

***Current and vibration analysis  
for a preventive condition monitoring in offshore wind farms  
An advanced signal processing approach***

*Supervisors: Nadine MARTIN, Tel. 33 (0)4 76 82 62 69  
[nadine.martin@gipsa-lab.grenoble-inp.fr](mailto:nadine.martin@gipsa-lab.grenoble-inp.fr)*

*Corinne MAILHES, Tel. 33 (0)5 34 32 22 37  
[corinne.mailhes@enseeiht.fr](mailto:corinne.mailhes@enseeiht.fr)*

The production energy of wind farm is becoming more and more important in several countries. Its impact on the electrical grid grows every day, at the country and continental grid scale. The economic value of the wind farm does not only reside in the amount of energy produced but also in the capacity to forecast this energy. The forecast is built on production capacity available and wind prediction. The availability of the equipment and therefore the capacity to plan the maintenance based on a reliable condition monitoring of the equipment are crucial challenges that the project KAStrion will take up.

KAStrion is a European project which will run from 2012 to 2014 with 7 partners coming from France, Poland and Netherland. Based on academic research labs, technical centers, industrial companies and production plants, the originality of KAStrion project lies in the crossing of high competencies in the full value chain of the condition monitoring of a mechatronic system from the data captures to the final decision-making in order to improve the production goals.

KAStrion project will deliver a stand-alone analysis system which delivers an innovative on-site pre-diagnostic of the machine based on a multi-modal spectral monitoring technology, connected to a tailored diagnostic center which delivers a reliability prediction of the farm.

This thesis is part of KAStrion project and will have the objective of designing and developing a part of the condition monitoring system with signal processing methods only. The candidate will benefit of all the existing developments and of the know-how of the 2 labs concerned. The final system developed by one SME of the consortium will be embedded in the nacelle of a wind turbine. The candidate will participate to the tests in collaboration with the other partners of the project. Onshore wind turbines of different manufacturers will be instrumented to evaluate the prototype performance in real condition in order to assess the turbine component wear. Results will be validated by experts in the domain. The main objective is to develop an autonomous system which could also be used in offshore where the access is difficult and costly.

The candidate will essentially focus on the signal processing part of the system, mainly on the non-stationarity issue due to the wind variations and on the surveillance of the system along time. Based on the analysis part already developed, the candidate will propose a way of tracking relevant features in order to monitor the turbine components.

The PhD student will be integrated in GIPSA-lab, SAIGA team, in collaboration with the *Signal and Communication* team from IRIT lab of Toulouse. He will participate at the working meetings of KAStrion project.

***Skill requirement:*** *signal processing, time-frequency and spectral analysis, detection theory, classification*

***Financial support:*** *KAStrion project*

***For further information:*** [AStrion](#)

***Application should be sent to*** [nadine.martin@gipsa-lab.grenoble-inp.fr](mailto:nadine.martin@gipsa-lab.grenoble-inp.fr)