Wind Energ. Sci. Discuss., referee comment RC1
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Comment on wes-2021-66

Christian Navid Nayeri (Referee)

Referee comment on "Design, steady performance and wake characterization of a scaled wind turbine with pitch, torque and yaw actuation" by Emmanouil M. Nanos et al., Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2021-66-RC1, 2021

General Comments

This article describes in detail the design driving parameters, the scaling analysis, the mechanical components and the acquired operational properties of a miniature wind turbine model optimized for wind turbine wake wind park studies in wind tunnels.
It is a very valuable contribution to the field of wind tunnel experiments for wind park control studies, wake studies and complex terrain studies.

The paper is very well written and comprehensive. I have only a few comments.

Specific comments

L27: I would appreciate if you could list a few references related to this statement “There is only a handful of articles that address the methodology behind the design of scaled models and/or provide some assessment of their characteristics”

Figure 2 : Could you provide some other parameters of the XFOIL simulation, e.g. Ncrt, Ma, etc.?

L160: Can you provide a reference to the last statement?

L176: How are CL and W estimated or calculated to do this process?

Fig. 7: How far upstream of the turbine are these profiles measured? It would be nice if you could add the measured TI-profiles.

L212: Until now the presentation is based on design and assembly, what "typical use" are you referring to?

L232: Strouhal number not frequency. Please clarify what are f, D and U here.

L243: Only G1 was provided with a reference so far. Could you include a reference to G2?

L299: How is the inflow speed measured? The technique, sensor and details are missing.

L302: Is there any kind of filtering in the data previous/after the controlling operations?

L330: The overheat ratio should be 1.8 (from the reference mentioned)

L333: You state that one wind tunnel creates a „uniform velocity profile". However, from my understanding both velocity profiles are sheared, i.e. non-uniform in Fig.7.

L333: What does "Clean tunnel" exactly mean? Spires, roughness, turbine, everything out?

Technical corrections: typing errors, etc.

L12: "…with a similar slightly larger scaled model turbine": for the sake of better readability I would rephrase this, e.g. „…with a similar **but** slightly larger scaled model turbine"

Caption Fig. 19: there is a double “the the”

L561: I suggest replacing “represented“ by „represents

L564: remove “at” from “…including at the rotor…“ and „in“ from „..in the near- and far-wake regions..

L564: insert “spanwise” before “circulation”

L571: remove “an” from “have an almost”