Master thesis: Modal analysis of an interaction between a strake vortex and a turbulent boundary layer *(time frame: 6 months)*

Background:

The proposed master thesis is supposed to experimentally investigate the interaction of a generic strake vortex with the turbulent boundary layer of the DLR F15 airfoil. Special focus lies on the vortex core meandering caused by the interaction with the boundary layer, as well as a possible correlation between the meandering and a BL detachment at the Fowler flaps.
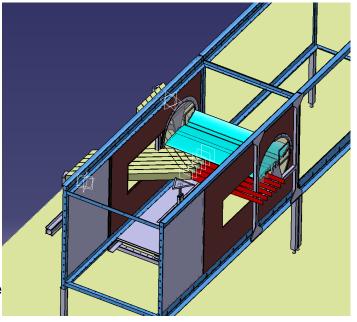
For this, a time-resolved Stereo-PIV campaign in supposed to be conducted within the subsonic wind tunnel of the TU Braunschweig. The master thesis includes a meticulous evaluation of the PIV planes via a modal analysis with the help of the Python library flowTorch, as well as an evaluation of the pressure data of the two-element airfoil.

Tools:

* Stereo-PIV
* DAVIS 8
* Python

Requirements:

* Advanced knowledge in (unsteady) Aerodynamics
* Preferably: knowledge in PIV setup and/or PSI setup

Literature:

* Landa, Tim, et al. "Experimental and Numerical Analysis of a Streamwise Vortex Downstream of a Delta Wing." *AIAA Journal* 58.7
* Weiner, A. and Semaan, R."flowTorch - a Python library for analysis and re 2021",*Journal of Open Source Software* , Vol. 6, No. 68