

Experimental Investigations of a W/T Model with Adaptive Elasto-Flexible Membrane Wings

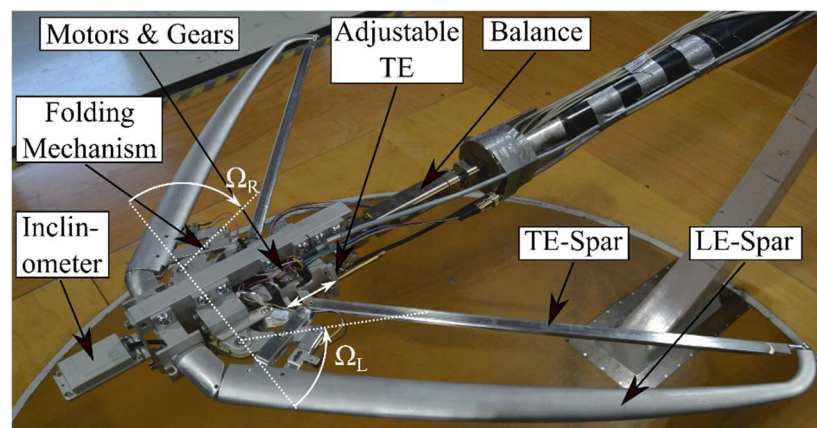
Bachelor's Thesis / Semester Thesis / Master's Thesis

Start: from now

The morphing wing concept aims to constantly adapt the aerodynamics to different flight stages. The wing is able to adapt to different flight conditions by an adjustable aspect ratio (AR) and sweep. A high AR configuration provides a high aerodynamic efficiency, while a low AR configuration with highly swept wings offers good maneuverability [1]. Additionally, the flexible membrane allows the wing surface to stretch and contract in-plane, as well as the airfoil to adapt to different aerodynamic loads. In the context of this work, the aerodynamic characteristics of a full model with form-adaptive elasto-flexible membrane wings are investigated experimentally. The focus lies on the high-lift regime and on the analysis of the aerodynamic coefficients as well as on their sensitivities. Especially, the lateral aerodynamic derivatives at asymmetric wing positions are of interest.



MemWing model in the W/T



Structure of the MemWing model

In the thesis, the W/T model should be investigated experimentally by Particle Image Velocimetry (PIV) and a deformation measurement method. First, the student will assist during the W/T measurements. Later - if the student is experienced enough - he will do his own measurements. Furthermore, the thesis includes theoretical preliminary studies and the analysis of the measured data.

Preliminary work packages:

1. Theoretical studies of aerodynamics of aircrafts and the used measurement methods
2. Familiarization with the used software and hardware
3. W/T measurements with PIV and DIC
4. Evaluation of the measured data

If you are interested in this topic or you have questions, feel free to contact me.

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