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**Predicting Weight Support Based on Wake Measurements of a Flying Bird in Still Air** ERIC GUTIERREZ, Aeronautics and Astronautics, Stanford University, DAVID LENTINK, Mechanical Engineering, Stanford University — The wake development of a freely flying Pacific Parrotlet (*Forpus coelestis*) was examined in still air. The bird was trained to fly from perch to perch through the laser sheet while wearing custom-made laser safety goggles. This enabled a detailed study of the evolution of the vortices shed in its wake using high-speed particle image velocimetry at 1000Hz in the plane transverse to the flight path. The measurement started when the bird was approximately 0.25 wingbeats in front of the laser sheet and stopped after it traveled 3.5 wingbeats beyond the laser sheet. The instantaneous lift force that supports body weight was calculated based on the velocity field, using both the Kuttta-Joukowski and the actuator disk quasi-steady model. During the first few flaps, both models predict an instantaneous lift that is reasonably close to the weight of the bird. Several flaps away from the laser sheet, however, the models predict that the lift steadily declines to about 50% of the weight of the bird. In contrast to earlier reports for bat wakes in wind tunnels, these findings for bird wakes in still air suggest that the predictive strength of quasi-steady force calculations depends on the distance between the animal and the laser sheet.

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