

Abstract Submitted
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Scalning of transient lift response to actuation in a 3D separated flow¹ TIM COLONIUS, California Institute of Technology, DAVID WILLIAMS, Illinois Institute of Technology, GILEAD TADMOR, Northeastern University, WES KERSTENS, VIEN QUACH, SETH BUNTAIN, Illinois Institute of Technology — The transient lift response of a separated flow to short duration (pulsed) blowing is studied on a low Reynolds number, semicircular-planform, flat-plate wing. Actuators were distributed along the leading edge of the wing. The pulse duration, amplitude (supply pressure), and freestream speed were varied in the experiments. We identify two non-dimensional parameters governing the response, and use the data to find functional forms for the lift coefficient increment. We show that the lift coefficient increment is nearly independent of the pulse duration and increases (solely) with the square root of the supply-pressure coefficient up to a saturation. We also find that the shape of the lift response curve is similar to that produced in other experiments with different airfoils and actuators.

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