

## **Comment on wes-2021-157**

Anonymous Referee #2

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Referee comment on "Development of a wireless, non-intrusive, MEMS-based pressure and acoustic measurement system for large-scale operating wind turbine blades" by Sarah Barber et al., Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2021-157-RC2>, 2022

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Interesting paper outlining the development of new valuable apparatus to measure aerodynamic pressures on wind turbine blades.

### General comments:

- It is recommended to pay more attention to careful unambiguous dissemination. I have tried to point out some points in the specific comments but it remains the responsibility of the authors to convey the message across to the general public.
- Although some wind tunnel tests are described, the aerodynamic effect of adding this system to a specific sections remains unclear. Such a verification should not be too difficult to perform by comparing to conventional taps in the wind tunnel.

### Specific comments

#### -1.1 Introduction p2

Perhaps it is useful to commemorate historical efforts in IEA Task 14 and 18 that also featured some field test including pressure measurements. From IEA Task 47 it is known that also at DTU there is an ongoing effort to develop a pressure belt, would it make sense to refer to this development as well and identify differences and synergies?

-1.2 p3 line 53/55 MEMS footnote on line 55 is introduced after its first usage on line 53

-1.2 p3 line 55 Explain the relevance of IoT in this context

-1.3 p3/4 The summation of added value items is often overlapping and inter-related.

Perhaps restructure or remove enumeration

-2.1 p6 line 152/153 Can something be mentioned about the effect of transition on  $C_p$ ? It would be worthwhile to mention absolute thickness of the sleeve in mm.

-2.1 p6 line 154 Is the mentioned nr of 40 sensors based on a criterium, e.g. accuracy in CI?

-2.1 p6 line 160 Can a reference and/or graphic be given to further illustrate the L-shape configuration mentioned?

-2.1 p7 Fig. 1. The figure suggests dynamic stall phenomena to occur only below 1 Hz which does not make sense

-2.1 p7 Fig. 1. Why is the range of dynamic pressure sensors limited to only 2k (perhaps to limit bandwidth)?

-2.4 p10 line 219 clarify or give reference to json schemas

-3 p13 line 258 and beyond, Fig. 6.

It is mentioned that the tests are aimed to evaluate if it was technically possible to capture main flow features with the system. On the other hand it is mentioned the physical meaning of the measurements do not need further investigation. This seems a bit contradictory, perhaps this could be rephrased or e.g. the azimuthal load variation from the integrated pressure distributions could be added to verify if the results make sense.

-4.1 p14

Clarify the spanwise position of the belt compared to the 40 taps (or did I miss it?).

-4.1 p14 line 292. Is mid-span meant instead of mid-chord? (also on p16 line 317)

-4.1 p15 line 311. It is claimed that flow on a rotating wind turbine blade is mostly three-dimensional which is a motivator for the subjected approach, is there a reference to substantiate this claim? p16 line 321 then mentions XFOIL is used which is a 2D tool which seems a bit strange in this respect?

-4.1 p16 Fig. 9 Clarify significance of horizontal axis label  $\eta$

-4.1 p16 line 325 An error in angle of attack of 2.5deg can be interpreted as quite large, but is mentioned to be satisfactory. For which application is this the case?

-4.1 p17 Fig. 10 Clarify wind speed for pressure taps in legend. Are these results for a tilted or non-tilted blade?

-4.1 p17 Fig. 10. The caption mentions flushed pressure taps, perhaps flush mounted taps are meant here?

-4.2 p18 If I understand correctly the sensors are added in a sleeve to be wrapped around the section (This aspect should be clarified better in the text describing the apparatus or did I miss it?). How would such a sleeve impact the erosion measurements as it is wrapped over the eroded surface?

-4.2 p18 line 342. Perhaps add a reference for 'Non-Homogeneous Compound Poisson Process'

-4.2 p19 line 349. Are any results given of this approach?

-4.2 p19 line 362. is->are

-4.2 p19/20 For the second approach it is not clear how this method would work in the field, where sectional inflow conditions are unsteady and unknown due to atmospheric turbulence.

-4.2 p20 Fig. 13 The caption should indicate the significance of ?histogram? that is added to the vertical and horizontal axes