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Flow mechanisms induced by 2D transverse cavities leading to separation control[1] DREW SMITH, AMY LANG, University of Alabama, LEAH MENDELSON, Franklin W. Olin College of Engineering — Cavities embedded in the surface of an object moving through a fluid can help delay flow separation by imposing partial slip velocities and augmenting the turbulence of the boundary layer. Furthermore, recent experiments have shown that embedded cavity surface geometries may have their greatest effect on separation control at the point where the flow initially encounters them. This study investigated whether this effect is observed on a model with two-dimensional, transverse grooves embedded in the surface. The embedded cavities were mounted as a full-span section within a flat plate model in a low-speed water tunnel. Digital Particle Image Velocimetry was used to obtain flow data which were compared to that obtained over a flat surface. An analysis of the boundary layer profiles and Reynolds stresses at multiple locations on the model was conducted. Special attention was paid to the changes in these characteristics with streamwise distance.

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