General comments

- Interesting work on using multi-element airfoils for Airborne Wind Energy. While I believe multi-element airfoils can be beneficial for AWE purposes, not much research has been conducted so far in this area. I'm also interested in future work considering optimisation algorithms, including tether drag and 3D effects.
- The figures presented in the paper are clear and add to the understanding of the paper.
- Be a bit more critical of your results and the use of multi-element airfoils in general. Also, discuss possible disadvantages of using multi-element airfoils as well as possible limitations of the models you used. (See specific comments.)

Thank you for taking the time to review this paper in detail. We believe that your specific comments have improved the quality of the paper, and hope that you agree! The changes relevant to your comments are marked in blue in the marked-up manuscript.

Specific comments

- Introduction
  - 49: Explain why multi-element airfoils stall at higher angles of attack. How is the flow affected using multi-element airfoils?
    We have explained this better on lines 50-51.

  - 56: It is stated that a multi-element airfoil has a higher aerodynamic efficiency. This cannot be stated in general as this is highly dependent on the metric you are using to assess the efficiency and the specific conditions. Nuance under which conditions and which metric multi-element airfoil can be advantageous.
    Changed, see line 59.

  - 76: Stress out more why exactly multi-element airfoils are beneficial and how they are beneficial for AWE. Multi-element airfoils can reach much higher C_L than single element airfoils, but this comes at a cost of higher C_D. To my knowledge, multi-element airfoils do reach higher C_L/C_D than single element airfoils. However, for AWE, power scales with E^2 C_L (Loyd formula), using this metric, C_L is more important, and multi-element airfoils can be beneficial. Moreover, the drag of the tether also adds to the total drag, therefore the drag of the aircraft becomes relatively less important, another argument in favor of multi-element airfoil. I think your research should contribute to validating the above statements.
    Adjusted as suggested (lines 82-84).

- Baseline Simulations
  - 94: At first sight, the presented geometry doesn't look like the DU 00-W-401 airfoil. I had to look up the paper of Ragheb and Selig to understand where the MFFS-018 multi-element airfoil comes from. This is not a very typical multi-element airfoil configuration because of the extra Strut, so I would explain a bit more in detail the choice for this geometry.
    This is already explained in the first paragraph in Section 2.1. We re-read the explanation and aren't really clear how it could be changed so that it is more understandable for you (it makes sense for us!). Could you please let us know if there is anything particular we should change at the start of Section 2.1?

- 97: transonic Mach numbers are not relevant to your problem.
  No, but this is how the MSES works. We have adjusted the explanation for clarity (line 104).

- 107: Explain how 3D effects could influence your results.
  We have added an explanation to line 116 (referring to a new figure on request of Reviewer 2).

- 134: I would say that MSES under-predicts the drag and that OpenFOAM is closer to reality as it is a higher fidelity model.
  Yes, we agree and have changed this sentence (line 153).

- 145: Comment on how it would influence your results if the drag of the tether is taken into account. Personally, I think it would be very interesting to include this term as it is very relevant for the AWE community to understand how the tether influences the design of an AWE aircraft. Furthermore, it could be relatively easily implemented by assuming a certain drag coefficient, length and diameter of the tether.
  We agree that this would be interesting, but unfortunately the project has finished and it is therefore not within the scope of this work to do this. We are doing it in the next step. We mentioned this already so just made a small change (line 166).

- 165: I would not consider a change of 6 degrees in AoA small …
  Maybe not. We have reworded this accordingly (line 186).

Airfoil optimisation

- 271: “multi-element airfoils have a high potential for application to AWE systems.” Be specific. On what result is this conclusion based? You did not compare with single element airfoils in your study.

  You are right – the study showed that there is a high potential to significantly improve the performance of existing multi-element airfoils for application to AWE. However, this does imply that they have a high potential for application to AWE, due to the fact that other, non-optimised multi-element airfoils have been compared to single airfoils and found to be suitable. We have reworded lines 312-314 accordingly.

- Conclusion
  - I would not call this a conventional wind turbine airfoil, the airfoil is far from conventional.
    On line 329, we have changed "standard" to "existing….from the literature". However, the word "conventional" on line 294 is not referring to the airfoil, but to conventional wind turbines, so we have left it.

Technical corrections

- 74: For these studies. the optimization criteria … remove ". ": changed
- 128: I find "feasibility" a confusing term here, consider using "verification": good point, we have changed this.
- 145: Consider rephrasing "on request of the designer", and explain in more scientific terms why the drag of the tether is not included. We have changed this.
- 156: Main leading edge: not sure what to change here. "Main" is written with a capital "M" because we are referring to the element called "Main". Maybe it's confusing to have the word "main" appearing in small so soon afterwards? ("main chord direction") Anyway we have changed this to "overall" to avoid confusion.
- 239: "rounder and beneficial aerodynamic shape" Vague description, be more precise in explaining results: this is true, we have reworded this.
- 302: Consider: This study has shown that significant improvements up to 46.6% in E2CL are possible. Thank you, we have changed this.