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Flow Visualization around a Simplified Two-Wheel Landing Gear

ALIS EKMEKCI, GRAHAM FELTHAM, University of Toronto — The flow topology around a simplified two-wheel landing gear model is investigated experimentally by employing the hydrogen bubble flow visualization technique in a recirculating water channel. The landing gear test model consists of two identical wheels, an axle, a main strut and a support strut. The flow Reynolds number based on wheel diameter is 31,500 and wheels with varying geometric details are considered. Flow structures have been identified through analysis of long-time video recordings and linked to the model geometry. In the flow region above the wheels (wing side), the flow in the inter-wheel region either separates prematurely from the inner surfaces of the wheels and forms slant vortices in the near-wake, or remains attached till the aft wheel perimeter. Inclusion of interior wheel wells are found to result in a jet-like ejection as a result of the interaction with the axle and main strut. In the flow region below the wheels (ground side) the near wake contains periodically forming, complex, large-scale structures.

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