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A successful microblowing strategy for airfoils
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Abstract
This paper presents a successful microblowing technique (MBT) strategy for airfoils in subsonic flows, reducing both components of drag. Critical pressure distribution points on the airfoil are identified acting to aid in the airfoil selection process and prior determination of the blowing region. It effectively addresses the alteration of pressure distribution and hence the pressure drag caused by microblowing. Evidence through numerical simulation on a S1223 airfoil resulted in an improvement to its lift-to-drag ratio by 30% with a relatively strong blowing fraction of 5% when operating at 2° angle of attack and Reynolds number of 1 × 106. Drop in skin friction reached almost 5% while reduction in pressure drag is about 37.5% across a range of angles of attack. Applying MBT on the pressure side of concave trailing edge airfoils where blowing is positioned on the second critical point should produce significant improvement in their aerodynamic performance.

Author Keywords
active flow control; airfoil; MBT; microblowing technique; RANS; UAV

Index Keywords
Angle of attack, Drag, Lift, Lift drag ratio, Pressure distribution, Reynolds number, Unmanned aerial vehicles (UAV); Active flow control, Angle-of-attack, Critical pressures, Distribution points, Lift to drag ratio, Micro-blowing techniques, Pressure drag, RANS, Reynold number; Airfoils

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