

# ***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**

Received and published: 29 July 2020

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’

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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

I11-create>creates I15- smartblade>smart blades I21 - 2007 is not so recent of a reference... I37 - static variations ? I47 - 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'

I68 - 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  $s_x, s_y$  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 ?

I118 - default>a non-identification I120 - So, you corrected the data-points for which the detection algorithm did not work, and set  $s_{xc}$  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, wouldnt it make sense to 'correct' these data-points to around  $s_{xc}=0.75$  ?

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  $\hat{}$  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.

I171 - brutal > massive I184 - you show a characteristic frequency, not the associated time-step

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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

I207 -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

I262 - is this 'dispersion' associated with turbulent structures in shear layers ? Please be specific

I287 - futher>further

I305 - famous DS vortex> Leading edge vortex associated with dynamic stall

Fig 19 - Remark  $\Psi_2$  has a much smaller energy content

I313 - 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 !!

I336 - 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  $e=9$ .

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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

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