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Flow past 2-D Hemispherical Rigid Canopies MARIA-ISABEL CARNASCIALI, University of New Haven — The flow past a 2-dimensional rigid hemispherical shape is investigated using PIV. Flow field measurements and images were generated with the use of a Thermoflow® apparatus. Results of this study are compared to prior work (APS DFD 2012 Session E9.00003) which employed CFD to investigate the flow in the near wake of hemispherical parachutes. The various sized gaps/open areas were positioned at distinct locations. The work presented here is part of a larger research project to investigate flow fields in deceleration devices and parachutes. Understanding the pitch-stability of parachutes is essential for accurate design and implementation of these deceleration devices but they present a difficult system to analyze. The flexibility of the parachute fabric results in large variations in the parachute geometry leading to complex fluid-structure interactions. Such flow, combined with flow through gaps and open areas, has been postulated to shed alternating vortices causing pitching/oscillations of the canopy. The results presented provide some insight into which geometric features affect vortex shedding and may enable the redesign of the baseline parachute to minimize instabilities.

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