

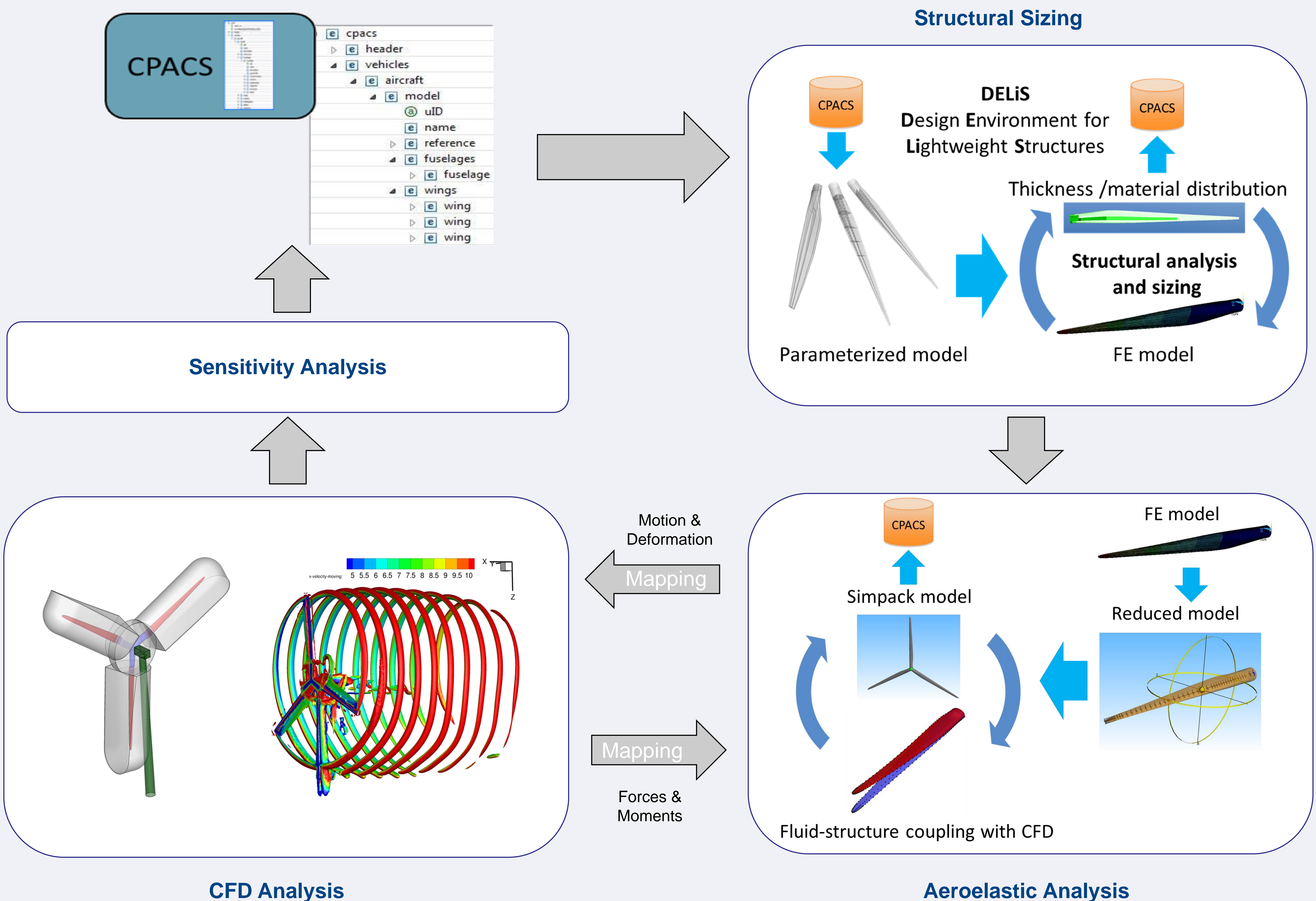
Abstract

Due to the multi-disciplinary nature in the design of wind turbines, developers and manufacturers face several challenges. One of them is the exchange of model data between the different disciplines, e.g. aerodynamics or structural dynamics. To overcome the problems of data exchange between the disciplines the Common Parametric Aircraft Configuration Schema (CPACS) has been developed by the German Aerospace Center (DLR) [1]. Based on this data schema a multi-disciplinary tool chain has been developed and a sensitivity analysis will be performed.

Objectives

The objective is to provide an understanding of the potential of parametric model generation in the wind turbine design process. Variable structural designs can be studied and evaluated [2, 3]. The process chain allows the utilization of different aerodynamic model fidelities. Therefore, local aerodynamic effects as well as fast load calculations are possible. Based on the generation of a multidisciplinary simulation environment for wind turbine rotors a guideline for the integrated design of wind turbine rotors will be developed.

Methods



Conclusions

The poster gives an overview of the multi-disciplinary high fidelity tool chain. This tool chain is capable of performing coupled high fidelity CFD-CSM simulations [4]. This will include RANS simulations with the atmospheric boundary layer, a parametric hierarchical FE-model generator, aeroelastic stability analysis, assessment of alternative manufacturing techniques and a systematic sensitivity analysis with respect to the chosen design parameters.

References

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