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Interactive comment on "Establishing a robust testing approach for displacement measurement on a rotating horizontal axis wind turbine" *by* Nadia Najafi and Allan Vesth

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Anonymous Referee #2 Received and published: 3 January 2018

Title: "Establishing a robust testing approach for displacement measurement on a rotating horizontal axis wind turbine" Paper No: wes-2017-49 Authors: Nadia Najafi, Allan Vesth

Dear Editors: I would like to express that the current manuscript is suitable for publication. There are few minor corrections that must be addressed by the corresponding author:

Thank you for reconsidering the paper and constructive comments. In the following I tried to be precise in answering and satisfying the points.

* All the commentsare applied to the marked document that has been attached to the supplement.

** Allthe page numbers, reported in the answers, are based on the marked document that has been attached to the supplement.

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COMMENT 1: I suggest, that the authors should mention the assumptions and/or limitations of the experimental setup. Could the experimental results be affected by using different materials with less or more flexibility or rigidity?

RESPONSE: It is a fair point. One of the assumptions is considering that the cameras follow the pinhole camera model that is added in page 4, second paragraph. The other limitation of the experiment is about camera synchronization that has been explained in page 14, second paragraph: "In the current study there is no external trigger or switch to start the cameras and they are triggered at the same time using software trigger (LabVIEW code) that could disturb the perfect synchronization between the cameras." There are also other limitations in the setup regarding the turbine yaw and pitch that have been explained in paragraph 3 and 4 in page 14.

The proposed method for displacement measurement is not affected by the flexibility or rigidity but if the material is too flexible the normal distance between two markers would change due to the rotation and the change of this parameter during rotation cannot be used as an indication of measurement inaccuracy.

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COMMENT 2: pp. 4, line 7: The selection of the distance of 7.5m between the camera and the turbine was a result of a dimensional analysis? How did you come up with this particular distance?

RESPONSE: According to the turbine dimensions the imaging area is chosen to be almost 2mx2m, the lens focal length is 40 mm and the camera sensor size is 11.26 mm x 11.26 mm. Based on these factors and pinhole camera model, the distance between the cameras and turbine is calculated to be 7.5 m.

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COMMENT 3:

In section 4, pp.7-8, I recommend add a flow chart of the tracking algorithm.

RESPONSE: Is it an open loop or closed loop algorithm? I added a flow chart at the end of the tracking algorithm section. It is a closed loop.

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COMMENT 4: In figure 12, reduce the scale for the y-axis as follows: Ux from 0.08-0.11, Uy from 0.08-0.11 and the mean value from 0.2 to 0.5.

RRESPONSE: Ux exceeds a bit from 0.11 so I set the range for Ux and Uy to 0.08-0.11 and for Uz to 0.2-0.5.

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COMMENT 5: I suggest that the conclusion should be focused on the most relevant results obtained in the experiments. Details about the experimental setup and procedure should be mentioned in the experimental setup section (pp. 3). Is it realistic to apply the proposed 3D technique to a 3.6 wind turbine?

RESPONSE: It is a fair point; I removed the part about the setup and procedure in the conclusion. With considering some practical points the technique can be applied on a full size wind turbine. New information and explanation is provided in page 15 about applying the proposed technique in filed.

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COMMENT 6: In pp. 14, line 16, the imaging area is supposed to be 2mx1.9m (see pp. 5, line 21).

RESPONSE: 2mx1.9m is the dimensions of the 2D calibration grid while the imaging area is a bit bigger (about 2mx2m) as it can be seen in Figure 4.

Regards, The reviewer

Please also note the supplement to this comment:
https://www.wind-energ-sci-discuss.net/wes-2017-49/wes-2017-49-AC2-supplement.pdf

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