FLAIR

Final Year Project 2016

Fluids Laboratory for Aeronautical and Industrial Research (www.flair.monash.edu.au)

Automated wind turbine defect detection

A 12-credit-point Final Year Project for one student studying Mechanical or Aerospace Engineering

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Background

Modern wind turbines (WT) have a lifespan of 20 years and are often required to operate in harsh atmospheric conditions. To ensure optimal performance, continual monitoring of the fatigue state of critical turbine components such as the blades, is required. Wind turbine blades experience a number of fatigue issues including cracks, water damage, lightning strikes, internal defects and leading/trailing edge erosion. Depending on wind turbine location, the blade paint or 'gel coat' can be eroded on the leading edge due to a variety of reasons including airborne particulate matter, rain, hail and insects. The wind industry would benefit from more robust optical based inspection methods.

Figure 1: Wind Turbine leading edge erosion affects aerodynamic performance and structural integrity of the blades.

Project description

In this project, the student will conduct experiments on wind turbine blade samples using various light sources (daylight, laser, Red, UV, IR) and filters to determine optimal defect detection conditions. Using this knowledge, a method to automatically detect wind turbine blade defects will be developed.

Figure 2: Damage to a wind turbine tip due to a lightning strike.

Student requirements

This project will suit a student that has an interest in both aerodynamics and wind/renewable energy, a strong understanding of digital image processing and competency with MATLAB/Python. The project will be 12 credit points.

Further Details

To express interest in this project please contact either Dr. Jisheng Zhao (jisheng.zhao@monash.edu) or Dr. Michael Sherry (michael.sherry.au@gmail.com)