The EnerWíng

Combining Performance, Longevity, Robustness, and Serial Production for Commercial EnerKíte Airborne Wind Converters

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Publication date
2024

Document Version
Final published version

Citation (APA)
Breipohl, F., Levevre, J., Winter, J., & Candade, A. A. (2024). *The EnerWíng: Combining Performance, Longevity, Robustness, and Serial Production for Commercial EnerKíte Airborne Wind Converters*. Abstract from 10th International Airborne Wind Energy Conference (AWEC 2024), Madrid, Spain.
http://resolver.tudelft.nl/uuid:7c159132-67c8-485c-81d7-c2bb406067cf

The EnerWíng: Combining Performance, Longevity, Robustness, and Serial Production for Commercial EnerKíte Airborne Wind Converters

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EnerKíte's high-performance wings are designed for maximum yield over an extended project lifetime. The wing has optimised aerodynamics and planform to realise long harvest trajectories with a short retraction phase. This poses a design challenge to achieve a stiff but lightweight structure capable of withstanding the forces from prolonged manoeuvre loads of the harvest phase.

These high-performance requirements have led to a novel structural concept called the gridshell. With the gridshell, EnerKíte has invented a new wing construction method that combines the following features:

- Material savings of 40% compared to a monocoque with comparable structural properties
- Reduction of parts for the wing to > 1/12 compared to differential construction methods
- Optimisation-friendly design
- Drastic reduction of steps in assembly
- Defined bonding surfaces and lower bonding areas
- High durability and robustness against mechanical impacts
- High degree of automation in mass production and wing assembly at low unit costs

Together with the German Aerospace Center (DLR), the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, INVENT GmbH, and CTC (Airbus Company), EnerKíte is now addressing the mass production of the EnerWíngs. With the successful automated launch and landing with the rotating mast, the high-performance wing, and the gridshell design, EnerKíte is now well-positioned to bring the safest, most reliable, and most efficient system into product development for series production. The presentation aims to showcase the current state of development and to provide a perspective on the next steps and challenges on the path to the series production.

Modalanalysis (FEM) of the EnerWíng-Gridshell. EnerWíng-Gridshell docked on the mast of EK30

EnerKíte