Abstract Submitted
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Flight experiments on laminar flow control in swept-wing boundary layers[1] WILLIAM SARIC, ANDREW CARPENTER, CELINE KLUZEK, LAUREN HUNT, CHRISTOPHER MCKNIGHT, SHANE SCHOUTEN, Texas A&M University — Recent experiments have shown that the interaction of freestream turbulence and surface roughness not only strongly influences both the location and 3-D aspects of boundary-layer transition, but has a sensitivity to spanwise distribution and roughness Reynolds number heretofore unknown. This work then concentrates on conducting boundary-layer transition control within a low-disturbance flight environment. A swept-wing model is hung from the wing of a Cessna O-2 and flown at chord Reynolds numbers up to 7.5 million. The laminarization scheme of spanwise-periodic discrete roughness elements (DRE) elements is investigated. We use a combination of hotfilm anemometry and infra-red thermography to document the transition delay due to the roughness. The hotfilm measurements give the important passband and spanwise scales while the thermography gives transition location. It is shown that DRE can effectively delay transition from the smooth-surface reference case.

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