

Investigating the Effect of Electromagnetic Interference on the Measurement Equipment of a Rotor Test Rig

Background:

The MERIT Test Rig (pictured) is a Whirl Tower designed specifically for dynamic stall investigations in a rotating system. Due to the unpredictability and harsh loads experienced during dynamic stall, the motor is overscaled at 85 kW, to ensure it can maintain a constant RPM value and does not get damaged by unexpected aerodynamic occurrences. However, this means that the electromagnetic field surrounding the motor, as well as the cable supplying electricity, has a measureable impact on the quality of the data from the sensory equipment. This is most drastically seen in the force gauges, wherein even just supplying the power to the motor at 0 rpm causes large amplitudes to be seen in the measured signal. The thesis would involve first conducting a literature review, wherein common problems and solutions may be assessed. While some preliminary work has been conducted, prompted by observations during routine tests, a comprehensive and quantitative analysis has not been conducted yet.

Contact:

Matti Mitropoulos
matti.mitropoulos@tum.de
089 289 16370
Office: MW2701

Project Outline and Milestones:

- Literature Review on EMI on motors and cabling, and shielding / mitigation methods
 - MS1: Expose outlining project
- Initial Testing to quantify effects of EMI on each sensory output
 - MS2: Identify key hardware where most significant improvements can be made
- Determine optimal methods of improvement and implement these
 - MS3: Implement and quantify effect of newly implemented measures

Prerequisites:

- Ideally experience with DAQ systems and Hardware operation
- Creative approach to problem solving

