Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

**Unsteady Ground Effects On A Rectangular and Swept Wing During Deceleration.** DIBYA RAJ ADHIKARI, GEORGE LOUBIMOV, MICHAEL KINZEL, SAMIK BHATTACHARYA, University of Central Florida — An unsteady aerodynamic model in ground effect, validated by experiment and numerical simulation, has been developed to understand the aerodynamic characteristics of a rectangular and swept wing in ground effect. Here,we consider gradual deceleration to stop from a steady velocity with decreasing ground height applicable to a landing situation. The wing also undergoes a heaving and pitching motion during deceleration. During the heaving motion, the lift and drag forces increase to an initial peak force from the initial force value; this can be attributed to the change in effective angle of attack caused by changes in relative velocity. The initial peak force is even higher in the heaving and pitching motion case; however, in the later stages of this configuration, the aerodynamic forces drop rapidly. The rapid decrease in the lift force on the heaving and pitching wing planform is correlated to the detachment of the LEV and trailing edge vortex (TEV) from the wing surface. In the steady phase, the swept wing produced a relatively higher value of the forces compared to the rectangular wing planform. However, during the growth phase, the forces overlap between both the planform shapes. The fluid physics are explored and discussed in this study..

Dibya Raj Adhikari
University of Central Florida

Date submitted: 12 Aug 2020 Electronic form version 1.4