Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2015-407-RC2, 2016

Atmospheric Measurement Techniques Discussions
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Interactive comment on "Proof of concept for turbulence measurements with the RPAS SUMO during the BLLAST campaign" *by* Line Båserud et al.

Anonymous Referee #2

Received and published: 26 May 2016

This paper presents a summary of the deployment of a UAS during the BLLAST field campaign. In particular, the paper focuses on challenges, data treatment and some preliminary results. The major contributions of the paper include identify challenges associated with making high-quality measurements and proposing several solutions. In particular, the authors present a method for dealing with spurious vertical velocities. I think the paper has merit for publication, but the authors should first address the concerns outlined in this review. Particularly related to the description of the vertical velocity treatment. In addition, the authors nicely describe various aspects of uncertainty. I would improve the article if these could be quantified more.

Specific comments: Please carefully review the manuscript for grammar mistakes.

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Discussion paper

Abstract, please quantify and report key error metrics in the abstract.

Line 41, Consider referencing: Stevens, W. R., Squier, W., Mitchell, W., Gullett, B. K., & Pressley, C. (2013). Measurement of motion corrected wind velocity using an aerostat lofted sonic anemometer. Atmospheric Measurement Techniques Discussions, 6(1), 703–720.

How do the path/leg directions compare to the wind direction (when considering Taylor's hypothesis applicability) for the various cases?

Figure 1 - Please zoom in and label components inside the aircraft.

Line 200, page 9: Please carefully explain the filtering of w. Something seems wrong. Generally, a moving average is a low pass filter, but if you subtract the original signal from the low pass filtered signal, you effectively create a high pass filter (high frequency fluctuations are left). The current document is unclear, but the data look correct. Please provide details on the filtering process. How was this filter chosen? Why? What is the impact of this type of filter on data generally in spectral space? Also, what is the impact of the filter on all scales? This component is the biggest contribution to the paper. It would be beneficial to provide more data and exploration of other treatment options.

Figure 7, the spike at 2 Hz does not seem to be easily removed.

Around Line 210, page 10: Please mention the heights of the legs either in the text here or in the figure caption. I know they are in the Table 2, but it is easier for the reader.

Figure 7, could an additional panel with the time series of w for the sonic and the spectra for the sonic be included here?

Lines 227-229, Page 10 - The text states "Looking at the spectral plot in the right panel of Fig. 7 it is clear that although the sonic and SUMO show a good agreement in the integral parameter of sigma_w, a distinct difference in the underlying energy spectrum of the corresponding data sets remains." This is confusing. I don't see any sonic

anemometer spectra in Fig 7 of my version of the paper. Just the raw signal and the filtered signals. Please do include the sonic spectra or u, v, and w.

Figure 10, can more discussion be given to the physical significance of the profiles?

Can more data from the 60 m tower be used to illustrate the performance of the filtering technique?

The authors present a nice list of potential uncertainties. Can the magnitude of each be estimated and tabulated?

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