

# IPID4all Doctorate Research Exchange with Energy research Centre of the Netherlands (ECN)

## Feedback report

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*First of April till end of May*

*Validation of Yaw correction models*

*ECN*

*Wind energy Dep, Petten-NL*

*Gerard Schepers*

### Introduction

The Energy Research Center of the Netherlands-Wind Energy Technology department is mostly focused on engineering models in connection with wind Turbines. This includes work on LIDAR research, computational fluid dynamics, rotor wakes and engineering modes. All these topics are of high interest to the wind energy CFD group of ForWind institute in Oldenburg. As the group of Prof. Schepers is already in cooperation with Forwind in several EU projects such as MexNext and AVATAR and also he has a deep knowledge in engineering models, this work was highly interested for both parties and we exchange our experience in the field of wind turbine aerodynamics.

### Research Undertaken

In this period we investigate the capabilities of current engineering tools

Blade Element Momentum (BEM) and free vortex wake code for prediction of key aerodynamic parameters of wind turbines in yawed flow. Axial induction factor and aerodynamic loads of three wind turbines (NREL VI, AVATAR and INNWIND) were investigated using wind tunnel measurements and numerical simulations for 0 and 30 degrees of yaw.

### Personal Experience

For me was very interesting the experience of working in a professional group with people who are dealing daily with industrial partners and also getting to know other researchers who are working in same field and having discussion about my topics.

### Conclusions

I would really appreciate the opportunity that IPID4all provided for me to do this research visit. I would also strongly recommend the other students to use this programme in order to improve their research.

### Outlook

- o The results from this exchange has been summarized in one paper which has been submitted to the conference of the Science of Making Torque from Wind and will be presented in October.

Title of the paper:

Investigation of the current yaw engineering models for simulation of wind turbines in BEM and comparison with CFD and experiment

- o My supervisor from ECN is going to visit us in ForWind in October in order to further work on this topic and also possible cooperation regarding other topics which we work on in ForWind



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