

Abstract Submitted  
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**Control and system identification of transition induced by free-stream turbulence** FREDRIK LUNDELL, Linné Flow Centre, KTH Mechanics, Royal Institute of Technology, SE-100 44 Stockholm, Sweden — Control has been applied to disturbances in a laminar boundary-layer under a turbulent free-stream in a wind tunnel. A feed-back control system comprising of two units, each with four sensors (wall wires) and four actuators (intermittent suction through narrow holes), has been used. The suction through the holes is managed by fast solenoid valves and is turned on (with a delay) when a moment of low velocity is detected by the sensor straight upstream of the actuator. In each measurement sequence, the suction rate is constant, but it can be varied between runs. It is shown that the control system manages to inhibit the disturbance growth for a considerable distance downstream of the actuators. The disturbance structure with and without control The non-dimensional suction rate is one third of the one necessary if uniform suction is used to reach the same control effect. Linear system identification is used to evaluate which modifications of the control system that would be most beneficial: developed control logics, more advanced actuator technology or improved sensors.

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