

# Battery system for low-noise electric airplane

## Initial Conditions

An appropriate battery system is to be dimensioned for a feasibility study for an electrically powered training aircraft. Particular attention must be paid to meeting weight and safety requirements. All components are designed in such a way that they are suited for obtaining possible aircraft approvals. A particular challenge is that the aircraft is not being newly constructed, but a conventional aircraft is remodeled.

## Results

Various approaches and the technical implementation were developed. An evaluation was conducted based on a description found in the literature. Due to the high energy density requirements, only lithium-ion batteries were eligible for energy storage. Thanks to their balanced properties and having been tried-and-tested in practices, battery cells based on NMC technology became the preference in the course of the project.

In collaboration with partners experienced in aviation, a system design was created, which ensured the highest-possible level of safety and flexibility thanks to a redundant and modular design. Calculations, simulations, and measurements show that with technology available today, it is possible to implement a battery system with fast-charging capability, that provides an energy content of up to 45 kWh at a total weight of 280 kg. This equals a flight time of roughly 50 minutes.

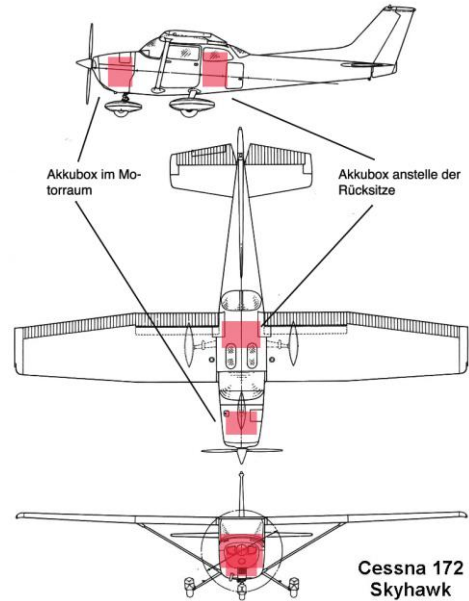


Figure 1: Installation site of the battery system

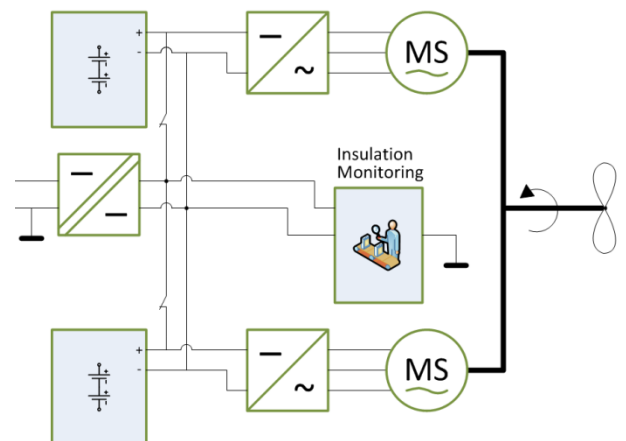


Figure 2: Electric actuator overview diagram