Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Force production and time-averaged flow structure around thin, non-slender delta wings[1] HAN TU, MELISSA GREEN, Syracuse University — Experimental force measurement and time-averaged three dimensional flow visualization of low Reynolds number baseline cases have been carried out on a steady flat plate delta wing. Current data will serve as steady reference for future unsteady flow and actuation cases. The comprehensive study will compare force production in highly unsteady environments, which is necessary to consider in unmanned combat aerial vehicle (UCAV) control strategies. Force measurements are carried out at angles of attack 10, 15, 20, 25 and 30 degrees. The coefficient of drag increases with angle of attack, while the coefficient of lift reaches a maximum value at 20 degrees. Time-averaged flow visualization conducted at angles of attack of 20, 25 and 30 degrees shows vortices with larger magnitude that persist farther into wake are generated at higher angles of attack. These results compare analogously with similar steady baseline experiment results of high Reynolds number conducted by collaborators.

[1]This work was supported by the Office of Naval Research under ONR Award No. N00014-16-1-2732. We also acknowledge the collaborative support of Dr. David Rival and Mr. Matthew Marzanek at Queen's University.

Melissa Green
Syracuse University

Date submitted: 01 Aug 2017 Electronic form version 1.4