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A whisker sensor: role of geometry and boundary conditions HENDRIK HANS, Nanyang Technological University, PABLO VALDIVIA Y ALVARADO, DILIP THEKOODAN, Singapore MIT Alliance for Research and Technology, MIAO JIANMIN, Nanyang Technological University, MICHAEL TRIANTAFYLLOU, Massachusetts Institute of Technology — Harbor seal whiskers are currently being studied for their role in sensing and tracking of the fluid structures left in wakes. Seal whiskers are exposed to incoming flows and are subject to self-induced vibrations. The whisker's unusual geometry is thought to reduce these self-induced disturbances and facilitate a stable reference for wake sensing. An experimental platform was designed to measure flow-induced displacements and vibrations at the base of whisker-like models. Four different whisker-like models (scale: 3x) were towed at different speeds down a towing tank and base displacements in the direction of motion and in the perpendicular axis were measured. Each model incorporated a particular geometrical feature found in harbor seal whiskers. Three different visco-elastic supports were used to mimic various boundary conditions at the base of the whisker models. The effects of geometrical features and boundary conditions on measured base vibrations at three relevant Reynolds numbers are discussed. The material properties of a model's base influence its sensitivity. When compared to a circular cylinder model, whisker models show almost no sign of VIV.

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