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Revolutionizing Wind Turbine Operations & Maintenance: World Class Maintenance Fieldlab Zephyros starts new phase in development of resident blade inspection- and monitoring systems

Breda November 14, 2023 – The wind industry has witnessed a remarkable surge in the construction of offshore wind farms in recent years. As a result, the maintenance of wind turbines, particularly the inspection and repair of blades, has become a rapidly growing and critical activity. However, the current methods for Operations & Maintenance (O&M) are far from optimal, resulting in unhealthy blades in operation and demanding considerable effort from technicians who work under challenging and hazardous offshore conditions.

Two major challenges in today's O&M of offshore wind farms are the lack of knowledge about the condition of operational blades and blade-systems, and the difficulties involved in offshore inspection and maintenance work, compounded by the shortage of offshore wind energy technicians. These challenges not only hamper efficiency but also increase costs and reduce the overall performance and lifespan of the blades, which ultimately affects the Levelized Cost of Energy (LCOE).

In response to these challenges, Fieldlab Zephyros is proud to announce the start of the next phase on its AIRTuB roadmap (Automated Inspection and Repair of wind Turbine Blades) in the form of an ambitious project called AIRTuB-ROMI (Resident Offshore Monitoring & Inspection) aimed at revolutionizing the O&M landscape for offshore wind farms. The primary goals of this project are to develop automated and 'resident' systems that monitor and inspect wind turbine blades.

Project Goals:

In this groundbreaking three year project starting December 2023, AIRTuB will develop cutting-edge, automated systems designed to control the health of the blades of offshore wind farms. Building upon the technological advancements achieved in the AIRTuB 1 project, such as ultrasonic sensing and drone/crawler platforms, this project will further enhance and integrate these technologies into a resident system within offshore wind farms. The ultimate ambition is to refine, test, and demonstrate these innovative technologies in real offshore conditions and offer them as "AIRTuB as a Service (AAAS)" to service providers.

Project Outcomes:

The result of this groundbreaking project will be "AIRTuB as a service - AAAS," which incorporates:

- **Sensor-in-blade monitoring solutions:** Developed and installed to detect real-time events and damages, these solutions will track blade conditions, enabling the drone-crawler platform to prioritize inspections. Major findings will be classified before they lead to failures.
- **Drone- and crawler inspection platform:** This platform, equipped with sensors, will have a maximum take-off mass of less than 25 kg and a base station for installation on offshore wind farm turbines. The platform will primarily focus on inspecting the structural health of the blades, including post-lightning strike inspections for cracks and delamination.
- **Inspections:** The inspections will encompass a combination of ultrasonic and visual methods, ensuring comprehensive assessments of blade conditions.

- **Resident Drone-Crawler Platform:** Designed to operate within the wind farm without requiring on-site crew, this lightweight platform will offer automated charging and flight capabilities, enhancing inspection efficiency.
- **Data Communication:** The system will ensure seamless data communication within the wind farm and with the turbine operator.
- **Digital Twin Technology:** Information from inspections will be assessed using digital twin technology to determine the severity of any damage, facilitating timely repairs.

Fieldlab Zephyros is poised to revolutionize the offshore wind energy industry with its innovative approach to wind turbine blade O&M, ultimately improving efficiency, reducing costs, and enhancing the performance and lifespan of blades. By addressing the industry's challenges head-on, AIRTuB's AAS will play a pivotal role in securing a sustainable and cost-effective future for offshore wind energy.

For media inquiries and more information about AIRTuB's revolutionary project, please contact projectmanager [Ferry Visser, FV@worldclassmaintenance.com](mailto:Ferry.Visser@worldclassmaintenance.com)

Participating organizations are:

- Stichting World Class Maintenance (Penvoerder)
- Vattenfall Duurzame Energie N.V.
- Eneco Wind B.V.
- LM Wind Power R&D B.V.
- Terra Inspectioneering B.V.
- Nest-Fly technologies B.V.
- Inertia Technology B.V.
- Dehn Nederland B.V.
- Avular Innovations B.V.
- Mistras Group B.V.
- Tarucca B.V.
- Nobleo Technology B.V.
- TU Delft, Faculteit Luchtvaart-en Ruimtevaarttechniek
- Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek TNO
- HZ-University of Applied Sciences in collaboration with ROC Scalda
- Stichting Koninklijk Nationaal Lucht- en Ruimtevaartcentrum NLR
- InHolland University of Applied Sciences

About Fieldlab Zephyros:

Fieldlab Zephyros is a pioneering initiative from World Class Maintenance, a Dutch network of smart maintenance industries, committed to transforming the wind energy industry by developing innovative solutions for the Operations & Maintenance of offshore wind turbines. With a focus on automated blade monitoring and inspection systems and cutting-edge technology, the fieldlabs projects are at the forefront of ensuring the efficiency, reliability, and sustainability of offshore wind energy.

“The project is being carried with Topsector Energy subsidy from the Ministry of Economic Affairs (From: Regulations on national EZK and LNV subsidies).”

For more information:

<https://www.worldclassmaintenance.com/project/fieldlab-zephyros/>