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Comparison of LES and PIV Velocity Fields in a Complex Multi-Stream Supersonic Nozzle SAMUEL BANAHENE, HARRY WINICK, MATTEW BERRY, ANDREW TENNEY, MARK GLAUSER, Syracuse Univ, CORY STACK, DATTA GAITONDE, Ohio State Univ, CHRISTOPHER RUSCHER, Spectral Engergies, ANDREW MAGSTADT, Syracuse Univ — Two independent Large Eddy Simulations (LES) were conducted on a Mach = 1.6 rectangular multi-stream nozzle. PIV data was taken on the same nozzle for the purposes of experimental validation. We will compare centerline velocity measurements from these data sets at various downstream locations. Mean and RMS velocity contours and profiles from these LES data sets show reasonable agreement with PIV data. Shear layer growth rates will also be compared between the experimental and computational visualizations. Based on the acquired velocity contours, it appears that both LES data sets slightly overestimate shear layer growth in the jet plume. Velocity spectra will be extracted from the LES time-series for comparison between these two independent studies. Flow over the aft-deck of the nozzle appears similar between all data sets, with the exception that the LES data seems to overemphasize boundary layer growth.

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