

In-situ wireless monitoring of on - and offshore WIND TURbine blades using energy harvesting technology – DEMOnstration / WINTUR Demo

the objective of the project

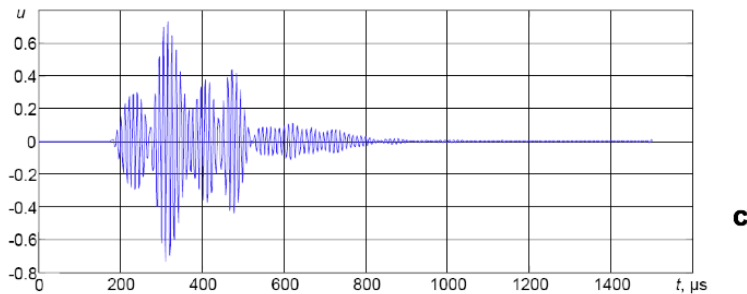
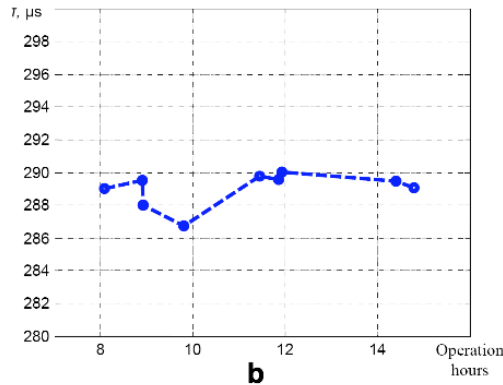
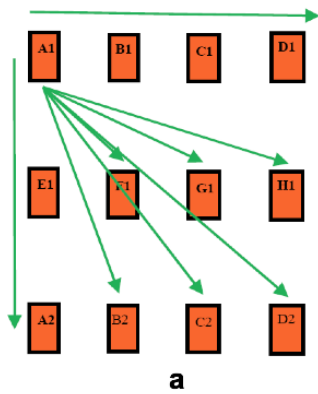
To implement the technology demonstrated at the end of the preceding Research for SMEs project WINTUR, which delivered a prototype of condition monitoring system for wind turbine blades, towards commercial maturity.

motivation

Wind energy is an increasingly important contributor of power within the renewable energy sector. In the EU, wind power installations accounted for 17% of new power installations in 2010, and wind represented 10% of the total EU power generation capacity. According to the IEA, wind power capacity will produce 181TWh, meeting 5.3% of gross EU final power consumption in an average wind year, avoiding about 115 million tons of CO2 annually. The need of the WINTUR DEMO project, arises because technique presently used is visual inspection - a relatively slow, potentially dangerous, expensive of providing the user with the blade information sought before a critical failure occurs. Autonomous condition monitoring will reduce or eliminate the need for inspection personnel to routinely visit these installations, which are often situated in hard-to-access sites in remote areas and off-shore installations.



The sector of interest and the internal structure of the wind turbine blade to be monitored, positions of transducers



Configuration of the embedded ultrasonic transducers when transducer A1 is transmitting and other transducers are receiving (a) and variation of the time of flight (b) of the received signal by receiver B1 (c) during operation of the wind turbine

ultrasound institute

Proposed configuration of the ultrasonic transducer array. Also, developed signal analysis algorithm to differentiate between environmental conditions and the onset of structural degradation within the turbine blade. In addition, supported the SMEs concerning feasibility of system, validation of the developed prototype and installation procedures to new or existing wind farms.

related publications

1. Mazeika L., Raišutis R., Kažys R., Samaitis V., Jankauskas A. Structural health monitoring of wind turbine blades using ultrasonic guided waves, ISPA 2013, Germany

project homepage

<http://www.winturdemo-project.com/>