

Human-Oriented Robotic IoT Digital Platform for Wind Blade Inspection

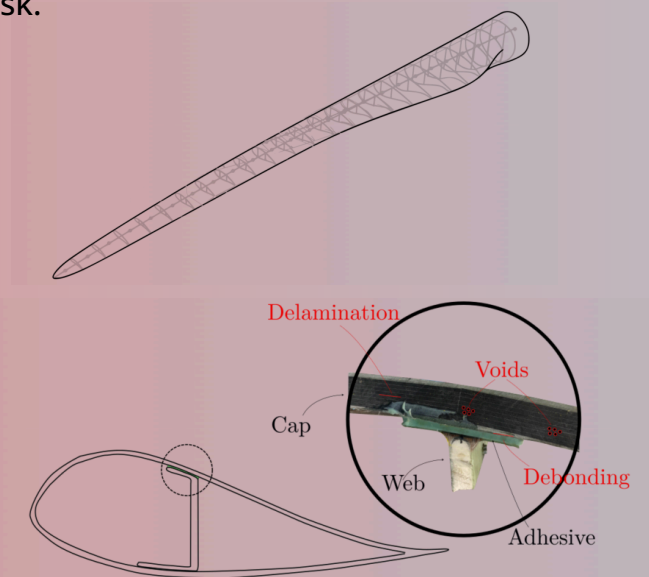
The **ORION** Project, selected during the EARASHI Open Call 2, addresses the challenge of Robotic Assistance for Heavy-Duty Tasks in the production machines/tools sector. It focuses on improving the inspection of wind turbine blades, a critical process for ensuring performance and safety in renewable energy systems.

ORION integrates IoT solutions for structured data management and AI algorithms to support decision-making, enabling operators to efficiently analyze large amounts of ultrasonic testing (UT) data. By embedding human expertise into AI systems, ORION enhances operator-driven quality inspections, improving accuracy and reducing stress in a demanding task.

CHALLENGES

ORION aims to address several critical aspects of wind turbine blade inspections and operator efficiency:

- Ensuring safety and accuracy in inspections of large, complex components
- Reducing operator stress and workload in interpreting UT data
- Managing and analyzing extensive amounts of inspection data
- Enhancing the reliability of defect detection
- Improving process efficiency through automation
- Integrating human expertise with AI for decision-making



SOLUTIONS



Real-Time Ultrasound inspection



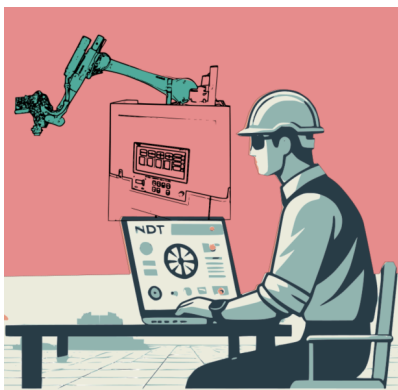
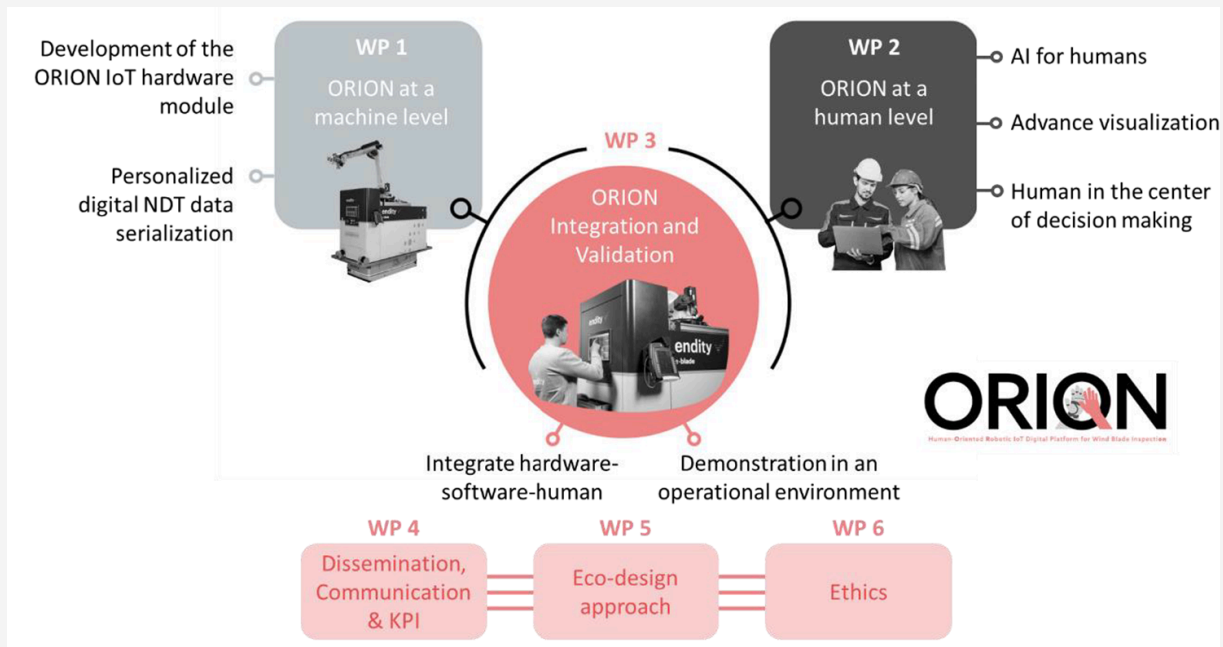
Advanced AI for decision making



Advanced inspection visualization platform



Safety improvement and stress level reduction for NDT workers



MAIN GOALS

- Automatic Ultrasound defect Detection
- Worker Well-being
- Human-centered AI-Enabled DSS
- Industrial Demonstration and Validation

KEY NUMBERS



Traditional inspection times are reduced by up to **10** times, going from 80 hours to just 8 hours for a full blade inspection.



Each Enhanced robotic system successfully inspects **15** wind turbine blades per week.



Solution demonstrated with **8** workers



AI algorithms created to assist operator decision-making include **7** innovative approaches.



The development of the **ORION** solution, through the integration of advanced solutions in robotic Ultrasound inspection systems, has made it possible to greatly accelerate the capture and analysis of results. In this way, not only has the physical safety of the operator been improved, but also their stress levels have been reduced due to the help provided in the decision making process.



The financial support and services offered by the EU have played a crucial role in realizing the **ORION** initiative, enabling the exploration and advancement of state-of-the-art AI innovations and permitting the actual application and assessment of these technologies in real-life environments.

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