Abstract Submitted
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Roughness receptivity in swept-wing boundary layers - Experiments[1] ANDREW CARPENTER, WILLIAM SARIC, HELEN REED, Texas A&M University — Data are presented on boundary-layer transition to turbulence in low-disturbance environments. The measurements include infra-red thermography to study roughness related issues of boundary-layer transition in flight. A swept-wing model is mounted on the wing of a Cessna O-2 aircraft where nonlinear parabolized stability equations (NPSE) correlate the stability measurements and transition locations. The laminarization scheme of spanwise-periodic discrete roughness elements (DRE) is investigated at chord Reynolds numbers of 7.5 million. Flight experiments were conducted where the surface roughness amplitude was varied from 6 to 50 microns while the disturbance shear-stress was measured with calibrated hotfilm gauges. In this way, the disturbance velocity amplitude was calculated as a function of roughness Reynolds number. These data were then used as initial conditions for the NPSE calculations to determine the efficacy of the DREs.

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