



DLR – DAAD Fellowships

Fellowship No. 510

Research Area : Aeronautics

Research Topic: **Development and application of a rapid-CFD capability based on the next-generation CFD code developed by Airbus, ONERA and DLR**

DLR Institute: Institute for Aerodynamics and Flow Technology, DLR Göttingen

Position: Postdoctoral Fellow

Openings: 1

Job Specification: High-fidelity computational fluid dynamics (CFD) is an essential tool for multi-disciplinary analysis (MDA) and multi-disciplinary design optimization (MDO) of aircraft and helicopters as well as for detailed aerodynamic analysis of components. To perform CFD, a computational mesh based on a CAD geometry is required. While the MDA/MDO simulation process and the coupling of disciplines is highly automated today, most of the CAD preparation and mesh generation is still done manually by skilled experts. When dealing with geometry variations in the design and optimization phase with a very high number of simulations needed, mesh generation becomes a bottleneck in the automated simulation process.

To overcome this bottleneck, a rapid-CFD capability is being pursued based on the CFD-Code CODA, which is being developed collaboratively by Airbus, ONERA and DLR. The rapid-CFD capability comprises automatic octree-based cartesian mesh generation using the Cassiopée code, which is passed on to CODA via the FlowSimulator Data Manager (FSDM) platform and, the application of a RANS solver in CODA utilizing Immersed Boundary Methods (IBM) in conjunction with wall models. The different codes (Cassiopée, FSDM, CODA) and the components (RANS solver, basic versions of IBM, wall models) for a rapid-CFD capability are available. Hence, the focus of the offered position is on setting up the overall workflow (Cassiopée → FSDM → CODA), the automation of the interaction of these components and the

application of rapid-CFD to relevant testcases in terms of verification and validation. The latter includes the evaluation of results in comparison to body-fitted mesh approaches concerning accuracy, robustness and efficiency and the identification of potential needs and improvements.

Required Qualification: DLR looks for a person with experience in the field of development and/or application of components of rapid-CFD (i.e. automated cartesian mesh generation and processing, immersed boundary conditions, wall models), e.g. obtained during a PhD or dedicated project work. A substantial knowledge in advanced programming languages (Python, C++) is essential.

Advantageous Skills: Experience in software development in a team is preferred.

English competence: See requirements on www.daad.de/dlr

Earliest Start Date: 01.08.2021

Application Deadline: Until position filled

Further Information: <http://www.dlr.de>
<http://www.daad.de/dlr>