

**|Bachelor thesis|Semester thesis|Master thesis|**

## Fluid Structure Interaction Investigation of a Dynamically Camber Morphing and Pitching Rotor Airfoil

### Background:

Active camber morphing airfoils have a major potential to improve the efficiency of rotor blades by adapting to the various inflow conditions occurring over a rotor revolution. In comparison to traditional trailing edge flaps the continuous changes in camber show improvements for the lift-to-drag ratios by maintaining a similar lift. The Fish Bone Active Camber (FishBAC) device was shown to be a promising approach for implementation. Due to the highly flexible structure of the FishBAC, aeroelastic effects play a crucial role and can have a vast influence on the aerodynamic performance of the airfoil. In previous studies a high-fidelity fluid-structure interaction simulation was build up with the CFD-solver TAU, the FEM-solver Calculix and the coupling library preCICE.

A major part of further development is the investigation of the elastic dynamic motion of the structure with the help of Finite-Element Method, to improve the accuracy of the coupled simulation. Furthermore, the influence of the fluid structure coupling under different flow conditions, morphing frequencies and geometry variations must be examined. Within this framework, we are looking for a motivated student who wants to write his/her **Bachelorthesis**, **Semesterthesis** or **Masterthesis** at the chair of Helicopter technology.

If you want to learn about a multidisciplinary field of research and acquire a broad knowledge in FEM, CFD, multiphysics coupling and programming feel free to get in touch.

### Recommended Skills:

CFD, FEM, python

### Language:

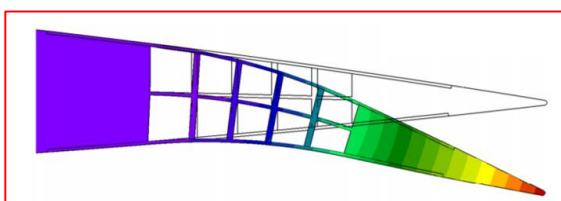
German or English

### Start:

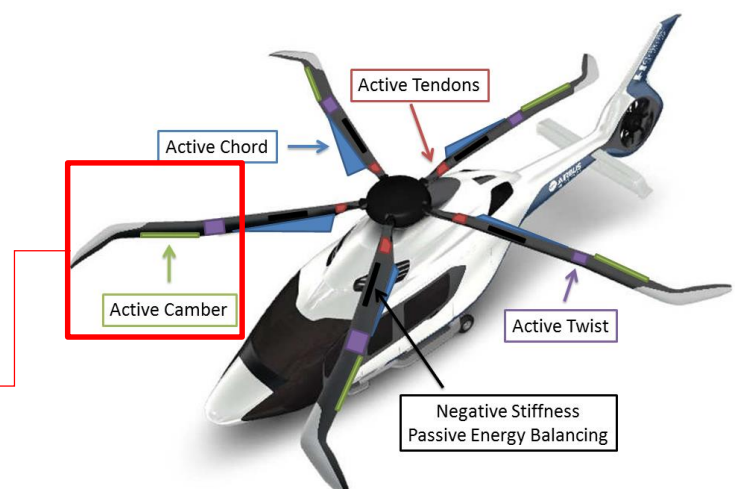
**Flexible (Best March/April 2021)**

### Contact:

Jonas John  
jonas.john@tum.de  
Institute of Helicopter Technology  
Email: amine.abdelmoula@tum.de



Active camber section



Shape adaptive blades as envisioned by SABRE