InnoMatch

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EIC INNOVATION PROCUREMENT PROGRAMME

BladeRider
case study

REBLADE

AUTOMATED DRONE REPAIR OF WIND TURBINE BLADES

with the support of

geo-structural

Geotechnical and structural solutions

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PILOT: Reblade & Geo-Structural

BladeRider | Renewable Energy and Wind Turbine Maintenance

100% RISK	50 to 60%	TRL 7	0 HUMAN
SAFETY RISK ELIMINATED	**TURBINE DOWNTIME CUT**	**FIELD READY MATURITY**	**ROPE SUSPENSION NEEDED**
Technicians no longer hang on ropes at dangerous heights during blade coating	Reduces turbine shutdown maintenance time by more than half	System fully validated on live commercial wind turbines	Robotic drone arm handles cleaning, sanding, and resin application

PILOT PROFILE

EIC Awardee: Reblade

Solution: BladeRider / Drone Blade Repair System

Partner: Geo-Structural (Wind Turbine Maintenance Service Provider)

Testing Ground: Live commercial onshore wind farm sites operating under real-world weather conditions

Sector & Challenge Focus: Renewable Energy and Wind Turbine Maintenance

The Challenge

Wind turbine blades rotate at high speeds, causing rain, dust, and insects to erode their leading edges over time. Damaged blade edges reduce aerodynamics, lowering electricity production. Repairing turbine blades traditionally requires human technicians to hang on ropes hundreds of feet in the air (abseiling). This rope work is extremely dangerous, weather-dependent, expensive, and requires shutting down electricity generation for days at a time.

The Solution

BladeRider is an autonomous drone-mounted robotic repair system. The drone flies directly to the wind turbine blade, locks onto the edge using a robotic stabilizing arm, cleans and sands the damaged surface, and applies protective liquid resin coatings automatically, eliminating the need for human rope work.

Objectives

The pilot aimed to demonstrate that drone robotics can repair turbine blade leading edges safely, accurately, and rapidly under real wind farm conditions. Geo-Structural wanted to verify that drone repairs reduce turbine shutdown time and lower technician safety risks compared to rope access.

Constrains

Operating precision robotics on a flying drone in gusting offshore and onshore winds requires advanced flight stabilization. The engineering team also had to ensure that repair resins cure properly in cold outdoor climates.

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Performance

The trial successfully demonstrated automated drone repair on live commercial wind turbines, reaching Technology Readiness Level 7. The drone system reduced high-altitude technician safety exposure by 100% and cut turbine shutdown downtime by an estimated 50% to 60%, allowing wind farms to resume generating clean electricity much faster.

Partner Operational Improvements

Lowered maintenance operating costs, improved technician health and safety ratings, and reduced lost electricity generation during turbine servicing.

SUCCESSFUL PILOT VALIDATION

Geo-Structural and Reblade are finalizing commercial service partnership frameworks, training regional operator crews, and preparing commercial drone repair campaigns for onshore wind farm operators across Europe.

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