



## Thesis

# AI-Assisted Optimization in Classical Flight Planning: Case Studies in Cargo Delivery and Tourism Flights

### Background:

Flight planning is a fundamental process in aviation, ensuring efficiency, safety, and regulatory compliance. Traditionally, this process involves multiple manual steps, including route planning, airspace integration, weather assessment, fuel calculations, and risk management. This thesis aims to explore how Artificial Intelligence (AI) and other automated systems can enhance or replace specific aspects of classical flight planning.

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

- State of the Art & Classical Flight Planning Process:
  - Overview of traditional flight planning steps:
    - Route planning and airspace integration
    - Weather analysis and impact on flight routes
    - Performance calculations (e.g., fuel consumption, battery management)
    - Regulatory compliance and operational constraints
    - Key challenges and limitations of manual flight planning
    - Current automation trends in flight planning
- Case Study Analysis – Identifying Automation Potential:
  - Cargo Delivery (Multicopter):
    - Evaluate manual flight planning steps for a transport mission
    - Identify AI-driven optimizations (e.g., dynamic route adaptation, automated obstacle avoidance, real-time weather-based replanning)
  - Tourism Flights (Optionally Piloted Vehicle):
    - Analyze flight planning requirements for a sightseeing mission
    - Explore AI-based decision support for optimal routing, passenger comfort, and dynamic risk assessment
- Feasibility & Implementation of AI in Flight Planning:
  - Identify which elements of flight planning can be automated
  - Evaluate potential AI models and decision-support systems
  - Assess regulatory and operational challenges in AI-assisted flight planning
- Documentation & Recommendations:
  - Summarize findings in a structured thesis, including references and appendices
  - Develop concrete recommendations for AI integration in classical flight planning

### Required Profile of Qualifications:

- Diligent and structured working methods and high level of commitment
- Basic knowledge of flight planning and aircraft operations
- Interest in AI applications in aviation and automation technologies

### 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