DTU Wind Energy
Department of Wind Energy

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hama

Dear Reviewers

First of all, we would like to thank you for the constructive review of our article. Please find below our responses (in red) to your comments (in blue) and the updated text of the article (in brown). Also a few typos have been corrected.

Yours sincerely

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Comments to Reviewer #1

1)

A nice article about the application of an innovative measurement technique to gain new insights on the topic of blade/tower interaction for downwind rotors. The article is rather lengthy for the message it brings and some parts could be streamlined better to make it more concise. Although the purpose of the measurement dataset is to progress modeling and validation, there is very few about this in the paper. As such the novelty is mainly about the challenges faced during the experimental campaign and the corresponding solutions instead of the intended application of the results. However the results do provide an unique insight in the aerodynamic pressure on blades and tower in a downwind configuration, although the result interpretation could benefit from a more thorough study. From the viewpoint of novel measurements, the article provides new and valuable insight and is worthy of publication.

We thank you for the overall positive evaluation of the article that provides unique information on the blade/tower interaction of downwind turbines. We also agree that the main focus has been on the experimental set-up and the campaigns. However, we hope that the data have been presented in a way that makes it clear what type of model validation can be conducted, e.g., full resolved CFD rotor simulations of the blade tower interaction comprising instantaneous pressure variations on the blade and the tower.

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2)

-p2 intro. Although later on in the paper in section 4.5.1 the NREL UAE from 2000 is mentioned, which featured wind tunnel testing of a downwind configuration, it is not mentioned here, while it is believed to be applicable..

Agree, see also comment 22 to reviewer 2 below. Text from 4.5.1 moved to the Introduction and reads:

On the experimental side on the blade/tower interaction of a down wind turbine the Unsteady Aerodynamics Experiment conducted by NREL in 2000 should be mentioned as an old source of interesting data. This experiment was a test of an extensively instrumented model wind turbine rotor with 10 m diameter in the giant NASA-Ames 24.4 m by 36.6 m wind tunnel. The turbine could be operated upwind and downwind of the tubular tower.

In a later study by Zahle et al. (2009), the data were used to validate a CFD model of the blade/tower interaction on the same rotor. An important observation is that in both the simulations and in the measurements a strong impact on the blade response was caused by the blade passing through shed vortices from the tower. The blade/tower distance was 3.5 tower diameters in this previous experiment. In the present experiment, the blade/tower distance is only about one tower diameter, since it is an upwind turbine operated in a downwind configuration where, e.g., the blade prebend reduces the blade/tower clearance. Due to this much closer distance between the blade and the tower, it is expected that the blade in the present experiment will pass through a more clean deficit as visualized in the CFD flow field simulations at a tower diameter downstream of the tower, as presented in Madsen et al. (2007). It should also be mentioned that no pressure measurements were carried out on the tower in the Unsteady Aerodynamics Experiment, preventing the full validation of the simulated blade/tower interaction.

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3)

p5 line 113. It is indicated that one of the pressure ports of the belt is used as a reference. Although reference is made to a 2022 publication, please make clear where and how the reference pressure is obtained, both in the case of blade and tower application? For the blade application, is the pitot used? From section 3.5 about calibration of the 5 hole probe, line 237 at p12 seems to indicate the static pressure from the pitot is used as reference to the belt? If this is the case, it is unclear whether a physical connection by means of a tube exists?

Thank you for the question for clarification of the reference pressure. The reference port in each of the two 16 channel scanners at one station is connected with a tube to the static port of the five hole probe at this radial position.
The static reference port for the 64 channel scanner for the tower pressure measurement was inside the housing or box where the scanner was mounted. The box, mounted about 1 m above the tower pressure belt, was almost airtight.
To clarify, we modified the text of the article.

The pressure scanners, with a size of 37 x 32.4 x 9.2 mm, are operated in a so-called calculated differential mode, where one of the ports is used as reference and connected to the static port of the five hole probe at this radial position.

and the modified text for the scanner on the tower:

The two segments were vertically shifted by one belt width (see the photo on the right in Fig. 9) to allow the connection of a 64-channel pressure scanner, which was installed in an almost airtight box attached to the tower opposite the prevailing wind direction at a location approximately 1 m above the pressure belts. The scanner is the Scannivalve MPS4264 electronic pressure scanning module with a full range of 4 inH2O (0.145 Psi) and with the static port open inside the box with the scanner

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4)

-p7 fig .4 The layout is difficult to read in spanwise direction and can be ambiguously interpreted. Consider using different colours and/or a legend to fix this.

Agree. Figures and text updated.

The pressure tap (also known as port or orifice) layout used at both belt locations was based on a cosine spacing law. This arrangement produced higher port density at the leading edge and sparser port density at the trailing edge of both pressure and suction surfaces. The spanwise spacing of ports minimized upstream ports tripping the boundary layer for downstream ports, though some degree of disruption of the airfoil boundary layer might be expected in some conditions from the spanwise-running ramps at the edges of the pressure belt (cf. Brown et al. (2018)).. The port layout is shown in Figs. 4 and 5. Both the (a) chord positions and (b) span positions of the ports are presented. The span position plots show the pressure belt from above as wrapped around the leading edge at $s_{arc} \approx 2$ m and $s_{arc} \approx 1$ m for the two stations.

Note the spanwise layout axes are not to scale. The red vectors are 15° wedge angles from vertical to assess downstream transition spreading. Additionally, pressure belt tubing connectors interfered with optimal port locations near the trailing edge. These interference areas are indicated shaded red trapezoids in Figs. 4(b) and 5(b).

In Fritz et al. (2024) the authors initially developed an optimization routine to minimize the number of pressure ports needed to accurately measure lift coefficient. This work showed that 32 pressure ports with cosine spacing already had a lift coefficient error below 0.01. Therefore, there was not a significant advantage to using an optimized layout.

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5)

-p7 section 3.3 The dynamic pressure reconstruction is validated by generating rapid pressure pulses, which is very encouraging to see. Could the authors comment on the applicability of the reconstruction method, acknowledging real life pressure variations consist of a mixture of different frequencies?

The pressure pulse used to characterize the tubing system excites frequencies from low frequency (DC) to some upper cutoff frequency (at least to 500 Hz in this case where the content is about half that of lower frequencies) as shown by the surface pressure signal in the frequency domain (the black line) in Figure 6. The characterization thus confirms the capability of the reconstruction process over this range of frequencies - not just at high frequencies. This is evident in the frequency domain of the reconstructed signal (the blue line) that appears to closely resemble the frequency domain representation of the surface pressure signal's frequency (the black line) out to approximately 400 Hz. This provides confidence in the reconstruction of the 0-400 Hz frequency components of any signal.

We have modified the text to emphasize that the pulse has frequency content from low frequency to 500+ Hz.

The frequency-domain plot (right panel) confirms these observations: the pressure pulse applied to the surface has frequency content from low frequency out past 500 Hz, the remote-raw pressure is significantly attenuated at all frequencies greater than 10 Hz, and the remote reconstructed pressure accurately restores the broadband frequency content up to 400 Hz. The ability to reconstruct pressure signals with frequency content up to 400 Hz ensures the ability to resolve unsteady aerodynamic phenomena relevant to blade/tower interactions.

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6)

-p9 section 3.5. Please clarify the significance of this calibration (also refer to the above comment about reference pressure).

It is our experience that we increase the accuracy of the five hole probe measurements by applying the calibration coefficients from our own calibration compared using the calibration coefficients supplied by the manufacturer.

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7)

Can the authors comment on the applicability of wind tunnel calibration in comparison to operation in a turbulent environment with flow curvature ?

We agree with the reviewer that atmospheric flow measurements with probes calibrated under steady wind tunnel conditions are challenging and are related to additional uncertainty. However, presently we do not have better procedures.

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8)

-p11 fig. 8 Please clarify the significance of the variables in horizontal and vertical axes in reference to Fig 6b and eq. (7) to (10)

Definitions inserted and text updated.

Two different probe coordinate systems were used in this investigation. The coordinate system defined by the angle of attack α and the angle of side slip β was used to characterise the aerodynamics at the wind turbine blade. The coordinate system defined by the yaw angle θ and the roll angle Φ exploits the symmetry of the theoretical shape of the five-hole probe. The conversion between the two coordinate systems is given by

$$\alpha = \arctan(\sin(\phi)\tan(\theta)) \tag{1}$$

$$\beta = \arcsin(\cos(\phi)\sin(\theta)) \tag{2}$$

and

$$\phi = \arctan(\sin(\alpha)/\tan(\beta)) \tag{3}$$
$$\theta = \arccos(\cos(\alpha)\cos(\beta)). \tag{4}$$

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9)

-It is recommended to investigate to what extent Fig. 10 to 13 can be reduced/removed without detriment to the message of this paper.

We find that some of the figures are important to provide a quick overview of the data, e.g. for a reader to decide if the data can be used for a specific model validation. However, figures showing pitch and yaw error removed and figures showing wind speed, wind direction, electrical power and rotational speed merged into one figure.

Text updated

An overview of wind conditions during the D1 campaign is shown in Fig. 11 together with the turbine electrical power and rotor speed. As seen by the measured wind speeds at three heights in Fig. 11 (top-left), the wind varied a lot during the first 2–3 hours of the measurement campaign. Later in the afternoon, the wind speed was more stable. The large variations in wind speed had a positive impact: During this short campaign of about 5 hours, the turbine operated from cut-in wind speed to rated power with pitch regulation, as observed in the lower-left graph in Fig. 11 and in the rotor speed variations in the lower-right graph. The drawback is the large variations in wind direction as shown in the upper-right graph which result in high instantaneous yaw errors, which limits useful data when a narrow filter on the yaw error is applied

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10)

-p17/18 line 320-331 and beyond. Provide a reference to the 2000 work (see also intro comment).

Done - see above in the introduction.

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11)

Can the authors comment on what would be a realistic/representative distance between tower and blade for a downwind configuration, in relation to the difference between the 2000 experiment and here? Besides this difference and the absence of tower measurements in 2000, what was the outcome of the downwind measurements carried out in 2000 against this work, e.g. are the physics comparable?.

See the answer to 2) above about the text moved to the introduction about the 2000 experiment.

Then we think that the parallel measurements in the present experiment of the blade and tower pressure provide a unique new data set providing detailed insight into the aerodynamics of the blade/tower interaction and can be a valuable data set for validation of 3D CFD simulations. Also in relation to what we cite in the introduction:

"An exception is an interesting advancement in low-frequency noise modeling and simulation in which pressure fluctuations on the tower from the blade/tower interaction also seem to contribute considerably to the total low-frequency noise level (Klein et al., 2018; Zajamsek et al., 2019). In previous simulations of low-frequency noise (Viterna, 1982; Madsen et al., 2007; Madsen, 2010) only impulsive blade loading was considered as the source of the noise".

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12)

-p16/17 section 4.3 and 4.4 fig 14/15/16. It is hypothesized that the differences in pressure coefficient are largely related to uncertainty in the estimated AOA from the five-hole probe. Acknowledging this reasoning, what angle of attack in the 2D simulations would be needed to match the pressure distributions? I suppose that would be easy to verify. Are the lift coefficient deviation shown in Fig. 16 in line with this hypothesis?

Please see answer 21) below for the second reviewer. We have changed the explanation of the deviations to a higher importance of 3D flow effects combined with this rather thick airfoil of 25 $\%$ in turbulent atmospheric flow compared to the 2D CFD simulations of the pressure distribution presented.

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13)

-Fig 17 Can the wind speed variation be included in this plot as well to observe the correlation with loads?

We have inserted a new figure below Fig. 17 (now below Fig. 16) showing time traces of wind speed and electrical power to illustrate the correlation to the aerodynamic tower and blade loading.

The integrated total aerodynamic loads $Ftowe$r and F_nblade from the measured pressure distributions on the tower and the outboard blade section for a period of about 1/2 an hour of the second measurement campaign are shown in Fig. 16 followed by Fig. 17 showing the wind peed and electrical power during the same time sequence. There is an overall good correlation between the variations in blade and tower loads, but the level of the tower loads is 3 to 5 times lower due to the difference between the speed of the free wind forcing the tower and the relative velocity determining the sectional force of the blade.

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14)

-p19 section 4.5.2 and fig 18 and 19. A qualitative description of the observed load variation on tower and blade are given for a high and low wind speed. Can the authors comment on the different physics behind the observed different load variations between low and high wind speeds cases (e.g. occurrence of dips instead of peaks)?

We cannot explain this change in impulsive load pattern at the moment and its subject for deeper investigations. Text added about this in the article

The difference in this impulsive load pattern on the tower from low to high wind speed is a subject of further investigation.

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15)

p26 section 4.5.5 last paragraph

Acknowledging the small distance between tower and blade, in how far is it justified to model tower flow and its effect on the blade flow separately, in other words is the interaction between the two negligible?

This is a valid question. We added the following sentence to the end of the paragraph

It should also be noted that at the unusually small blade-tower clearance of this experiment, the assumption of a one-way decoupled interaction, where the tower wake acts as an incoming disturbance to the blade without the blade's pressure field in turn modifying the tower flow, may not be fully justified. At such close proximity, two-way aerodynamic coupling between blade and tower could represent an additional source of modeling error beyond the two already identified. The full three-dimensional CFD rotor simulations including tower flow mentioned above are the appropriate tool to assess the significance of this coupling.

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16)

How is the tower incident inflow speed defined in the OpenFAST implementation, is it impacted by the blade induced velocity and if so in an iterative way? If not accounted for would its effect reduce the difference in the magnitude of the drop between simulations and measurements? As suggested it would be nice to compare the five hole probe measured speed to the tower model predicted tower wake velocities, which should not be difficult to do?

In OpenFAST the tower incident inflow speed is not impacted by the presence of the blade. As noted earlier, full three-dimensional CFD rotor simulations would be able to explore these phenomena and we hope to have the opportunity to conduct such studies.

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Comments to Reviewer #2

Dear Reviewer

Your general comment:

1)

The authors present a field measurement campaign to investigate the aerodynamics of blade/tower interaction of a modified (downwind) 1.5MW wind turbine. The data set is unique and very interesting. The paper is well written. It reads more like a dataset presentation, which is still very important, rather than a deep investigation on the complex aerodynamic interactions of downwind rotors. More detailed comments and questions in the attached file.

It is correct that the focus of the paper is on a description of the unique instrumentation and presentation of the data set. However, we have included the results of a preliminary post processing e.g. to illustrate the pressure variations on the tower and the impulsive load on the tower an the blade.

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2)

Neither the abstract nor the paper include findings regarding these shortcomings. The paper reads more like the presentation of a validation data set. If the authors can reach conclusions on the pros/cons of the downwind configuration they should do so in the conclusions (and add it to the abstract). If not, then perhaps the abstract should avoid mentioning addressing the shortcomings.

We write later in the abstract: "Impulse loading is found to be 100–150 Nm^{-1} on the tower and 200–500 Nm^{-1} on the blade in a time span of approximately 0.3 s." Therefore, we find that we have documented one of the shortcomings, the impulsive loading, of the downwind turbine concept.

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3)

The readers already know this, so this is probably redundant.

Agree. Text "As mentioned above, the deployment of the pressure belts represents an element of a larger experiment focused on the characterization of the loads and acoustic emissions of downwind rotors." removed.

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4)

Can the authors comment on whether and in what way would the findings of this study be affected if a turbine designed to operate in a downwind config was used?

See the text, now in the introduction, commenting on how the present set-up deviates from the old NASA Ames experiment and what impact it could have.

In a later study by Zahle et al. (2009), the data were used to validate a CFD model of the blade/tower interaction on the same rotor. An important observation is that in both the simulations and in the measurements a strong impact on the blade response was caused by the blade passing through shed vortices from the tower. The blade/tower distance was 3.5 tower diameters in this previous experiment. In the present experiment, the blade/tower distance is only about one tower diameter, since it is an upwind turbine operated in a downwind configuration where, e.g., the blade prebend reduces the blade/tower clearance. Due to this much closer distance between the blade and the tower, it is expected that the blade in the present experiment will pass through a more clean deficit as visualized in the CFD flow field simulations at a tower diameter downstream of the tower, as presented Madsen et al. (2007).

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5)

The important piece of information here is the Unsteady Aerodynamics model, rather than the parameter value in the solver. Please refrain from providing parameter names (especially if they are not defined).

We slightly reformulated the sentence so that it is no longer necessary to include the code-specific flag implemented in OpenFAST. Note that the same change was also applied to Section 4.5.4.

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6)

Please provide an accuracy estimate of the system.

We have performed several comparisons of pressure belt measurements with pressure measurements from standard tap instrumentation on blade sections tested in the PLC wind tunnel at DTU but unfortunately these test results have not been published so far. Below in Fig. 1 we show one comparison of measurements on a DU00-W2-350 airfoil at a Re. 5 mill and at three different AoA. Overall, the pressure distributions correlate very well except at the negative input angle where the profile stalls. We could include the three figures with pressure distributions if recommended by the reviewer.

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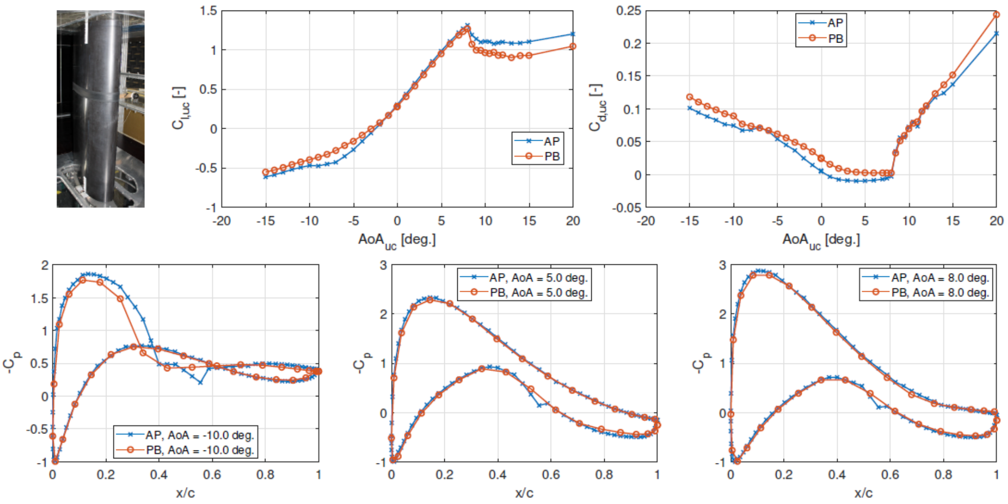

Figure 1. Clean at $Re = 5E6$. Upper row: left: picture of model, centre: C_l curve, right: C_d curve. Lower row: uncorrected C_p left: $AoA = -10.0deg.$, centre: $AoA = 5.0deg.$, right: $AoA = 8.0deg.$.

Figure 1: Comparison of pressure belt measurements in comparison with a standard tap instrumentation carried out in the PLC wind tunnel at DTU. For details see the text in the Figure caption above.

7)

Perhaps Fig. 4 would be more suitable here.

We have modified the text: "The position of the taps is shown in Sec. 3.2" to:" .

The positioning of the taps is discussed in Sec. 3.2 and shown in Figures 4 and 5.

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8)

If available, would it be possible to provide a close-up photo from the actual belt installed on the blade? It would help the readers who do not have access to the actual measurement/acquisition system. If not available, you can direct the reader to Fig. 9

We have extended the caption of Fig. 1 directing the reader to Fig. 9.

See also the actual installation on the blade in Fig. 10

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9)

For completeness, please provide this in r/R, too. Also, please provide blade profile chord in m, and relative thickness at the two locations.

Text changed to:

The two blade belts were designed to be installed at distances from the blade root of 18.90 m and 31.45 m where r/R = 0.51 and 0.84, the chord 1.91 m and 0,96 m and the relative thickness 25% and 18%.

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10)

I agree, but it would be nice if the authors could add a reference here.

References inserted:

Future experiments will be able to focus on more challenging blade regions, such as closer to the root and tip, where flow is known to be more three-dimensional (3D), (Bangga, 2018) and (Jeong and Ha,2021).

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11)

Do you mean the belt was installed on a blade section like a 'C-type' grid (for lack of a better reference)? I think this is what is implied, but it would be nice if the authors could clarify

Exactly like a C-type grid. However, we modified the text slightly which might be a more precise description:

The length of each belt was set to ensure that the ends of the belt reached the trailing edge on both the suction and pressure sides.

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12)

Axes have no values, units or titles.

Figures and text updated

The port layout is shown in Figs. 4 and 5. Both the (a) chord positions and (b) span positions of the ports are presented. The span position plots show the pressure belt from above as wrapped around the leading edge at $s_{arc} \approx 2$ m and $s_{arc} \approx 1$ m for the two stations.

Note the spanwise layout axes are not to scale. The red vectors are 15° wedge angles from vertical to assess downstream transition spreading. Additionally, pressure belt tubing connectors interfered with optimal port locations near the trailing edge. These interference areas are indicated shaded red trapezoids in Fig.4(b) and Fig.5(b).

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13)

I am assuming (but could be wrong) that the tubing on the blade was under some tension. When brought back to the lab, was this taken into account during the dynamic calibration? Or is the effect not important?
Any other parameters that should be clarified regarding the in situ and lab set ups?

We do not think that the tension in the belts or connections has an influence on the pressure response since the belts and tubing are attached in a flexible way to the blade surface with a double sided tape. What is more important for the dynamic response is the arrangement of connection of the pressure belts to the pressure scanners, which is shown with photos from the final report in Fig. 3. The complete pressure belt and connectors were included in the characterization of the dynamic pressure response in the lab.

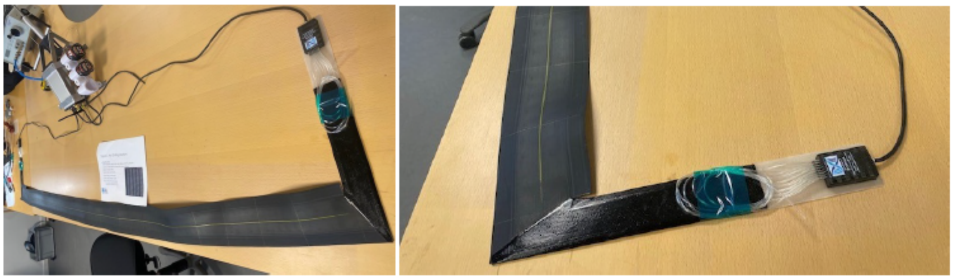

Figure 2.6. Photo showing the connection of the pressure belt to the pressure scanners through a printed fixture with 32 tubes connected to the two 16 channel scanners. The scanners are have data transmission link to the data acquisition in the flyboard as seen in the left photo.

Figure 2: Above a Figure from the final report on the measurement campaign showing the connection of the pressure belt to the two pressure scanners with two printed U-bends connected to the pressure scanners with tubes.

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14)

consider starting a new paragraph here, to facilitate understanding.

done

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15)

400?

changed

the critical frequency range up to 400 hertz,

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16)

what were the dimensions of the flyboard

The flyboards are approximately 30 cm in spanwise and chord-vise direction and 10 cm height. See also one of the flyboards on Fig. 9 in the article. Below we show a CAD drawing of the flyboard without the printed cover. In addition to the data acquisition system, three batteries are also inside the flyboard.

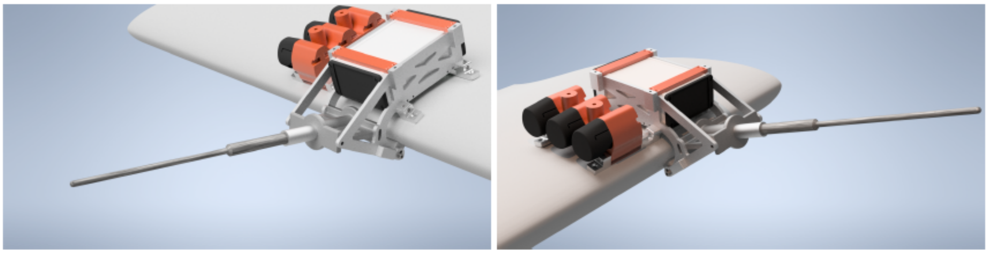

Figure 2.11.| CAD illustrations of the flyboard design.

Figure 3: Above a Figure from the final report on the measurement campaign showing the flyboard without the cower.

The dimension of the flyboards is approximately 30 cm in spanwise and chordwise direction and about 10 cm in height, see Fig. 9 .

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17)

perhaps add the word physically here

done

Note that if the WiFi malfunctions, the data is also stored in the data acquisition system housed on the flyboard and can be retrieved physically by accessing the flyboard.

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18)

As mentioned above, data were collected on two days

changed

Data were collected on two days: 22 April (D1) and 29 April (D2) 2024. During D1, only the two blade systems were available.

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19)

Why not the five hours from the previous campaign?

Text updated.

Together with the previous acquired data set of about 5 hours, the main objectives of the experiment and the instrumentation were fulfilled.

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20)

2D RANS simulations are not expensive. Did the authors check the pressure data against CFD results from other AoA to support this claim?
Also, please quantify the uncertainty in the measurement data so that the reader can better assess the discrepancy with CFD.

The AoA-binned mean measured pressure distributions are compared for 4 AoA in the linear lift range which is considered adequate. We agree that the uncertainty in conversion of the measured inflow angle to AoA based on the upwash from the 2D CFD simulations might not be the most important root for the deviations in the pressure distributions and in particular for the considerable deviations at 4 and 6 deg. AoA. However, the largest single source of uncertainty in the inflow and pressure belt system as discussed in the paper WES, 10, 2499–2513, 2025 is the uncertainty of the geometrical angle of the Pitot relative to the local chord which might be as big as +- 2 deg. We have reformulated the text and put much more focus on the impact of 3D flow effects.

This could be attributed to shape and roughness imperfections, but probably not least due to the impact of three dimensional flow effects in combination with a rather thick airfoil of 25 $\%$ in atmospheric turbulent flow. The missing suction peak could be due to this.

However, also the conversion of the measured inflow angle by the five hole probe to AoA based on 2D CFD simulations is an important source of uncertainty combined with the uncertainty in estimating the geometrical angle of the five hole probe relative to the local chord.

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21)

Should this not be part of the lit review in Section 1? Why introduce data from the literature in the results section?

Agree. Section moved to the Introduction

On the experimental side on the blade/tower interaction of a down wind turbine the Unsteady Aerodynamics Experiment conducted by NREL in 2000 should be mentioned as an old source of interesting data. This experiment was a test of an extensively instrumented model wind turbine rotor with 10 m diameter in the giant NASA-Ames 24.4 m by 36.6 m wind tunnel. The turbine could be operated upwind and downwind of the tubular tower.

In a later study by Zahle et al. (2009), the data was used to validate a CFD model of the blade/tower interaction on the same rotor. An important observation is that in both the simulations and in the measurements a strong impact on the blade response was caused by the blade passing through shed vortices from the tower. The blade/tower distance was 3.5 tower diameters in this previous experiment. In the present experiment, the blade/tower distance is only about one tower diameter, since it is an upwind turbine operated in a downwind configuration where, e.g., the blade prebend reduces the blade/tower clearance. Due to this much closer distance between the blade and the tower, it is expected that the blade in the present experiment will pass through a more clean deficit as visualized in the CFD flow field simulations at a tower diameter downstream of the tower, as presented in in Madsen et al. (2007). It should also be mentioned that no pressure measurements were carried out on the tower in the Unsteady Aerodynamics Experiment, preventing the full validation of the simulated blade/tower interaction.

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22)

Do the data presented here and in figs 14 and 15 include the blade passage downstream of the tower? Would it make sense to filter them out?

It is true that the AoA-binned measured pressure distributions include data from the tower passage, but averaged for all measurements in the same AoA bin. The measured AoA and Vrel from the Pitot includes any influence from the tower disturbance. Since the article focuses on the detailed measured performance of the airfoils sections in downwind operation, it is considered appropriate to not filter for this and present any differences to undisturbed airfoil performance, which is shown to be very low in an averaged sense (at least for the outboard section)

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23)

Please use full words in the legend (e.g. inboard instead of in ?) or explain the legend in the caption

Abbreviations are now explained in the caption.

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24)

This figure looks pixelated, image quality could be improved.

Quality of Figure 22 updated using eps format.

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25)

s much as I feel for you and congratulate you on the final outcome, this comment belongs more to an internal report than perhaps a research paper.

Text modified to:

Although challenged by the weather conditions during the planned experimental campaign over 2 weeks in the second half of April 2024,

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