

Title: A Novel contactless ground based radar to monitor in-field wind turbine blades and towers

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A quasi monostatic ground based radar (GBR) is a novel non-contact sensor able to determine typical and atypical unbalanced parameters of wind turbine blades and towers in less than 30 minutes. GBR is able to determine the radial velocity, radial deflection, natural frequency, and modes shapes of blades and towers as portable vibration based structural health monitoring. Results done on a sub-megawatt wind turbine and a 1 kW wind turbine indicate results being achieved within a deflection accuracy of a micron.

The results adumbrates four major contributions of GBR for wind industry practitioners and researchers: primarily it enables the contactless characterisation of blades for unbalanced parameters under varying wind loads. In addition, it contributes to understanding of composite materials as increasingly used in wind turbine blades. Furthermore, the GBR results provide actual real time measured data that can be used to verify numerical models used in design and certification of wind turbine blades hence making research, design and testing of blades cheaper and efficient.

Lastly, the GBR results enable emliration of the fatigue life testing techniques and numerical analysis of these components. Consequently, making the manufacture of blades and tower cheaper and more efficient due to the better understanding of the material properties of the blades under actual real-time wind loadings

Biography

Xavier has is undertaking his PhD at the University of Nottingham, and has been a practioner on renewable energy and particurlarly wind energy. He is a research fellow at the institute of energy and environmental technology at the Jomo Kenyatta University of Agriculture and Technology. Morevoer, he has undertaken over 25 international consultancies for the European Union in the area of Renewable energy in addition to being a reviewer for the Journal of Renewable energy reviews.

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