Abstract Submitted
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Study of high speed turbulent jets in crosslfow using numerical simulations[1] XIAOCHUAN CHAI, KRISHNAN MAHESH, University of Minnesota — Numerical simulations are used to study a sonic jet injected into a supersonic crossflow and a supersonic jet injected into a subsonic crossflow, where the flow conditions are based on Santiago *et al.*'s (1997) and Beresh *et al.*'s (2005) experiments, respectively. A finite volume compressible Navier–Stokes solver on unstructured grids (Park & Mahesh 2007) is used. The simulations successfully reproduce experimentally observed shock system and turbulent flow structures such as the jet shear layer vortices, wake vortices, horseshoe vortices that wrap up in front of the jet and the counter rotating vortex pair (CVP) downstream of the jet. The dynamics of these flow structures are discussed. The effects of grid resolution and crossflow boundary layer condition are studied, as well as the contribution of subgrid scale model. The time averaged flow fields are compared to the experimental results, and reasonable agreement is observed.

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