Abstract Submitted
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**Fluidic Control of Round Inlet Flow in Cross Wind**[1] D.A. NICHOLS, B. VUKASINOVIC, A. GLEZER, Georgia Institute of Technology, M. DEFORE, B. RAFFERTY, The Boeing Company — The suction flow within a round inlet in the presence of cross wind is investigated experimentally with specific emphasis on characterization and control of separation over the surface of windward lip using arrays of surface static pressure ports and radial total pressure rakes, surface oil-flow visualization, and particle image velocimetry. Of specific interest are the roles of independently-interchangeable variations between the inlet flow (M ¡ 0.8) and crosswind speed (up 35 knots) on the the onset and evolution of topology of separation. It is shown that for a given inlet flow the presence of sufficiently high cross wind leads to the formation of a three-dimensional separation domain that has an azimuthal, horseshoe-like boundary with its tip near the windward edge. As the cross wind speed increases, separation spreads by the formation of secondary interacting azimuthal separation cells whose topology resembles the main separation domain. Fluidic control of the separation leads to significant reduction in losses that are manifested by reduction in cross stream total pressure deficit and a concomitant increase in the inlets mass flow rate.

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