

Abstract Submitted
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Experimental investigation of boundary layer transition in the presence of a step SERGIY GERASHCHENKO, BEVERLEY MCKEON, Graduate Aeronautical Laboratories, California Institute of Technology, RUSSELL WESTPHAL, Washington State University, Tri-Cities, ANNE BENDER, AARON DRAKE, Northrop Grumman Corporation — A fundamental experimental study of the influence of a sharp-edged step on the stability of a laminar boundary layer over a range of step sizes, Reynolds numbers and pressure gradients was performed. The unique test facility, the Towing Wind Tunnel at Tohoku University in Japan, allowed measurements of disturbance growth and transition to be made in a minimal disturbance environment at unit Reynolds numbers of order $10^6/\text{m}$. Velocity fluctuations were recorded with an array of hot-wire sensors in the boundary layer downstream of the step, alongside complementary Pitot tube measurements of the mean velocity of the flow. Disturbance spectra, critical transition Reynolds numbers and “N-factors” at different flow conditions and step sizes will be discussed.

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