



Delft University of Technology

The EnerWing

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

Breipohl, Florian ; Levevre, Jean; Winter, Jens; Candade, A.A.

Publication date
2024

Document Version
Final published version

Citation (APA)
Breipohl, F., Levevre, J., Winter, J., & Candade, A. A. (2024). *The EnerWing: Combining Performance, Longevity, Robustness, and Serial Production for Commercial EnerKite 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>

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright
Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy
Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.

*This work is downloaded from Delft University of Technology.
For technical reasons the number of authors shown on this cover page is limited to a maximum of 10.*



Florian Breipohl

CEO
EnerKite GmbH

Heegermühler Str. 64
16225 Eberswalde
Germany

f.breipohl@enerkite.de
www.enerkite.com

The EnerWing: Combining Performance, Longevity, Robustness, and Serial Production for Commercial EnerKite Airborne Wind Converters

Florian Breipohl¹, Jean Levevre², Jens Winter³, Ashwin Candade^{1,4}

¹EnerKite GmbH

²DLR

³TU Braunschweig

⁴Delft University of Technology

EnerKite'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, EnerKite 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), EnerKite is now addressing the mass production of the EnerWings. With the successful automated launch and landing with the rotating mast, the high-performance wing, and the gridshell design, EnerKite 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 EnerWing-Gridshell. EnerWing-Gridshell docked on the mast of EK30