

Abstract Submitted
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The actuation of microflaps inspired by shark scales deeply embedded in a boundary layer¹ JACKSON MORRIS, AMY LANG, PAUL HUBNER, Univ of Alabama - Tuscaloosa — Thanks to millions of years of natural selection, sharks have evolved to become quick apex predators. Shark skin is made up of microscopic scales on the order of 0.2 mm in size. This array of scales is hypothesized to be a flow control mechanism where individual scales are capable of being passively actuated by reversed flow in water due to their preferential orientation to attached flow. Previous research has proven shark skin to reduce flow separation in water, which would result in lower pressure drag. We believe shark scales are strategically sized to interact with the lower 5 percent of the boundary layer, where reversed flow occurs close to the wall. To test the capability of micro-flaps to be actuated in air various sets of flaps, inspired by shark scale geometry, were rapidly prototyped. These microflaps were tested in a low-speed wind tunnel at various flow speeds and boundary layer thicknesses. Boundary layer flow conditions were measured using a hot-wire probe and microflap actuation was observed. Microflap actuation in airflow would mean that this bio-inspired separation control mechanism found on shark skin has potential application for aircraft.

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