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Bioinspired Passively Actuated Microflap Surface for Improving Airfoil Performance[1] SEAN DEVEY, CHRIS JARMON, AMY LANG, PAUL HUBNER, The University of Alabama — Flow separation acts to limit the efficiency of aerodynamic systems. A novel dynamic surface is proposed as a mechanism to limit flow separation. This surface is derived from the flank skin of the shortfin mako shark, which has been proven effective at limiting flow separation in adverse pressure gradient flows. An array of passively actuatable "microflaps" mimics the geometry and flexibility of mako flank denticles. It is hypothesized that these microflaps will respond to local reversing flows to passively enforce a selective flow direction and increase mixing within the boundary layer to limit flow separation. This surface has been produced with additive manufacturing and incorporated into the upper surface of a NACA 0012 airfoil. Low speed wind tunnel testing (Re ˜2e5) of this airfoil is in progress. An increase in maximum lift and delay of stall is expected due to limiting of flow separation by the microflap array.

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