

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

2D CFD Analysis of an Airfoil with Active Continuous Trailing Edge Flap¹ DYLAN JAKSICH, JINWEI SHEN, University of Alabama — Efficient and quieter helicopter rotors can be achieved through on-blade control devices, such as active Continuous Trailing-Edge Flaps driven by embedded piezoelectric material. This project aims to develop a CFD simulation tool to predict the aerodynamic characteristics of an airfoil with CTEF using open source code: OpenFOAM. Airfoil meshes used by OpenFOAM are obtained with MATLAB scripts. Once created it is possible to rotate the airfoil to various angles of attack. When the airfoil is properly set up various OpenFOAM properties, such as kinematic viscosity and flow velocity, are altered to achieve the desired testing conditions. Upon completion of a simulation, the program gives the lift, drag, and moment coefficients as well as the pressure and velocity around the airfoil. The simulation is then repeated across multiple angles of attack to give full lift and drag curves. The results are then compared to previous test data and other CFD predictions. This research will lead to further work involving quasi-steady 2D simulations incorporating NASTRAN to model aeroelastic deformation and eventually to 3D aeroelastic simulations.

¹NSF ECE Grant #1358991 supported the first author as an REU student.

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Date submitted: 31 Jul 2014

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