

GENERAL COMMENTS

The paper investigates an interesting topic: how ground-gen airborne wind energy systems flight dynamics scale with size.

In my opinion, it still needs major revisions to be accepted. A lot of analyses are carried out to study too many different configurations (different mass scaling, sizes, aerodynamic coefficients, wind resources etc). I believe that all these configurations are overcomplicating an already complicated analysis and driving the reader away from key conclusions. Why not to have a reference design and modifying one parameter a time? It would be more educational.

Moreover, many optimal control problems are not converged. I think a journal publication cannot have non-converged simulations among the results. Those optimizations are not “outliers”, but non meaningful solutions which should not be even there. The results should be physical and meaningful, otherwise all the discussions are worthless. I recommend spending way more time on making sure the optimization setup is working robustly before starting the analyses. I agree with most of the conclusions, but unfortunately, I do not trust the implementation of the methods enough to consider the results a solid proof of the conclusions.

SPECIFIC COMMENTS

- Line 6: comma at line 6 and line 8 should not be there. Also the two “-“at line 8.
- 13: missing a space
- 31: please check all the websites references. The dates are misleading.
- 121: Is there any reference for the reel-out and in speed? The results you show (e.g. Figure 6) seem extremely dependent on these values. Are these values scaling with size? I would expect that with a generator up scaling the drum diameter would also increase and thus these values, for the same drum angular velocity. Maybe you can add a comment here.
- 124: Can you elaborate a bit more on the tether diameter design? It is not clear to me what it the procedure. Is it an iterative procedure?
- 144: Eq. 4 is not necessary
- 146: The total drag coefficient does not depend only on these three parameters, as you mention in the sentence after. Please rephrase.
- 193: The citation goes before, when talking about the CD^{tether} of the QSM.
- 195: "This leads to an underestimation of total tether drag at the aircraft" Not clear what "this" refers to.
- 197: I don't understand why, if you have a tether model, you don't apply all external forces (including weight and inertial) to the element's nodes. Can you explain? Are inertial forces on the tether included in the analysis?
- 202: This information has already been given in 3.1. Please do not repeat. It makes more sense here.
- 225: Can you give the two power harvesting factor values?

- Fig 4: Maybe these plots could go to an appendix as they are standards results and some discussions removed.
- 234: remove "The wind field is assumed to be constant for every optimization.": it is obvious and stated in the previous sentence
- 252: "because lift-to-tether drag ratio scales linearly with wingspan." wing area maybe.
- 294: There should be physical or modeling/optimization reasons for this. Please elaborate on it. It is important to give an interpretation to optimal trajectory, otherwise we cannot trust the results.
- 295: These considerations should be moved to future works.
- Fig 7: I don't understand why there are points with the same x coordinate.
- 334: The optimization is a deterministic process. If we change one parameter defining the optimization (e.g. wind speed), the optimal results should be a continuous function of this parameter. If we find a discontinuity, we need to understand why. Can the wind speed discretization be increased to have points closer to the outliers?
- 362: same comment as before on the discontinuities
- 368: maximum wind speed of the dataset (otherwise the maximum wind speed is related to extreme events)
- Tab 2: The overbar on P should not be there
- 396: maybe eq 9 and 10 can be removed to save space. they are well known.
- 408: wrong measurement units
- Fig 14: can you indicate in the legend at which wind speed the first plot is done?
- 560: should not be there