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Axial Vorticity in the Wake of an Inclined Slender Body K.H. KELLER, A. BRANDT, K.M. KALUMUCK, C.E. SCHEMM, S.M. SCORPIO, The Johns Hopkins University Applied Physics Laboratory — The generation and evolution of axial vorticity in the wake of an inclined slender body is studied using 2D Particle Image Velocimetry (PIV) measurements around a 6:1 Prolate Spheroid mounted at a 10° angle of attack in a hydraulic flow channel. Long time series measurements of PIV data at Reynolds numbers (Re_L=UL/ν) of 0.15, 0.3, and 0.5x10^6 in planes normal to the flow were obtained at several stations along the body and at downstream distances up to one body length. This is an extension into the wake region of a number of previous numerical and experimental studies on vortex roll-up on the body of a 6:1 Prolate Spheroid (for example Fu *et al* (1994), Tsai and Whitney (1999)), where the emphasis was on characterizing the vortex structure near the body and the related lift coefficients. In the present study the focus is on the structure of the axial vorticity present in the wake downstream of the body, both instantaneously and in the mean. In the mean, it is found that the primary axial vorticity is generated in reaction to the lift but an additional source of vorticity is due to the interaction of the primary vorticity with the tail of the hull, resulting in two oppositely oriented vortex-tube pairs. Instantaneously, the primary and secondary vortex tubes are comprised of multiple smaller vortex tubes rather than larger, more well defined tubes evident in the mean.

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