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Drag reduction in flows over superhydrophic surfaces[1] CHARLES PEGUERO, Brown University, CHARLES HENOCH, NUWC, KENNETH BREUER, Brown University — Recent research has suggested that large reductions in both laminar and turbulent skin friction might be realized in water flows over over superhydrophobic surfaces due to the modification of the no-slip boundary condition at the liquid-solid interface by a thin layer of trapped air. In our work, superhydrophobic surfaces have been fabricated by first laser-etching a textured pattern into an aluminum baseplate, and then coating the surface with a hydrophobic coating. The superhydrophbic characteristics and the presence of a trapped air layer have been characterized at a variety of operating pressures. The drag characteristics of the baseline and superhydrophobic surfaces have also been measured under both laminar and turbulent flow conditions using three different measurement apparatus - a narrow gap laminar flow channel, a large gap turbulent flow channel and a closed return water tunnel. The results from these measurements will be presented and discussed in detail.

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