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ROMAIN

**Development Of A Robotic
Maintenance System For Wind
Turbine Blades**

Call	*HORIZON CL4-Digital-Emerging-2021-01-09*
Duration	*September 2022 > August 2025*
Project ID	*101070320*

OBJECTIVES

ROMAIN is a project closely directed to end-users. The measurable technological and operational objectives are broken down as follows.

Technological objectives

The first objective of the project is to design a compact robot capable of carrying and deploying the newly developed inspection and repair kit along the Wind Turbine Blade (WTB).

Subsequently, the inspection system will be optimised to detect subsurface defects within the WTB locally: this includes the implementation of advanced image processing algorithms with the objective of significantly increasing the inspection rate.

The project is also aiming at demonstrating advanced repair techniques using composite repair patch and heating and compaction curing and consolidation to repair the WTBs locally, with the support of the robot.

Furthermore, image processing and AI algorithms will be designed to fast process the images acquired with the procedures illustrated.

Finally, safety measures will be put into place throughout the demonstration phase to manage the robot and the integrated inspection and repair kit in case of malfunction.

Operational objectives

The project intends to demonstrate the functionalities of the integrated system in a real operating onshore wind farm, separately at first (inspection kit separated from the repair one) and afterwards combined in a single system.

The demonstration activities will always be performed according to the safety standards.

The outcome of ROMAIN field trials will be disseminated and a cost benefit analysis drafted.

EXPECTED IMPACT

IMPACT 1: Inspection and maintenance practices still rely strongly on technicians, exposed to a demanding and hazardous work environment. ROMAIN will enable to use a robotic system to perform WTB maintenance, totally removing the need for human access and consequently the associated safety risks.

IMPACT 2: Currently, inspections are limited to surface defect detection. Advanced optical inspection technique with subsurface defect detection will be developed and integrated with the robot in ROMAIN. The improved performance of the inspection will naturally lead to improved performance of the repair.

IMPACT 3: Data on WTB Inspection is primarily optical images acquired by conventional digital cameras and passive temperature images by thermal cameras. ROMAIN will produce different type of data by developing advanced lock-in shearography and thermography with laser heating. The new information collected will lead to advancement in gathering new physical intelligence about WTBs and hence to new analytical results.

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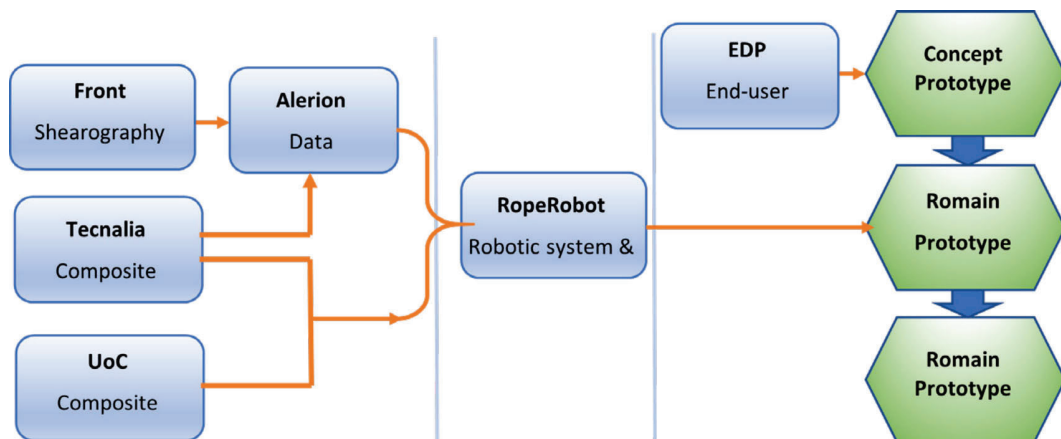
Romain consortium participants form a viable supply chain