

Press release

AQUADA-GO – New drone technology uses Artificial Intelligence to examine offshore wind turbine blades

Copenhagen, 13 October 2023

It's sometimes hard to get an annual medical check-up while you're hard at work. While it's sometimes the case for humans, it's also no less an issue for wind turbines. In response, RWE, DTU Wind and Energy Systems and Quali Drone have worked together to find a state-of-the-art, high-tech solution, combining new drone technology with the use of artificial intelligence (AI) to inspect wind turbine blades at sea – while the blades are still spinning.

Most people experience the effects of time, and this also applies to offshore wind turbines and their blades, which are increasingly critical to net zero and the health of the planet by generating green electricity from the wind.

Current practice is primarily for rotor blades to be inspected manually by crews sent out to offshore wind farms by vessel. The turbines have to be stopped during the inspection while the technician inspects the condition of the blade. This inevitably means the turbine has to spend some time when unable to generate clean energy on behalf of the climate and the operator.

The partners in the AQUADA-GO innovation project are working on a new technology that can automate the inspection of offshore wind turbine blades: RWE, one of the world's leading renewable energy companies, has partnered with researchers from DTU Wind and Energy Systems, the Danish start-up Quali Drone and Energy Cluster Denmark – the facilitator of the AQUADA-GO innovation project.

Nils Leseberg, CEO of RWE Renewables Denmark, explains: “As a leading wind farm operator, RWE is constantly looking for new technologies and solutions that can increase the efficiency and safety of our assets, and help us produce even more green electricity. We need to be able to monitor the condition of rotor blades without stopping the turbine and to continuously perform an advanced data analysis to better understand how to organise the maintenance and repair of our assets. AQUADA-GO is therefore an important project that can simplify a wide range of processes and thereby increase both employee safety and the production of green electricity. We are looking forward to testing the innovative technology at the Danish offshore wind farm Rødsand 2.”

RWE

Put a stop to turbine stops

AQUADA-GO has received funding from the Energy Technology Development and Demonstration Programme (EUDP) and runs until 2025. The partners have already developed the algorithms that can help the drone identify any damage on the surface of the blades, as well as potential fractures beneath it. The drone is fitted with a thermal camera that can scan the subsurface layers for damage, which is not possible through the current industry practice of manual inspections.

“For us, the project is about changing the whole perception of how to inspect wind turbine blades. We expect that artificial intelligence and drones can prevent the need for downtime of the turbines, by fully automating the inspection. This means greener energy for the benefit of the climate and less ships with technicians needing to be sent offshore. It’s a complex task, but we expect to solve it through this project, and we anticipate that the demand for our concept will be very high,” **says Jesper Smit, CEO of Quali Drone, the supplier of the drone hardware in the innovation research project.**

The next step is to test the drone technology on land to prove that the drones themselves can follow the blades around as they rotate. The technology will then be tested offshore at Rødsand 2 offshore wind farm, operated by RWE since 2010 and located south of the Danish Island of Lolland.

A GO in the title

The idea for the project originated at DTU Wind and Energy Systems, which has already published scientific articles on the so-called AQUADA technology. The GO in the project title has been added as the partners are now ready to transfer the work from the lab at DTU into the environments in which the industry operates.

“We’ve already processed a lot of data from project partners and will look at even more when we get the opportunity to test the technology on real wind turbine blades. In this project, we develop cutting-edge deep learning algorithms and computer vision technologies while utilizing our in-depth understanding of blade damage based on thermal-mechanical modelling. We expect the project to make a huge difference to the industry; for example, we will be able to save at least 50% of the cost of inspections in the future. This will create significant carbon reductions for the wind industry’s inspection work and will also generate business for the farm owners and Quali Drone, which is commercialising the solution. We are proud to see that our research can make a real difference, and we look forward to further innovation collaboration with the partners,” **says Xiao Chen, Associate Professor at DTU Wind and Energy Systems and Technical Project Manager for the AQUADA-GO innovation project.**

AQUADA-GO has a total budget of DKK 17 million and runs from 2023 to End of 2025. The partners are RWE, DTU Wind and Energy Systems, Quali Drone and Energy Cluster Denmark, and the innovation project has received DKK 7.3 million in funding from the Danish Energy Technology Development and Demonstration Programme (EUDP).

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A picture for media use (credit: Quali Drone) is available at the [RWE Media Centre](#)

DTU Wind & Energy Systems

DTU Wind and Energy Systems is about taking the technology to the next level. About creating an impact for people and society through research and innovation. About collaborating with the entire energy sector to develop the most effective technology on the planet. Contact: Xiao Chen, Associate Professor, T +45 93 51 35 67, xiac@dtu.dk

Quali Drone

Quali Drone aims to further develop and demonstrate fully automatic intelligent drone inspections to recognize errors on surfaces and measure large structures. This will be done by using artificial intelligence (AI), machine learning and digital twin technology for documentation purposes to comply with applicable industry standards. Contact: Jesper Smit, CEO Quali Drone, T +45 31 47 09 05

Energy Cluster Denmark

Energy Cluster Denmark is Denmark's cluster organisation for the entire energy sector. Our vision is for Denmark to be a leading green nation in the development and demonstration of innovative and global energy solutions. Therefore, Energy Cluster Denmark is a neutral, value-creating and member-driven innovation platform for establishing and facilitating innovation collaborations between small and large companies, knowledge institutions and public players throughout the energy sector. Contact: Jonas Nørholm Larsen, Senior Communications Manager, T +45 21 22 43 04

RWE

RWE is leading the way to a green energy world. With an extensive investment and growth strategy, the company will expand its powerful, green generation capacity to 50 gigawatts internationally by 2030. RWE is investing more than €50 billion gross for this purpose in this decade. The portfolio is based on offshore and onshore wind, solar, hydro power, hydrogen, batteries, biomass, and gas. RWE Supply & Trading provides tailored energy solutions for large customers. RWE has locations in the attractive markets of Europe, North America, and the Asia-Pacific region. The company wants to phase out coal by 2030. RWE employs around 19,000 people worldwide and has a clear target: to get to net zero by 2040. On its way there, the company has set itself ambitious targets for all activities that cause greenhouse gas emissions. The Science Based Targets initiative has confirmed that these emission reduction targets are in line with the Paris Agreement. Very much in the spirit of the company's purpose: Our energy for a sustainable life.

Forward-looking statements

This press release contains forward-looking statements. These statements reflect the current views, expectations and assumptions of management, and are based on information currently available to management. Forward-looking statements do not guarantee the occurrence of future results and developments and are subject to known and unknown risks and uncertainties. Actual future results and developments may deviate materially from the expectations and assumptions expressed in this document due to various factors. These factors primarily include changes in the general economic and competitive environment. Furthermore, developments on financial markets and changes in currency exchange rates as well as changes in national and international laws, in particular in respect of fiscal regulation, and other factors influence the company's future results and developments. Neither the company nor any of its affiliates undertakes to update the statements contained in this press release.

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