

**OBJECTIVES OF THE INTEREST GROUP AIRBORNE WIND -
WORKING GROUP AIRSPACE RISK MITIGATION**

IG AW WG Airspace

FGW Technical Guideline 11 Category A

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When does the WG plan to present the results? Revision 0 for the mid of 2022 planned

What is the problem, what is the content? How can one safely integrate Airborne Wind Energy Systems (AWES) into the airspace in a way that leads to commercial viability for AWE operators and an acceptable level of safety for other airspace users? AWES operate in heights where aircrafts are flying under visual flight rules (ICAO) which leads to potential risks. The current regulations and laws for Risk Mitigation and Air Safety are only partly applicable or not specified enough for AWES commercial operation.

ICAO Annex 14 Obstacle Light Requirements

EASA

- Unmanned aircraft system (UAS): Special approval needed for > 120 m. Tethers could be a problem.
- Specific Operation Risk Assessment (SORA):
 - Concept of operation, risk factors such as dimensions, weight, population density at location
 - Determination of Specific Assurance and Integrity Levels (SAIL) and deduction of requirements
 - A toolbox of strategies for reduction of SAIL for AWES is needed.
- Acceptable Means of Compliance (AMC): The certification basis needs to be specified towards EASA (tailored for each system or blueprint).
- Organizational certification

National regulations in Germany

- Marking required above 100m flight height
- LuftVG: restriction of air space generally possible
- AVV: concerns obstructions. It requires heavy & huge tether markers & lightning.

- LuftVO: regulation for “normal” kites, not very specified
- FSAV: regulation defining transponder equipment for VFR air traffic at night – maybe relevant for safety concept

The responsible department within an authority or the authority to which one must turn varies in European countries and even in the German federal states the responsibility is not regulated. This leads to long and undefined approval processes, inconsistent approval process with individual requirements.

Due to the novelty of the technology each approval requires a lot of explanation. Also, it does not provide safety for the authority employee in their decision/approvals.

The different technical systems of AWES lead to a different impact on air risk mitigation and different strategies. Those need to be defined.

What is the goal, what result does the WG want to work out?

Develop a generalized approach of safe integration of AWES (differentiate between test/ scientific operation and commercial operation) into the airspace considering requirements from all stakeholders including AWE developers/operators, airspace regulators / authorities, other airspace users.

Example: The document should contain an overview of AWES different technologies and risk mitigation strategies. This could be strategies to reduce SAIL rating that can be applied by 1 or more companies. It should then be used in the approval process to ease the decisions of authorities to approve the operation. In some cases, the operation would be Proof of Concept for the mitigation strategy.

Should the document be prepared as a recommendation, test specification or certification specification?

Recommendation due to highly different requirements resulting from the different technical systems.

How often does the WG plan to meet?

The WG intends to meet 8 times each year in two-hour web meetings

What (lists, representations, explanations, recommendations) should the guideline contain specifically at the end?

1. Legal Basis: International regulations, EU regulations (2019/947, SORA, SES, SESAR, U-Space), national regulations
 - List of applicable and non-applicable regulations including explanations
 - Lesson learnt: Overview of approval experiences at different locations
 - Table of authorities and necessary regulations, contact people, related experiences
2. Variants of air risk mitigation

	<ul style="list-style-type: none"> • Air risk strategic mitigation • Tactical mitigation collision risk assessment <ol style="list-style-type: none"> 3. Technical solutions 4. Evaluation criteria for air risk mitigation 5. Evolution and assessment of concepts 6. Project-specific selection of the right concept using SORA
Should the guideline specify other documents?	All relevant norms, standards, regulations, certification specifications, acceptable AMCs, and other documents that provide relevant requirements or possible solutions to the topic.
What content should explicitly not be covered?	Description of content that needs to be discussed with aviation authority.
How does the WG proceed, which steps are planned?	<ol style="list-style-type: none"> 1. Collection and description of technology-specific Air Risks, also emerging Ground Risks. 2. Mitigation concepts will be described regarding their effect on air risk mitigation and safe operation. The regulation background in relevant countries and German federal states will be described and the result of dialogs with authorities will be presented. 3. Deduce and describe the recommendation for the Proof-of-Concept.
What research is needed regarding the existing regulatory framework, e.g. for the purpose of delineation or clarification?	International regulations & regulations of other countries (see above).
Who is the guideline aimed at?	Manufacturer, operator, regulatory authorities
Which experts or stakeholders are already involved?	Manufacturer, operator, planning offices
Which experts or stakeholders need to be involved additionally?	Regulatory authorities
What other topics could be included in the future?	Results of the Proof-of-Concept like statistics could be included.