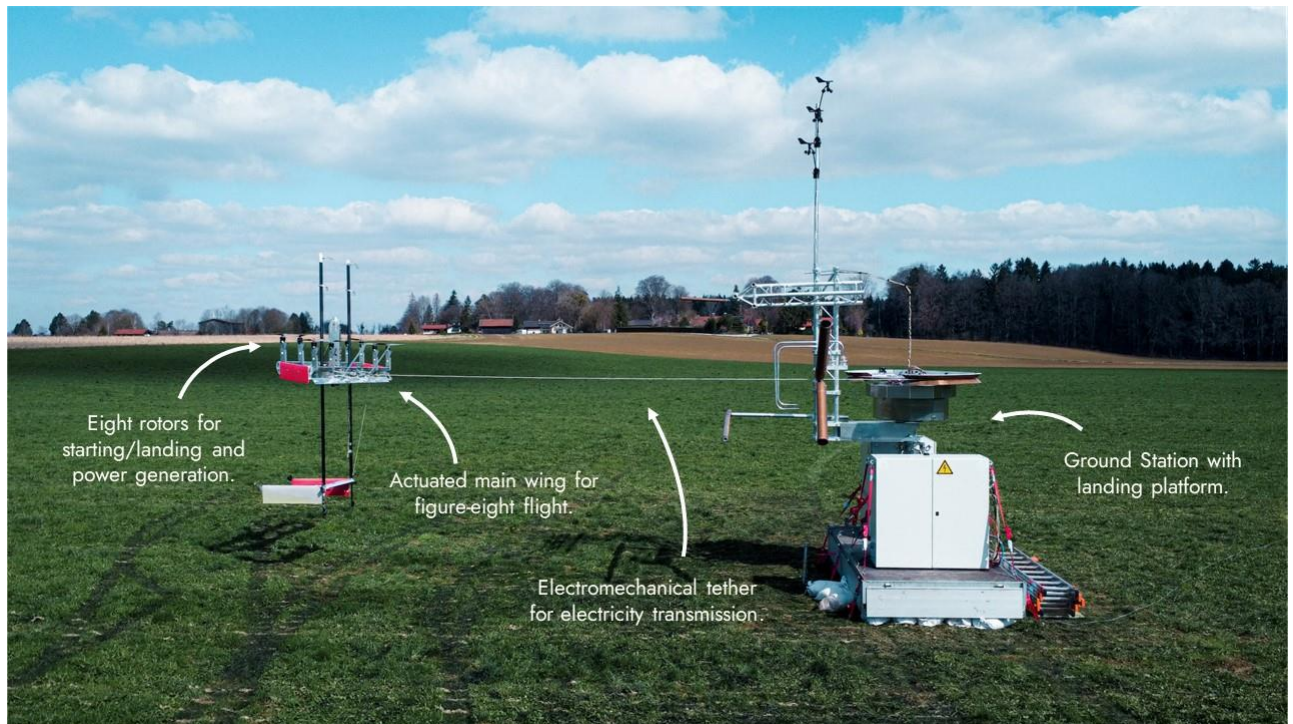


K I T E // K R A F T

Master Thesis on 800V SiC 3-Phase Bidirectional AC-DC Converter for Motor/Generator Control and Dual Active Bridge Converters (m/f/d)

Full Time, on-site in Munich (Rudolf-Diesel-Straße 26, 85521 Hohenbrunn), Starting immediately.

Kitekraft GmbH, Germany



What We Do

Kitekraft is developing advanced wind power systems: power-generating kites, a.k.a. flying wind turbines, that require 10x less construction material than a conventional wind turbine. A Kitekraft unit will generate electricity cleaner, almost invisible, and at least 50% cheaper than conventional wind turbine of the same power rating, and eventually cheaper than any other alternative. Kitekraft develops and will build, sell, and operate flying wind turbines in the 100kW to 5MW+ range, for both grid-scale energy production and off-grid applications. Further information and videos: <https://www.kitekraft.de/>

Why We Do What We Do – Our Mission

Our mission is to help solving the climate and energy crisis. Today still 84% of primary energy comes from fossil fuels. All that has to be replaced by renewables. Electrification of most sectors is in full swing, additional capacities are required for production of e-fuels and hydrogen for transportation, especially shipping and flying, but also for CO₂-neutral steel production and more. We have to at least 10x the current renewable energy capacities. Wind energy will be a backbone of this because of its scalability and availability over the globe. Our flying wind turbines will accelerate adoption and provide a major portion of this since it is cheaper, feasible at more locations, simpler to deploy & maintain, and less visible.

Why write your Master Thesis with us?

- Work on real hardware and really build something that has an impact.
- Work on something that flies, fully automatically, and generates clean energy.
- Work on exciting topics and challenges relevant to solving the energy and climate crises.
- Tackle unknown challenges and deliver something that has never been done before.
- Be at the center of an agile and dynamic team of highly motivated aerospace/wind energy/climate-tech enthusiasts.
- Huge learning potential and the opportunity to build things from the ground up.
- You'll enjoy a high level of freedom and autonomy.
- Flat hierarchy and open communication.

KITE // KRAFT

Your Master Thesis Topic in Detail

In this master thesis, a 800V Silicon Carbide (SiC)-based bidirectional AC-DC power electronics converter (based on a 3-halfbridge "sixpack" module) is to be designed or extended, respectively. The hardware and firmware shall be eventually used for two applications: 1) for each of the 8 onboard electrical machines of the kite which each is connected to a rotor/propeller/wind turbine; 2) for 3-phase Dual Active Bridge-based DC-DC converters in the ground station. An initial design and built prototype are already available, but need to be checked, extended, and programmed. Preliminary high voltage tests have been conducted. However, the PCB design may need to be iterated and further tests at high voltage and full power, including various stress testing scenarios representative for operation on a power generating kite, have to be conducted, before the converter can be used in an actual kite demonstrator or later product. Additionally, for Dual Active Bridge operation, a transformer has to be selected, configured, and tested. Besides the documented hardware/software designs and codes, the master thesis as theory documentation and test reports are important outcomes. Guidelines and templates can be downloaded from <https://github.com/floba/StudentGuidelines>. This multidisciplinary task is supported by the members of the Kitekraft team. Upon start of your thesis, you will be supplied with further information, literature, and material.

Who You Are and What You Bring – Requirements

This student work will be jointly supervised by the Technical University of Munich (TUM) Chair of High-Power Converter Systems (<https://www.epe.ed.tum.de/en/hlu/home/>) and the TUM spin-off Kitekraft. The ideal candidate

- is a student in electrical engineering or related fields,
- can program in C/C++ (requirement for this master thesis)
- has good skills/background knowledge in power electronics, electronic circuit design, KiCAD or comparable software, MATLAB/GNU Octave, office software, LaTeX,
- is motivated in the respective field of science and engineering,
- has good English or German language skills.

Equal Opportunity

We are open to all groups of people without regard to age, color, national origin, race, religion, gender, sex, sexual orientation, gender identity and/or expression, marital status, or any other legally protected characteristics. Further details: <https://www.kitekraft.de/about#code-of-conduct>

Find out more!

Website



YouTube



Interested? Please apply!

Send your CV, transcript of records, and letter of motivation to work@kitekraft.de. Keep your letter of motivation short (max. 1 DIN A4 page with normal borders and font size), tell us concisely and with past examples why you can fill this vacancy best and fulfill the requirements. Ideally, you tell us about your hardest ever encountered challenge and how you solved it. We will then conduct a video call, ask you questions, give further details, and give you the chance to ask us anything. After that, we make a decision.