



## SUPER – Stuttgart University Program for Experiencing Research Project Information

### Institute's Information

Name of Institute    Institute of Aircraft Design  
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### Duration of Project/Number of Students

June/July                    \_\_\_\_\_  
June/July/August            x  
Number of Students        2

Name of Project        Electric and hybrid electric flight  
Analytical Aircraft Design

Beneficial Skills & Knowledge    Matlab, CAD, Aircraft Design, FEM, CFD, general craftmanship, composite construction, electrical knowledge, model aircraft pilots, glider pilots,

### Description of Work

The Institute of Aircraft Design focuses on economic and ecologic aircraft. The research group is working in various fields of activity, mainly theoretical aircraft design and applied aircraft engineering.

The preliminary Aircraft Design is a multidisciplinary iterative process with many interfaces and dependencies. Computing tools like Matlab/Simulink, Excel, Mathcad as well as dedicated preliminary design tools like SUAVE (Python) or UNICADO (C++) can help to create a larger variety of options for optimization for the Aircraft Design Engineer. In this research project different tools and modules of the Aircraft Design process shall be adapted and integrated as part of the Aircraft Design Toolbox. The Toolbox shall have defined interfaces and link the output to a variety of analysis software like Computational Fluid Dynamics or CAD.



Additionally, the team works with flying prototypes with solar-, battery electric and hybrid electric propulsion in order to find a viable way to reduce emissions and operating cost for future aircraft.

The whole spectrum of applied aircraft design is being utilized from general structural engineering to efficient aerodynamics and electrical drivetrain layout. With a great range of the mentioned engineering fields, we are open to almost all disciplines of technical background. The manned aircraft team is currently consisting of 4 academic positions and a varying number of students to work with.

In 2023 and 2024, the electric aircraft e-Genius received an upgraded primary propulsion system with new batteries and a more powerful electric motor. The system was then flight tested and several electric and automated glider towing flights were performed in the summers of 2024 and 2025. The goal for 2026 is to integrate and test a novel skin heat exchanger made out of carbon fiber in the aircraft.

Depending on the progress of the projects and most importantly on the skills and interest of the applicant, there will be tasks including mechanical and electrical integration aspects, subsystem design and most likely system optimization.

A structured and solution-oriented approach is expected. The work will be in close collaboration with the team.

