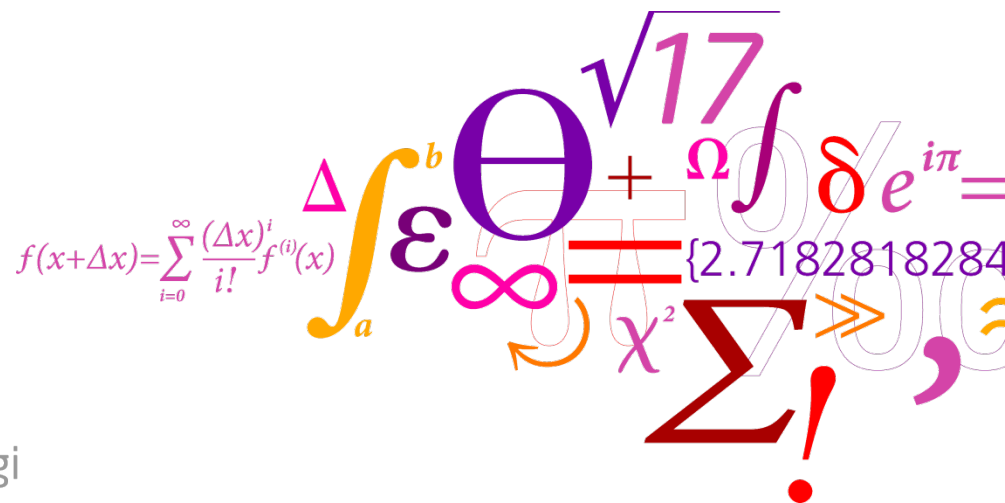


PSO Aerial Sensors for Wind Power Meteorology - Introduction

Workshop, Risø, 12. July 2010



Offshore example: Horns Rev

- Interesting meteorology
- Difficult to access
- Wakes are not very well understood
- Other technologies expensive or difficult to employ (masts, lidar..)



Project overview

The project started after hearing something about Quadrocopters on the Deutsche Welle podcasts. After some initial research, I figured, “So ein Ding müssen wir auch haben!”. The idea here is (formulated by a colleague) to have a wind sensor at a freely configurable 3D place within an area of interest (e.g. a wind farm) for a given period of time.

This led to me (and a couple of colleagues) to join the COST action by Jochen, who had worked with the same sort of problems already for a long time, and to start thinking about a proposal.

Finally, the current proposal was put together with you to target broadly and boldly as a pre-cursor to further research.

Partners

- **Risø DTU**, Wind Energy Division
 Over 25 years experience in wind energy, strong meteorological and measurement expertise, runs national test station in Høvsøre
 Gregor Giebel, Meteorology Group
 Uwe Schmidt Paulsen, Test and Measurements
 Apostolis Piperas
- **University of Bergen**
 Jochen Reuder, Meteorologist, came from LMU with some experience in aerial sensors, now leader of COST action ES0802 “Unmanned Aerial Systems in Atmospheric Research”
- **Aalborg University**
 Anders la Cour-Harbo, comes from autonomous helicopter research
 Morten Bisgaard
- **Delta**
 Large experience with measurements – including electrical spikes at Nysted with synchronised 200 ns resolution
 Carsten Thomsen, Director of Engineering
 John Mølgaard
- **University of Tübingen**
 Strong collaboration with Braunschweig Technical University
 Jens Bange, formerly TU Braunschweig

Work packages - Overview

- WPO Management
- WP1 State-of-the-Art (“Existing Sensors / Platforms”)
 - 1.1 Report on existing aerial platforms
 - 1.2 Report on existing sensors
- WP2 Workshop (“Use in Wind Power Meteorology”)
- WP3 Flight Week and Hardware (“Demonstration of Existing Systems”)
 - 3.1 Kite
 - 3.2 Helicopter
 - 3.3 Flight week Høvsøre
 - 3.4 Data assessment

WP1 Existing Sensors / Platforms

In the COST project on UAS (www.cost-uas.net) , a database on aerial platforms and on sensors is built. In this project, we want to get a report and selection out of it usable for wind energy purposes.

- Task 1.1: Report on existing aerial platforms
- Task 1.2: Report on existing sensors
Includes wind estimation algorithms
- *Many existing – needs to start from the use case to exclude airframes*

WP2 Use in Wind Power Meteorology

Only item: Organisation of a one-day (*this!*) workshop with external stakeholders to figure out what the problems are, how flying platforms can be part of the solution, and how those solutions can be tried out during flight week. Largely as preparation of flight week.

WP3 Demonstration of Existing Systems

In comparison to the proposal, this task was left relatively untouched. The hardware budget even was increased somewhat.

- Task 3.1 Kite
See presentation of Uwe Schmidt Paulsen, Risø.
- Task 3.2 Helicopter
- Task 3.3 Flight week Høvsøre
- Task 3.4 Data assessment
Essentially, some time to work with the data and fine-tune algorithms.
Includes data acquisition of Høvsøre fixed sensor data and comparison.

Flight week: Høvsøre

- 5 large turbines
- 5 met towers to hub height
- 2 light towers up to 167 m
- ...plus some lidars, sodars etc.
- Permits??

