Bachelor Thesis / Project Thesis / Internship

Validation of a Coupled CFD-Rigid-Body Dynamics Method based on Store-Release Experiments

Background:
For simulations of gust encounters and maneuvers of aircraft DLR’s flow solver TAU was coupled with a rigid body dynamics (RGB) solver. Latter calculates the movement of the aircraft regarded as rigid body under the influence of aerodynamic forces and moments calculated by the the flow solver. Though the coupled solver has already been applied occasionally to maneuver and gust encounter simulations of generic aircraft [1,2], further testing and validation of the solver is still pending. However, validation data for these kinds of simulations is scarce. Primarily measured data from experiments with released stores is available for use in code validations.

Work content:
You will conduct CFD-rigid-body-dynamics simulations with the developed coupled solver for selected store release scenarios. You will evaluate your simulation results and prepare them for the comparison with the available experimental data, such as trajectories, pressure distributions at discrete time points, etc. You will assess the coupled simulation process regarding the achieved agreement with the experiments and you will identify potential improvements in the coupled solver.

Requirements:
Valid candidates should have or are willing to fastly acquire the following skills

- Comprehensive understanding of aerodynamics and flight mechanics
- Programming skills in Python (or related scripting languages)
- Experience with Unix/Linux OS

References:


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