

Abstract Submitted  
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**Experimental Investigation on the Effects of Free-Stream Turbulence on Swept-Wing Transition** TARIQ SAEED, JONATHAN MORRISON, Imperial College London — This study focusses on the experimental investigation of the high-frequency secondary instability development of roughness-induced stationary crossflows on a swept wing in moderate levels of free-stream turbulence. The first phase of this study is to determine the magnitude of the vortices produced for comparison with the predictions. The evolution of the disturbances are measured as they evolve downstream. The “AERAST” model used in this study is designed to enhance the growth of the crossflow instability, and has a sweep angle of  $40^\circ$ . The model has been tested in the Department’s 10’ x 5’ wind tunnel which has a top speed of 40 m/s, corresponding to  $Re_c = 2.2 \times 10^6$ . The measured stream-wise and lateral free-stream turbulence levels of the facility are 0.13% and 0.21%, respectively; an additional turbulence reduction screen to be installed would give 0.05% and 0.12%, respectively. A sublimation flow-visualisation technique is used to assess transition location, and detailed hot-wire measurements are conducted to assess disturbance evolution.

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