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PIV Analysis of Wake Induced by Real Harbor Seal Whiskers

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Cleveland State Univ — Harbor Seals are able to accurately detect minute disturbances in the ambient flow using their whiskers, which is attributed to the exceptional capability of the whiskers to suppress vortex-induced vibrations in the wake. To explore potential applications for designing smart devices, such as high-sensitivity underwater flow sensors and drag reduction components, research has studied the role of key parameters of the whisker morphology on wake structure. Due to the inherent variation in size and angle of incidence along the length of whiskers, it is not well understood how a real seal whisker changes wake structure, in particular the vortex shedding behavior. This work aims to understand the flow around a single real seal whisker using Particle Image Velocimetry at low Reynolds numbers (i.e. a few hundred) in a water channel. Variations in flow structure are inspected between several different real whiskers and whisker models. The results will provide insights of the effects of the natural geometry of the harbor seal whiskers on wake flow compared to idealized whisker-like models.

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