Abstract Submitted
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Boundary-layer receptivity of three-dimensional roughness arrays on a swept-wing[1] LAUREN HUNT, WILLIAM SARIC, Texas A&M University — This experimental study extends the knowledge base of swept-wing receptivity mechanisms to three-dimensional surface roughness arrays, quantifying the relationship between surface roughness height and initial disturbance amplitudes within a boundary layer that is dominated by a crossflow instability. The experimental configuration includes the ASU(67)-0315 swept-wing installed in the low-turbulence Klebanoff-Saric Wind Tunnel at Texas A&M University. It has a 45-degree sweep, 1.83m chord and a pressure minimum at 71% chord. Three types of spanwise-periodic discrete roughness elements are used. Appliqué, pneumatic, and plasma-actuated roughness are placed near the leading edge of the swept wing to investigate the effectiveness of each shape in creating the initial amplitudes of unstable stationary crossflow waves over a chord-Reynolds-number range of 2.0 million to 2.8 million. Results of naphthalene flow visualization and detailed boundary-layer scans using hotwire anemometry are provided.

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William Saric
Texas A&M University

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