

Abstract Submitted
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Aerodynamic Flow Control using Distributed Active Bleed JOHN

M. KEARNEY, ARI GLEZER, Georgia Institute of Technology — The aerodynamic effects of large-area air bleed that is driven through surface openings by pressure differences across a lifting airfoil and regulated by addressable, arrays of integrated louvers have been investigated in wind tunnel experiments. Time-dependent interactions between the bleed and cross flows alter the apparent aerodynamic shape of the lifting surface and consequently the distributions of aerodynamic forces and moments. The lift and pitching moment can be significantly altered over a wide range of angles of attack from pre- to post-stall by independently-controlled bleed near the leading (LE) and trailing (TE) edges. While TE bleed effects nearly-linear variation of the pitching moment with minimal changes in lift, LE bleed leads to large variations in lift and pitching moment with minimal drag penalty. Phase-locked PIV shows the effects of the bleed on the flow on the suction surface and in the near wake. Supported by AFOSR

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