

## Thesis subject:

### Reliability Assessment of Different Electrical Power System Architectures in Electrified/Hybrid Future Passenger Aircrafts

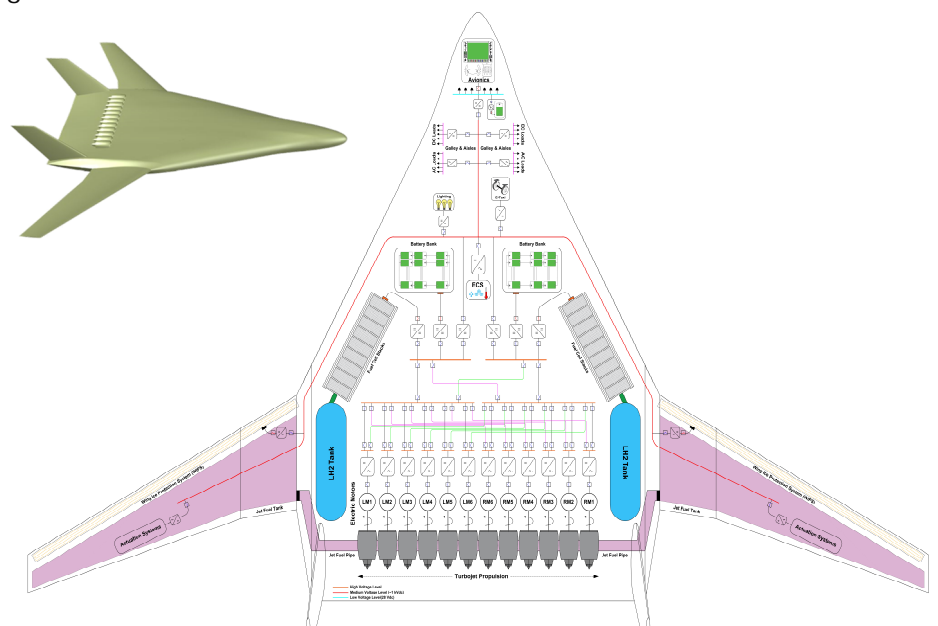
The thesis should be written in English.

**Note:** This master thesis is recommended to those electrical engineering students who are familiar with electrical on-board power system components and are interested in working on analysis of different power system architectures.

## Introduction

Electrifying aircraft is a big step forward in aviation, offering a greener and more efficient way to fly. By using electric propulsion systems fueled by batteries or fuel cells, it promises to change how planes operate. The transition from traditional combustion engines to electric motors introduces a paradigm shift in aircraft design, emphasizing the critical role of electrical components and systems. This master thesis should investigate on the pivotal importance of reliability of Electrical Power System (EPS) in electrified passenger aircraft, exploring the challenges, innovations, and strategies necessary to ensure that electrical power systems meet the very strict standards of safety and performance demanded by the aviation industry. Indeed, reliability assessment should be done through two below main criteria for different EPS architectures:

- Modeling, calculation and evaluation of reliability parameters and indices, including MTBF, MTTR, MTBR, MTTF, failure rate  $\lambda(t)$ , availability, ...
- Load flow analysis of different EPS architectures under normal condition as well as prominent n – 1 contingencies



An example of the power system architecture in a long range passenger aircraft

## Requirements:

- Familiar with or enthusiastic in MATLAB programming and Simulink
- Interested in learning reliability assessment methods in electrical power systems
- Familiar with different methods of power system analysis specially load flow in DC and AC systems
- Knowledge of modeling and analysis of electrical power systems with specialized software such as DigSILENT and similar is an advantage.

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