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**Light Vehicle-Trailer Systems' Aerodynamics Testing and Simulation**[1] HENRY BOYER, LORENZ SIGURDSON, Vortex Fluid Dynamics Lab, Mechanical Engineering, University of Alberta, CARLOS LANGE, Mechanical Engineering, University of Alberta — A wide range of trailers with very poor aerodynamics are hauled long distances across a vast North American highway system. Our goal was to use preliminary smoke-wire flow visualizations to learn: the characteristic flow patterns over models representing modern Vehicle-Trailer Systems (VTS); what improvements need to be made in the experimental set-up; and if there is an opportunity for reduction in aerodynamic drag. Visualization tests were done in an open circuit wind tunnel, with a cross-sectional area of 0.3 $m^2$. Detailed models of light duty trucks and trailers were used at a Reynolds number of 13,700. Images of the streaklines indicated two characteristic features. One was the presence of a stagnation point on the leading face of the trailer followed by a separation bubble on its top. The other feature was an unexpected separation bubble on the hood of the towing vehicle. We determined that it did not have a significant effect on the downstream flow pattern. By adding a small wedge deflector on the cab of the vehicle it was concluded that there is an opportunity for significant improvement of the VTS aerodynamics. Computational simulation of the flow is underway.

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