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Turbulent Boundary Layer Separation Control on a Convex Ramp using Plasma Actuators DAVID M. SCHATZMAN, FLINT O. THOMAS, THOMAS C. CORKE, University of Notre Dame — This work is focused toward the development of active feedback control of turbulent boundary layer separation from a convex ramp surface. The work reported here is performed in a subsonic wind tunnel facility and utilizes single dielectric barrier discharge plasma actuators for separation control. Smoke and oil surface flow visualization are used to characterize the separation in the absence of actuation. The surface mounted plasma actuators are positioned upstream of the flow separation locations. Plasma-induced blowing transfers additional momentum to the boundary layer along the ramp surface and has a beneficial effect on flow reattachment. Experimental results are presented which demonstrate the effects of both steady and unsteady actuation. The effectiveness of the active flow control is documented through surface pressure measurements, LDV measurements, and downstream wake surveys.

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