Edward M. Fagan

Mechanical Systems Analyst
Zero Nexus

460 Cornell Drive, Midland
Ontario, Canada

edward@zero.nexus
zero.nexus

Certification Roadmap for AWE Aerostructures

Edward M. Fagan[1], William Finnegan[2], Cormac Ó Cadhain[3], Michael Walls[3]

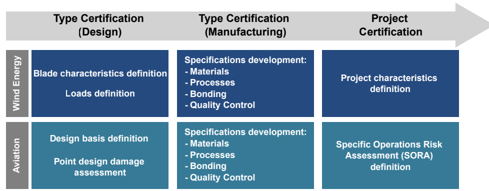
[1]Zero Nexus, Ontario, Canada

[2]Construct Innovate and the SFI MaREI Research Centre, Ryan Institute, School of Engineering, University of Galway, Galway, Ireland

[3]Composites Testing Lab, Galway, Ireland

Certification of AWE aircraft systems in the EU will be handled by the joint efforts of the European Union Aviation Safety Agency (EASA) and the National Aviation Authorities, while in the United States the Federal Aviation Authority (FAA) will likely be the responsible party [1]. Certification of commercial AWE wind farm projects will also require approval from organisations such as DNV, TÜV SÜD or Lloyd's Register. The whole certification process will therefore include requirements from both civil aviation and conventional wind energy sectors. Both industries provide guidance on the design, manufacturing, and maintenance of composite structures, each with industry-specific requirements and guidelines. The Hibernian Airborne Wind Kites (HAWK) Project seeks to identify the key challenges for predicting the capital and operating costs of composite airframe structures for AWE systems [2]. As part of the HAWK Project, the project team will map the requirements for certification for AWE aerostructures.

In this project activity, both industries' approaches to the certification of composite structures are reviewed and compared, with major deviations between the relevant standards analysed for the AWE context. The standards assessed include AMC 20-29 for aircraft composite components and the DNVGL-ST-0376 design standard for wind turbine rotor blades. The objective of the project is to develop a roadmap for certification of AWE system aerostructures which will contain (i) an overview of the development process, (ii) major deliverables and development milestones and (iii) risks and trade-offs for each industry's approach. The assessment of certification requirements and standards will complement the ongoing analyses of AWE safety and regulation in Work Package 3 of the IEA Wind Task 48 on Airborne Wind Energy [3].



Comparing the wind and aviation industries' approaches to certification for AWE systems/projects.

References:

[1] Petrick, Kristian, & Houle, Corey. (2023). Safe Operation and Airspace Integration of Airborne Wind Energy Systems (1.0). Zenodo. Doi: 10.5281/zenodo.7797228.
[2] SEAI, "HAWK: Hibernian Airborne Wind Energy Kites", https://www.seai.ie/data-and-insights/seai-research/research-projects/details/hawk:-hibernian-airborne-wind-energy-kites-.
[3] IEA, "IEA Wind Task 48 Work Package 3", https://iea-wind.org/task48/task48-activities/task48-activities-wp3/.

This study has been supported with financial contribution from Sustainable Energy Authority of Ireland under SEAI RDD 2022, Grant number 22/RDD/893.

HAWK
Hibernian Airborne Wind energy Kites

ZERO NEXUS