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Comparison of Complex Multi-Stream Supersonic Nozzle Geometry[1] TYLER VARTABEDIAN, SETH KELLY, EMMA GIST, DOMINIC DIDOMINIC, MARK GLAUSER, Syracuse University — Noise continues to be a concern with further developments of supersonic flow and the structural geometries surrounding it. A rectangular multi-stream supersonic nozzle with an aft deck is resolved utilizing stereo PIV along with near and far-field pressure and acoustic measurements. A focus is placed on optimizing for noise reduction while altering aft deck geometry through the development of a previously trained neural network. This is accompanied by incorporating a varied splitter plate which decomposes the flow field into two canonical flows, a core supersonic flow interacting with a subsonic wall-jet. The synergy of these two flows creates complex turbulent structures which feed into amplifying noise. Through the combined data from stereo PIV, near and far-field pressure and acoustic measurements, the goal is to design a low noise aft deck plate while furthering an understanding of how the splitter plate geometry effects the multi-stream flow interaction and relevant acoustic measurements.

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