

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Experimental study of Strouhal number effects on the wake produced by a trapezoidal pitching panel¹ JUSTIN KING, MELISSA GREEN, Syracuse University — Stereoscopic particle image velocimetry (PIV) was used to characterize the highly three-dimensional wake produced by a rigid, bio-inspired trapezoidal pitching panel. Previous work has demonstrated that one of the dominant parameters governing the wake structure of a pitching panel is the Strouhal number, and detailed analysis in terms of Strouhal number is the focus of the current work. Experiments were conducted over a range of Strouhal numbers from 0.17 to 0.56, and PIV data were collected in 55 planes across the spanwise extent of the wake. Examination of the spanwise vorticities and spanwise velocities found in the wake allow for an investigation into wake breakdown and spanwise wake compression behaviors. The results showed that increases in Strouhal number were associated with the movement of the wake breakdown location upstream and greater spanwise compression of the wake.

¹This work was supported by the Office of Naval Research under ONR Award No. N00014-14-1-0418

Justin King
Syracuse University

Date submitted: 31 Jul 2015

Electronic form version 1.4