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Drag reduction of a heavy vehicle JASON ORTEGA, KAMBIZ SALARI, Lawrence Livermore National Laboratory — During the 1970's and 1980's, a number of first-generation drag reduction devices were designed to reduce the aerodynamic losses of heavy vehicles (Cooper, 2003). The result of this effort led to the development of a number of devices that improved the aerodynamics of a heavy vehicle tractor. Additionally, a number of second-generation devices were developed for heavy vehicle trailers. Unfortunately, these trailer devices did not enter into the market on a wide-scale basis and, as a result, the modern heavy vehicle trailer largely remains a "box on wheels" with minimal aerodynamic consideration taken into its design. The primary obstacle to implementing trailer devices was not their effectiveness in reducing drag, but rather operational, maintenance, and ultimately, economic concerns. However, with rising fuel costs and potentially unstable fuel supplies, there is a renewed objective to further reduce heavy vehicle fuel usage. To accomplish this purpose, the present study investigates the drag reduction capability of a trailer device, which neither reduces the trailer cargo capacity, nor limits access to the trailer doors. RANS simulations are performed on a full-scale tractor-trailer that is traveling at highway conditions with and without the trailer device. This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

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