Flow Analysis over Batten Reinforced Wings for Micro Air Vehicles

KURTIS TOWNSEND, Arizona State University, TRAVIS HICKS, JAMES P. HUBNER, University of Alabama — Flexible membrane wings modify the flow separation of low Reynolds number micro air vehicles (MAVs). A specific type of fixed-wing geometry is a batten-reinforced configuration in which the membrane is attached to a rigid frame with chordwise battens, allowing the vibration of the membrane at the trailing-edge. In this study, smoke-wire visualization and hot-wire anemometry, both near the trailing-edge and further downstream in the wake, are used to quantify the frequency and energy of these fluctuations for various cell geometries and flow angles-of-attack. Improvement in the wake momentum deficit will be analyzed to determine preferred membrane cell geometries for MAV flight conditions.

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