

# Master Thesis / Student Project



## Title of the research:

## **Preliminary design of a heat exchanger test setup for hybrid electric propulsion systems**

## Description:

Management of waste heat of individual components is crucial for the effective functioning of (hybrid)-electric aircrafts. There are several thermal management system (TMS) elements that generate high heat fluxes and require a suitable heat exchanger (HEX) design for effective dissipation of this heat. New HEX concepts such as additively-manufactured HEXs, heat pipes, porous media HEXs, etc. are becoming more commonplace. Simulation tools are essential during the early stages of HEX concept development. However, novel designs must be experimentally validated, ideally under conditions that closely replicate real-world scenarios.

The objective of this study is to design and size a comprehensive thermo-mechanical experimental test setup designed to evaluate the performance of various heat exchangers under conditions that accurately simulate those encountered in hybrid electric propulsion flights. This setup will enable controlled testing across a range of operational parameters, such as temperature, pressure, flow dynamics, and loads providing critical insights into the thermal efficiency, pressure drop, structural/mechanical features and overall thermo-mechanical performance of heat exchangers in scenarios representative of hybrid electric aviation environments.



**Start:** As soon as possible.

## Expected qualifications:

- Fundamental knowledge on thermodynamic and heat transfer
- Basic CAD modeling skills
- Basic Matlab programming knowledge (Simulink/Simscape experience would be an advantage)
- Ability to work as a team member

## What we offer:

- Working in an international team
- Possibility of writing a master thesis
- Co-authoring research papers, e.g., in ASME TurboExpo or journals

If interested, please send an email to [asli@b-tu.de](mailto:asli@b-tu.de), including CV and transcript.