Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

2D CFD Analysis of NASA X-57 Maxwell High Lift Propeller Airfoil[1] SUSAN SANTIAGO, City College of New York, JINWEI SHEN , KYLE NELSON, The University of Alabama — The X-57 Maxwell is an experimental aircraft developed by NASA. This aircraft is designed to be quieter, lighter, and more efficient compared to the aircraft it is based on, the Tecnam P2006T. The aircraft has two large, outer propellers and 12 small, high lift, collapsible inner propellers. The high lift propellers are only active during low-speed flight which includes take-off and landing. During high-speed flights, the high lift propellers collapse into the wing of the aircraft and are no longer active. The goal of this aircraft is to demonstrate the benefits of distributed electric propulsion (DEP). Our research aims to calculate aerodynamic coefficients including lift, drag, and pitching moment on the airfoil of the high lift propellers. The coefficient tables generated will be used to obtain the aerodynamics for multi-body dynamics simulation testing of whirl flutter stability on the aircraft. To perform the computational fluid dynamics (CFD) calculations, we first conducted a validation study on a NACA 0012 airfoil. Using the same methodology, a CFD analysis was conducted on the high lift airfoil. The analysis on both the NACA 0012 and high lift airfoil were done using both Fluent and Genesis in order to validate the results obtained.

[1]NSF Grant: 1659710

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Date submitted: 29 Jul 2019 Electronic form version 1.4