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How do seal whiskers suppress vortex shedding AIDAN RINEHART, JUSTIN FLAHERTY, JOSEPH BUNJAVICK, Cleveland State Univ, VIKRAM SHYAM, NASA Glenn Research Center, WEI ZHANG, Cleveland State Univ — Certain seal whiskers possess a unique geometry that significantly reduces the vortex-induced vibration; which has attracted great attention to understand how the unique shape re-organizes the wake structure and its potential for passive flow control. The shape of the whiskers can be described as an elliptical cross-section that is lofted along the length of the whisker. Along the entire length of the whisker the ellipse varies in major and minor axis as well as angle of incidence with respect to the axis of the whisker. Of particular interest in this study is to identify what effect the angle of incidence has on the flow structure around the whisker, which has been overlooked in the past. The study will analyze the wake structure behind various scaled-up whisker models using particle image velocimitry (PIV). These whisker models share common geometry dimensions except for the angle of incidence. Flow conditions are created in a water channel and a wind tunnel, covering a wide range of Reynolds number (a few hundreds to thousands), similar to the ambient flow environment of seals and to the targeted aero-propulsion applications. This study will help address knowledge gaps in understanding of how certain geometry features of seal whiskers influence the wake and establish best practices for its application as effective passive flow control strategy.

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