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Flexible Flapping Wings' Flow Fields and Deformations ERIK SÄLLSTRÖM, PIN WU, LAWRENCE UKEILEY, PETER IFJU, University of Florida — The flow field and structural deformations of flexible Zimmerman planform wings are investigated in a simulated hovering environment. The wings are manufactured from a carbon fiber skeleton, reinforcing the wing root, leading edge, and chordwise battens at a few spanwise locations, and covered with a Capran membrane. The flow field is measured using Particle Image Velocimetry (PIV) at several spanwise locations, and wing deformations using Digital Image Correlation (DIC). The results are phase averaged, resulting in three dimensional, three component flow field data, and phase averaged wing deformation data, so that a the fluid-structure interactions can be better understood. The wing deformation data will be presented superimposed on wing deformation data. The measured vorticity will be studied and related to the generation of aerodynamic forces. Vortical structures are investigated and identified using the Q criterion in order to demonstrate the structures formed around the wing propagates into the wake.

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