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Atmospheric Measurement Techniques Discussions

Interactive comment on "Towards accurate and practical drone-based wind measurements with an ultrasonic anemometer" *by* William Thielicke et al.

Anonymous Referee #2

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The authors describe their first experiences with 3-D wind velocity measurements from a custom-designed quad-copter drone OPTOkopter, equipped with a special frame allowing for adoption of commercially available ultrasonic anemometers "TriSonica Mini Wind and Weather Sensor" by TriSonica and "Windmaster" by Gill Instruments. A description of the drone and it's design is provided, followed by a nicely documented review of the system properties retrieved from sophisticated wind tunnel and in-situ airborne tests where sensor readings were compared to velocity measurements from a bistatic Doppler lidar. Finally, example measurements performed in a wind turbine wake, documenting system capabilities are presented. The manuscript is written in a clear way and its content is of interest to the scientific community involved in boundary layer measurements and wind characterization. After addressing remarks pointed

below the manuscript should be published in AMT.

Remarks. l. 174 and Fig.4 It is not clear how data reported in Fig.4 were obtained. Add a comment, please.

Section 3.1. You show the dependence of accuracy of the sensor to pitch angle at 15 m/s windspeed only. Are the results at lower speeds (e.g. $\sim$5m/s) comparable? Does TriSonica perform relatively better?

Section 3.4. It seems that the flow in the course of the measurements was pretty turbulent. It would be interesting to compare the power spectral densities of velocities measured by the OPTOkopter and by the lidar . This would demonstrate capabilities of the system to measure and characterize atmospheric turbulence. Are any peaks related to the characteristic frequency related to stabilization of the drone are noticeable?

Editing suggestion: It could be useful to combine figs 10 and 11 19 into a two-panel figure and figs 14, 15, 16 and 18,19, 20 into three-panel figures?.

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