**MOMENTA PROJECT**

The master internship will be performed within the framework of the national project ANR MOMENTA. The objective of this project is to improve the estimation of aero-elastic loads in a configuration which appears more and more frequently with the current wind farm layouts, namely the specific case of a wind turbine exposed to the turbulent features of the wake of an upstream wind turbine (called later Wake-Induced Turbulence). The project proposes thus to provide an accurate description of two necessary aspects:
- the Wake-Induced Turbulence using original drone measurements (WP1, WIND INFLOW)
- the impact of this Wake-Induced Turbulence on aerodynamic loads using both wind tunnel measurements and CFD computations (WP2, AERODYNAMIC BLADE LOADS).

Then, these improved descriptions will be implemented in the aero-elastic wind turbine design solvers (WP3, AERO-ELASTIC SOLVERS) for a better estimation of aero-elastic loads. Due to the improvement of the Wake-induced Turbulence description (WP1), this project will also provide a first step towards optimized wind farm layouts in dense configurations, in terms of both energy yield and load reduction.
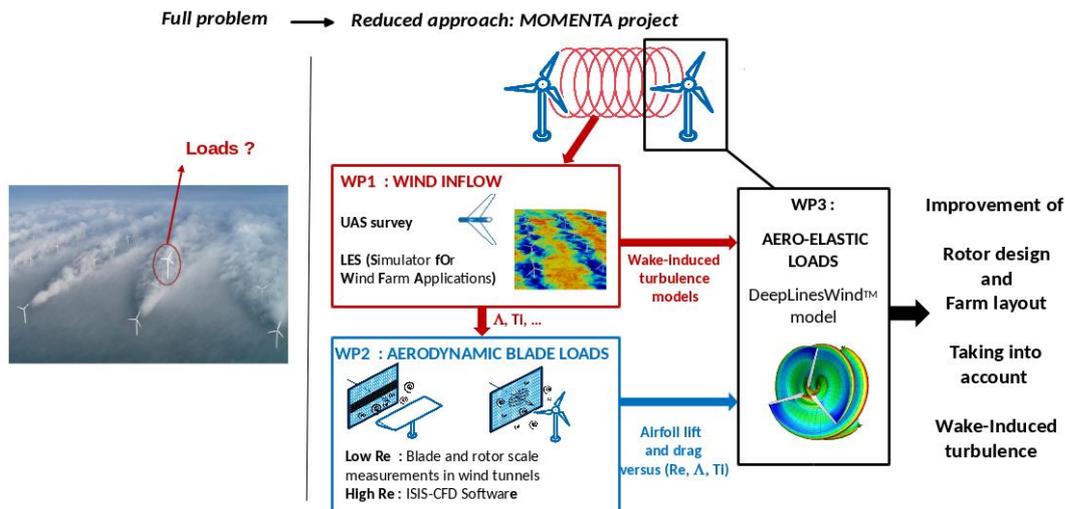
INTERNSHIP TOPIC

In the framework of this project, a field campaign in an onshore wind farm operated by VALOREM is ongoing. A meteorological mast equipped with sonic-anemometers located at different heights was installed near the wind farm. For some wind directions, the met mast is located in the wake of wind turbines.

The main objectives of the master internship is to process the meteorological data, classify them according to environmental conditions (wind speed and direction, thermal stability) and to study atmospheric flow properties in presence or not of a wind turbine wake perturbation. Met-mast data will be correlated with the WT operational data and with ERA5 global reanalysis data. The modification of the turbulent properties of the flow due to the presence of a wind turbine wake will be deeply investigated.

Required skills: fluid mechanics and turbulence, atmospheric flows, data processing and analysis
Level: Student in 2d year of Master of Science or final year of engineering school
Period: 6 months from March 2022

APPLICATION
Send your application before January 17, 2022, to Sandrine Aubrun (ECN/LHEEA lab)
sandrine.aubrun@ec-nantes.fr

The application should contain:
- A CV
- A motivation letter
- 1 or 2 Reference letters for former supervisors or teachers
- Transcripts for Master 1 and Bachelor