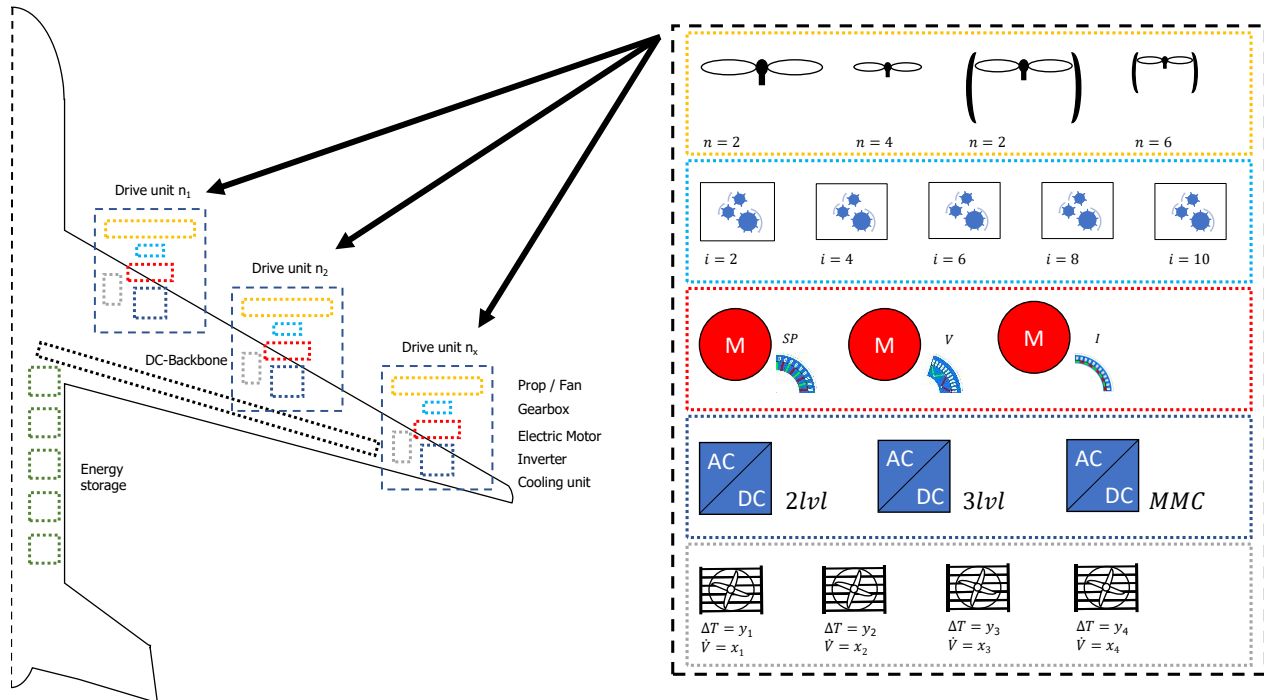


## Multi-Objective Optimization of the Powertrain for All-Electric Aircrafts Regarding Power Density and Efficiency



### Project Description:

In order to identify the best configuration of a powertrain for all-electric aircrafts regarding power density, efficiency, and safety, a holistic view of the powertrain is necessary considering the energy storages and distribution, power electronics, electric motors, gearboxes and fans/props.

The goal of the thesis is to develop a model containing all parts of the powertrain as well as the energy supply system. The model will take various powertrain concepts into account such as distributed propulsion and a centralized power conversion structure fed by a DC-Backbone versus a decentralized structure with directly fed inverter systems. The drive units  $n_1$  to  $n_x$  are set up from a construction kit that contains different elements of a powertrain for a variety of power characteristics.

After successfully linking the different interfaces of the components, the powertrain shall be optimized for a given thrust request with a multi-objective approach.

### Requirements:

Knowledge in electrical engineering especially in power electronics and electrical machines as well as basics in Matlab, programming, and system modelling.

### Contact information: