Interactive comment on “Ability of the e-TellTale sensor to detect flow features over wind turbine blades: flow stall/reattachment dynamics” by Antoine Soulier et al.

Anonymous Referee #2

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General Remarks: Overall an interesting study, comparing the ETell-Tale derived data with PIV, and employing 3 analytical methods to detect stall and reattachment on a pitching airfoil from PIV data. The authors show interesting insights, but a few points need revision, particularly the phrasing, the notation and details of the experimental and analytical procedures. There are also more than a few typos.

I also note I already read reviewer 1’s comments, so I will not repeat them.

Specifically:

Title: ‘On the ability of the e-TellTale sensor for the detection of flow stall and reattachment dynamics’
You are thinking about wind turbines, but the measurements are for a straight foil section at small Re. So the present title is a bit misleading, I think. Also, the use of / should be avoided, specially in the title.

1.1 create>creates 1.15 smartblade>smart blades 1.21 - 2007 is not so recent of a reference... 1.37 - static variations? 1.47 - wake width>foil wake (i.e. not the turbine wake)

Fig 2 - show detail of the geometry of the ETellTale sensor, namely the 'pink part'

1.68 - what is the mean AOA during the pitching motion?

Fig 3 - I miss the reference frame

Fig 4 - Rather unclear figure - I miss the reference frame and sx,sy ticks - subfigure a) appears to show a separated flow condition, whereas b) appears attached; is this inconsistently labeled in the caption, or is it because of the camera perspective? - is 'sy' vertical or along the span?

1.118 - default>a non-identification 1.120 - So, you corrected the data-points for which the detection algorithm did not work, and set sx to 1, and these correspond to the blue points in fig 5? Why? It appears the unidentified data-points occur when the flow is attached. According to fig 5, wouldn't it make sense to 'correct' these data-points to around sx=0.75?

Fig 5 - show y axis variable

Fig 6 - Show airfoil contour

eq (1) - This formula and its application is not so clear? Use subscripts? Is \( P \) the cross product? I guess \( P \) is a point with coordinates \((x,y)\) and not a vector, and so we cannot define the cross product.

1.171 - brutal > massive 1.184 - you show a characteristic frequency, not the associated time-step
Fig 7 - the a-i points were chosen based solely on visual inspection? Of how many instantaneous snapshots? It might explain why you found a consistent lag wrt the analytical stall and reattachment detection methods.

Figs 8 & 9 - Show foil contour - use large colorbar font

l207 - you only know the method is robust after you used it...

Fig 11 - larger colorbar font - Remark a2 and a3 are nearly complementary in terms of phase, which is indicative of a successful POD.

Fig 12 - Use reference "Norberg, C., Fluctuating lift on a circular cylinder: review and new measurements. Journal of Fluids and Structures, 17, pp. 57–96, 2003" To explain slightly higher St for your Re.

Fig 15 - what do c=21 and c=9 mean? mention in the caption - also in the caption >super-imposed

l262 - is this 'dispersion' associated with turbulent structures in shear layers? Please be specific

l287 - further

l305 - famous DS vortex> Leading edge vortex associated with dynamic stall

Fig 19 - Remark Psi 2 has a much smaller energy content.

l313 - since it appears all stall detection methods are early wrt the visual reference, does it make sense to adjust the visual reference?

Tables 1 & 2 - Use more concise column titles !!

l336 - Ability of the e-TellTale sensor to detect flow stall

Fig 23 - the fluctuations on the 'brut' signal appear to be of the same frequency as the sampling you are showing... and some of these higher frequencies are still seen with a moving average e=9.

C3
Do you know what is the natural frequency of the tell-tale sensor? This might have a crucial influence, and MUST be considered, for both laboratory and field experiment design.

I363 - trailing edge > in the aft region