

PROOF OF CONCEPT

Drones and acoustics monitoring combined

ABOUT US

Perceptual Robotics is a UK based technology company, focused on **drone automation and AI services in the field of Wind Turbine Blade Management**. Our services cover from technology for field inspection to data processing and repair management. With presence worldwide and thousands of inspections made we keep investigating new solutions.

FIGURES

- **2 turbines in Scotland monitored with Windrover**
- **Drone inspections made after detection**
- **2 Proven early detection significant damages**

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OVERVIEW

A combination of continuous acoustic monitoring with *ad hoc* drone inspections has proven to untap damages early that may result in significant impact later.

ABOUT WEROVER

Werover is a UK-based technology company with offices in Germany, Qatar and Türkiye. The company develops **AI-powered solutions for continuous health monitoring and early damage detection** of wind turbine blades, enabling predictive maintenance, risk reduction, and the digitalization of wind energy assets.

THE CHALLENGE

Until now, early identifying damages required full inspections of all turbines. That meant that for some damages the inspection could arrive too late. With acoustic continuous monitoring, damages can be spotted as soon as they originate, **enabling an early inspection and repair, without disrupting operations.**



Acoustics

Different damages create a different signal. Understanding changes determines the ability to identify damages



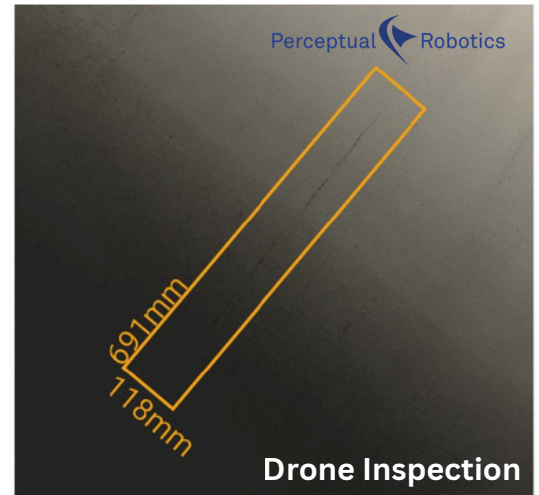
Drone

Ad Hoc Immediate Drone inspection after warning require in house drone



Time and Cost

Real time monitoring and early identification needs to be cost effective



WHAT

On the 25th of November 2025, a drone inspection was conducted for two turbines in a Scottish wind farm, to confirm whether the detected damages by Windrover were visible and corroborate the system's data with actual physical findings. This inspection followed several weeks of monitoring through Windrover system, which had been installed on the turbine in June.

RESULTS

	Windrover Acoustic monitoring	Dhalion Drone Inspection
Transverse Crack	✓	✓
Crack	✓	✓



Future

An ideal combination of tools: continuous monitoring with acoustics and in-house drone in the wind farm will allow reducing costly interventions as damage propagation won't be allowed.

OUTPUTS & STEPS

Significant damages where Windrover system had predicted them were discovered in the drone inspection. In one turbine a CAT3 transverse crack (69 × 12 cm) located at mid-span was the dominant defect. In the second turbine a new damage not present in previous drone inspections was also detected (suspected surface opening (crack-like) damage) and confirmed by the drone inspection.

01

Setting up Windrover

Acoustic system monitoring in real time in two turbines

02

Results

Suspected significant damage in at least one blade on each turbine

03

Drone Inspection

Autonomous drone inspection and AI data processing carried out

04

Validation

Predictions are accurate, significant damages identified on both blades

APPLICATIONS

- Enable **continuous monitoring** of blades as part of preventative maintenance.
- **Combine with in-house drone *ad hoc* inspections** to investigate early the acoustic detections
- **Increased availability** and **reduced risk** by early adoption of mitigation measures.