

Abstract Submitted
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Effect of Surface Imperfections and Excrescences on the Crossflow Instability¹ MATTHEW TUFTS, GLEN DUNCAN, JR., BRIAN CRAWFORD, HELEN REED, WILLIAM SARIC, Texas A&M University — Presented is analysis of the planned SWIFTER experiment to be flown on Texas A&M University's O-2A aircraft. Simultaneous control of the crossflow and streamwise boundary-layer instabilities is a challenge for laminar flow control on swept wings. Solving this problem is an active area of research, with a specific need to quantify the effect of surface imperfections and outer mold line excrescences on crossflow instabilities. The SWIFTER test article is a modification of a prior-tested flight model, with the additional capability of creating controlled excrescences in flight. Using a finite-element Navier-Stokes solution and a spectrally accurate boundary-layer solver, coupled with linear and nonlinear stability analyses, we show that the flow field over the test article is well suited to this study. Results are compared with flight data.

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