

Master Thesis – Research of electrical discharges using the equal-area criterion in a low-pressure environment for the power supply of All-Electrical-Aircraft

Project Description

The goal of "Flightpath 2050" is to significantly reduce the CO₂ emissions of air traffic. This requires a more efficient energy usage, which can be achieved with higher supply voltages in the aircraft. The so called All-Electrical-Aircraft is a technology which can be realized with an ongoing research effort and is a possible zero-emission solution.

For the supply grids on board it is necessary that they provide a safe operation even in case of possible disturbances like direct lightning strokes. High-voltage tests of insulators/isolations, cables, (power) electronics and much more will be necessary in the near future. Therefore, the necessary test and commissioning fundamentals must be developed today. The behaviour of homogeneous and inhomogeneous electrode geometries plays a decisive role for safe operation under aviation conditions (extreme pressure and temperature ranges). Research, development and test methods of high voltage technology must be available for the whole avionics sector.

During this master thesis, impulse voltages have to be applied to homogeneous and inhomogeneous electrode configurations, within a low-pressure environment. For data analysis of the recorded measurement results the equal-area criterion has to be used during the data analyses. Afterwards, the applicability of the "equal-area" also known as "volt-time area" criterion on discharges in low pressure environment has to be discussed. Finally, a physically model for the observed discharge process has to be developed.

Requirements

Fundamentals of high voltage engineering

Structured and independent work

Contact Information

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