Master Thesis

Evaluating the Applicability of SORA to Unmanned Airship Operations: A Comparative Study of SAIL II and SAIL III

Background:

The Specific Operations Risk Assessment (SORA) is a pivotal methodology within the European regulatory framework for assessing risk in Unmanned Aerial Systems (UAS) operations. While originally developed with multicopter and fixed-wing systems in mind, its applicability to unconventional platforms such as unmanned airships remains underexplored. This thesis investigates how SORA can be adapted and applied to unmanned airship operations, focusing on a comparative analysis between SAIL II and SAIL III levels. Through an examination of regulatory, technical, and operational criteria, the study aims to identify challenges, potential adaptations, and implications for integrating airships safely into European airspace. A particular emphasis will be placed on analyzing and evaluating mitigation strategies required under both SAIL levels, with a focus on their feasibility and effectiveness in airship-specific operations. We will also provide date from real world airship SORA applications for SAIL II and SAIL III

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

- Introduction to SORA and Motivation:
  - Introduction to the SORA framework and SAIL levels
  - Overview of relevant regulatory and technological background
- State of the Art / Literature Review:
  - Review of current research on SORA and airship-specific risk models
  - Analysis of previous applications of SORA to various UAS classes
- Methodology:
  - Analysis of regulatory documents and technical requirements
  - **Comparative assessment of SAIL II vs. SAIL III requirements**
  - (Optional) Use case studies for practical illustration
- SAIL II vs. SAIL III Comparison:
  - Analysis of differences in operational conditions, documentation, and technical requirements
  - Regulatory requirements
  - **Detailed comparison** of **mitigation strategies** associated with **SAIL II and III**
- SAIL III in Detail:
  - Deep dive into OSOs and system requirements of SAIL III
  - Challenges in implementation and compliance documentation
  - Critical assessment of required **tactical and strategic mitigations**
- Applicability to Airships:
  - Unique characteristics and constraints of unmanned airship operations
  - Identification of necessary **adaptations to SORA**
- Discussion and Reflection:
  - Strengths and limitations of applying SORA to airships
  - Optimization opportunities and future adaptation strategies
  - Potential impact on regulatory development
  - Recommendations for regulatory and methodological enhancements

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17.07.2025

Required Profile of Qualifications:

- Diligent and structured working methods and high level of commitment
- Familiarity with the JARUS SORA methodology is strong beneficial
- Proficiency in German, as many documents are available only in German
- Basic understanding of ConOps and aircraft development
- Basic knowledge in aviation safety and UAS regulation
- Interest in novel UAS platforms

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: As soon as possible
- The student should be open to the possibility of jointly developing a scientific publication (e.g., a journal article) based on the thesis, in collaboration with the supervisor

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