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**Laminar separation and turbulent reattachment for the Eppler 387 airfoil in its transitional Reynolds number range** JOHN MCARTHUR, GEOFF SPEDDING, University of Southern California — Previous studies have shown that the Eppler 387 airfoil at chord-based  $Re = 60k$  experiences a large drag increase at moderate lift coefficients and angles of incidence, and a subsequent drag decrease at higher lift coefficients and angles of incidence. This drag increase has been blamed on the formation of a laminar separation bubble, where laminar separation occurs early on the wing surface, and a turbulent shear layer reattaches to the surface. However, evidence for this was only found at higher  $Re$  where this drag increase is negligible. Also, the flow field for this case has never been measured. The present study makes these flow field measurements using a custom PIV setup, and also makes force measurements using a custom force balance. The flow field measurements measure the recirculating flow in the bubble, and average profiles are constructed downstream of reattachment. Relating the flow fields to the forces explains how laminar separation and turbulent reattachment affect the forces produced by this airfoil.

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