

Interactive comment on “Measuring the 3-D wind vector with a weight-shift microlight aircraft” by S. Metzger et al.

Anonymous Referee #2

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Page 1307 At the start of Section 2, the term "Joint Aviation Authorities" is used. According to their website <http://www.jaa.nl/introduction/introduction.html> this organization does not exist.

The aforementioned website states, in part: “The Joint Aviation Authorities (JAA) was an associated body of the European Civil Aviation Conference (ECAC) representing the civil aviation regulatory authorities of a number of European States who had agreed to co-operate in developing and implementing common safety regulatory standards and procedures.”

Reference to this organization should be changed to the successor organization, or the references should appear in the past tense.

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Note also that the purpose of this organization was not scientific, but safety/regulatory. This should be noted in the paper so that a reader who is unfamiliar with aviation will know the paradigms under which this organization (or its successor, as appropriate) operated/operates.

Page 1308 The paper states that all thrust is provided through a 73kW pusher engine-propeller combination. This must produce a large amount of as-yet un-quantified air-flow distortion.

Page 1309 The paper states: “The aircraft’s propeller, fuselage, and wing can be sources of flow distortion. Since the pressure probe is aligned on the longitudinal axis of fuselage and propeller, only little distortion from trike structural features is expected transverse to the pressure probe. Longitudinal and vertical distortions can be expected to carry continuously through the pressure probe location, since the probe is rigidly fixed to the trike.”

Can the authors quantify what is meant by “only little distortion” and under what circumstances such little distortion exists?

Page 1310 – Equation 3 This equation is a very simplified aerodynamic model of the upwash ahead of a wing with an elliptical lift distribution. An elliptical lift distribution is highly idealized, and real wings will only approximate this ideal model.

The variable “n” is incorrectly represented as “the separation distance from the wing’s centre of pressure to the position of the pressure probe, normalized by the effective wing chord”. The correct interpretation/application of Equation 3 is for a pressure probe which is directly ahead of the wing. “n” should not be interpreted as a point-to-point distance.

The applicability of this model to the aircraft in question is doubtful. The pressure probe is largely below – and not ahead of – the wing. As seen in Figure 3, the probe mounting is offset from the propeller’s centerline, and thus, different airflow entrainment

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would – in all likelihood – exist for various power settings. The aircraft body itself is not symmetrical – neither the shell shape, nor especially after considering the shape of the landing gear and occupant.

Of essential utility would be a mathematical model of the airflow distortion caused by the aircraft body, landing gear and propeller when different angles of attack and sideslip (relative to the aircraft body) are present, as well as for thrust changes. In the absence of an algebraic aerodynamic approximation, insight could be gleaned by utilizing one of several commonly available flow modeling programs (e.g. FLUENT).

Also, the orientation angle (and the distance) between the center of pressure and the pressure probe constantly change during flight, as the pilot rotates the wing to control the aircraft. No mathematical accommodation is made for this fact.

Page 1323 The 10-Hz aircraft data were block averaged to 1Hz. Why was this done? Surely the data can be analyzed in its entirety using modern computers. If the scatter is present without block averaging, isn't this a valid result?

Pages 1323-1331 A flowchart would be helpful, and would assist the reader in visualizing the process. Also, were the calibrations obtained separately in each step (to an un-calibrated system), or were the calibrations applied in a cascade fashion – whereas each step resulted in an incrementally-refined system?

Appendices: The appendices are voluminous. Can the peer-reviewed and accessible publication (to which the appendices refer) be simply cited, instead of reproduced?

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1303, 2011.

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