

Abstract Submitted  
for the DFD09 Meeting of  
The American Physical Society

**Development of plasma streamwise vortex generators for increased boundary layer control authority**<sup>1</sup> PATRICK BOWLES, DAVID SCHATZMAN, THOMAS CORKE, FLINT THOMAS, University of Notre Dame — This experimental study focuses on active boundary layer flow control utilizing streamwise vorticity produced by a single dielectric barrier discharge plasma actuator. A novel plasma streamwise vortex generator (PSVG) layout is presented that mimics the passive flow control characteristics of the trapezoidal vane vortex generator. The PSVG consists of a common insulated electrode and multiple, exposed streamwise oriented electrodes used to produce counter-rotating vortical structures. Smoke and oil surface visualization of boundary layer flow over a flat plate compare the characteristics of passive control techniques and different PSVG designs. Passive and active control over a generic wall-mounted hump model,  $Re_c = 288,000-575,000$ , are compared through static wall pressure measurements along the model's centerline. Different geometric effects of the PSVG electrode configuration were investigated. PSVG's with triangular exposed electrodes outperformed ordinary PSVG's under certain circumstances. The electrode arrangement produced flow control mechanisms and effectiveness similar to the passive trapezoidal vane vortex generators.

<sup>1</sup>Supported by Bell Helicopter

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Date submitted: 07 Aug 2009

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