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Numerical and Experimental Investigation of Plasma Actuator Control of Modified Flat-back Airfoil BENJAMIN MERTZ, THOMAS CORKE, University of Notre Dame — Flat-back airfoil designs have been proposed for use on the inboard portion of large wind turbine blades because of their good structural characteristics. These structural characteristics are achieved by adding material to the aft portion of the airfoil while maintaining the camber of the original airfoil shape. The result is a flat vertical trailing edge which increases the drag and noise produced by these airfoils. In order to improve the aerodynamic efficiency of these airfoils, the use of single dielectric barrier discharge (SDBD) plasma actuators was investigated experimentally and numerically. To accomplish this, a rounded trailing edge was added to traditional flat-back airfoil and plasma actuators were used symmetrically to control the flow separation caused by the blunt trailing edge. The actuators were used asymmetrically in order to vector the wake and increase the lift produced by the airfoil similar to adding camber.

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