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**Vortical wake evolution and its effect on performance using Lagrangian coherent structures** TIMOTHY JETER, MELISSA GREEN, Syracuse University — In the field of bio-inspired hydrodynamics, positive thrust producing wakes and their evolution are of particular interest. Water tunnel experiments that utilize a vertically-mounted low-aspect-ratio flat panel are actuated in a purely pitching motion by employing a two-axis motion controller. Vortical wake structure data are collected using stereo particle image velocimetry (SPIV), and the velocity fields are analyzed using the Eulerian Q criterion and the Lagrangian finite time Lyapunov exponent (FTLE). We validate specific assumptions and results of previous work done with a similar geometry such as a negligible spanwise velocity at the midspan of the wake, and a strong spanwise induced velocity near the edges of the wake. The stereo analysis provides a quantitative measurement of the spanwise velocity at selected locations to determine how important three-dimensional effects are and where they are originating.

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