**Abstract**

This technical note presents an analysis of uncertainty for measurements of wind from the Gulfstream V research aircraft operated by the National Center for Atmospheric Research for the National Science Foundation, with emphasis on measurements made in the DEEPWAVE field project in 2014. It begins with a description of the instruments used to make the needed measurements and the algorithms used for calculation of wind. Three systems are described, the primary system in depth, a new system based on a gust pod in lesser detail, and a laser air motion sensor in preliminary fashion because the latter is still under development. In addition to specifying the characteristics of the component measurements and propagating their uncertainty to the final measurement of wind, the document presents detailed information on how the measurements are calibrated in terms of airflow, are processed to incorporate corrections, and are checked with flight maneuvers. The results are presented in terms of standard uncertainties where possible, so if for example coverage intended to match 95% confidence intervals is desired the values quoted should be doubled. The net uncertainty in the standard measurement of vertical wind is 0.12 $\mathrm{m\,s^{-1}}$, and a correction procedure for removing the Schuler oscillation in pitch is developed that with special processing can reduce this value. For the standard measurement of horizontal wind, the estimated standard uncertainty is about 0.4 $\mathrm{m\,s^{-1}}$ for each component of the vector wind. These estimates are supported by itemized lists of the sources of error and how the associated uncertainty has been measured. The report also offers some suggestions regarding methods to improve the measurements, focused on the horizontal wind where the weakest measurement is that of heading. Appendices to the report discuss the conventions used for characterization of uncertainty and the high-rate (25 Hz) measurements used to characterize turbulence. Finally, the last appendix discusses how the analysis programs and data are preserved in ways that address reproducibility of the analyses, so that others can duplicate these results.