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LES of an inclined jet into a supersonic turbulent crossflow: synthetic inflow conditions ANTONINO FERRANTE, University of Washington, GEORGIOS MATHEOU, PAUL DIMOTAKIS, California Institute of Technology — The transition and spatial development of a helium sonic jet into a supersonic crossflow (M=3.6) were found to be strongly dependent on crossflow inflow conditions in the Large-Eddy Simulation (LES) of Ferrante *et al.* (AIAA-ASM, 2009-1511). These results indicate that correct turbulent inflow conditions are necessary to predict the main flow characteristics, dispersion and mixing, of a gaseous jet in a supersonic turbulent crossflow. The objective of this work is to provide a methodology for the generation of realistic synthetic inflow conditions for LES of spatially developing, supersonic, turbulent wall-bounded flows. The methodology is applied to the supersonic turbulent flow over a flat wall interacting with an inclined jet matching the experimental conditions of Maddalena *et al.* (JPP, 2006). The sub-grid scale stretched vortex model of turbulent momentum and scalar transport developed by Pullin and co-workers is employed. Inflow turbulence fluctuations are generated by modifying the methodology of Ferrante & Elghobashi (JCP, 2004) to high-Reynolds number, supersonic flows. The results show that the main flow features generated by the gas-dynamic interactions of an inclined jet with the turbulent supersonic crossflow, such as unsteady bow shock, barrel shock, shear layer, and counter-rotating vortex pair, were captured.

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