Abstract Submitted
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Experimental Evaluation of Splitter Plate Trailing Edge Modifications for Passive Control in a Supersonic Multi-Stream Nozzle[1] EMMA GIST, SETH KELLY, Syracuse University, PARSHWANATH DOSHI, The Ohio State University, MARK GLAUSER, Syracuse University, DATTA GAITONDE, The Ohio State University — Particle Image Velocimetry (PIV) and pressure measurements are performed for two configurations of a Multi-Aperture Rectangular Single Expansion Ramp Nozzle (MARS) to explore geometric modifications as a form of passive control. The nozzle consists of a supersonic core stream and a sonic bypass stream separated by a splitter plate. Previous studies of the MARS have shown the effectiveness of the bypass stream as a thermal and acoustic barrier can be impaired by a vortex shedding instability at the splitter plate trailing edge (SPTE). Simulation efforts indicate that an introduction of a spanwise wavenumber to the SPTE induces streamwise vorticity which allows for the break up of the shedding structures. This study seeks to validate the findings from Large Eddy Simulations (LES) by executing experiments for a wavenumber of $= 0.8$. A stereoscopic PIV campaign is used to compare the flow structures of the nominal and wave SPTEs along with simultaneous pressure measurements in the near and far-field.

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