Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Measuring and Analyzing the Birds Flight ALEXANDER FRIEDL, CHRISTIAN J. KÄHLER, Bundeswehr University Munich — To tackle the long-standing problem of precisely measuring shape and profiling of free-flying birds we developed a technique to determine the shape of naturally textured surfaces. The measurement principle is based on a calibrated stereoscopic camera setup that delivers the height information through the identification of characteristic texture elements in each concurrent camera image using highly developed optical flow algorithms. This allows estimating the motion and height information of each pixel based on the analysis over time. The reconstructed upper surface of the wing is calculated in temporal coherence with the whole image sequence and hence shows low sensitivity to disturbances and high spatial accuracy and resolution. The measurement technique is used to evaluate experimental data obtained within measurement campaigns with two freely flying birds. The slowly, but silently flying barn owl was chosen in contrast to the fast and agile flying lanner falcon. The experiments were carried out within two facilities to respect the different flying performances of the animals and allow for as little disturbances as possible and feasible. Details of the experimental campaigns as well as the measurement methodology will be illustrated during the presentation.

Alexander Friedl
Bundeswehr University Munich

Date submitted: 07 Aug 2012 Electronic form version 1.4