

Thesis

AI-Driven Aircraft Operations: Automation in Planning, Routing, and Execution

Background:

The aim of this research is to analyze the role of AI in the overall operation of both manned and unmanned aircraft, with a particular focus on unmanned systems. Special attention will be given to AI's potential in mission planning, flight preparation, route optimization, and operational management.

A key aspect of this research is the examination of AI-driven automation in the operation of different use cases: package delivery drones, air taxis, and emergency response drones. The study will identify areas where AI can enhance efficiency, safety, and adaptability in autonomous aircraft operations. Additionally, a model may be implemented using tools such as Simulink or Python to demonstrate AI's capabilities in these areas.

Task Description (description is only a suggestion—feel free to reach out with similar ideas in this field):

- Challenges in Unmanned Aircraft Operations:
 - o Challenges in the operation of package delivery drones, air taxis, and emergency drones
 - o Regulatory, technical, and operational challenges
 - o Financial, technological, and market-related challenges (optional)
- Al-Driven Automation in Aircraft Operations:
 - o Identification of potential areas where AI can support or replace traditional processes
 - Focus on AI applications in mission planning, flight preparation, route guidance, and in-flight decision-making
 - Case studies and examples of successful AI integration (optional)
- Implementation of an AI Model:
 - Development of a model using tools such as Simulink or Python
 - o Simulation of AI-driven decision-making in flight operations
 - Evaluation of the model's effectiveness in optimizing aircraft operations
- Documentation of results in a thesis, including references and appendices

Required Profile of Qualifications:

- Diligent and structured working methods and high level of commitment
- Basic knowledge in ConOps and aircraft development
- Knwoledge in modeling tools such as simulink or python

Submission Guidelines:

- The thesis should be written in English (however, german is possible) and follow the standard academic format
- Use of credible and up-to-date sources is mandatory
- Start date: Any time