Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Near and far wake structures behind freely flying bats[1] COSIMA SCHUNK, SHARON M. SWARTZ, KENNETH S. BREUER, Brown University — While pseudo-volumetric reconstructions of the wakes of flying animals, based on transverse (Trefftz) wake measurements, have become a well-established tool in the study of animal aerodynamics in recent years, there are a number of concerns that persist regarding their use in estimating drag and flight efficiency. Here we report on stereo particle image velocimetry (PIV) measurements behind freely flying bats (*Eptesicus fuscus*) in both the transverse and streamwise planes. The streamwise plane measurements are taken on the wing as well as in the near and far wake region up to eight chord lengths behind the bat. By organizing the data according to the flight speed, wingbeat phase and the spanwise position of the laser sheet on the wing we are able to connect specific features of the wing and body geometry with observed wake structures and thereby construct a detailed time-space map of the wake. Furthermore, we can quantitatively assess wake distortion and assess the validity of lift and drag estimates based on transverse wake measurements.

[1]supported by AFOSR

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Date submitted: 31 Jul 2014 Electronic form version 1.4