

Abstract Submitted
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Comparison of measured aeroacoustic source spectra to predictions using a jet model¹ DANIEL LEONARD, MICHAEL KRANE, ARL Penn State — Sound radiated from a turbulent jet-wall interaction in a duct is measured for several jet-wall interaction geometries, for which the acoustic response of the duct was identical at low frequencies. This sound production mechanism is identical to that of unvoiced speech sounds. Traditionally in these cases, the speech science community has stressed the acoustic filter's role in determining the radiated sound, and has neglected the importance of the aeroacoustic source. When the local source region aerodynamics, such as the mean jet path relative to the wall and the jet speed are varied, but the acoustic filter held constant, distinct differences due to the aeroacoustic source are observable in the radiated sound. The source spectra are determined and qualitatively compared to an analytical model, and the distinct differences in the source spectra are described theoretically, whereas the classical approach would not have been able to theoretically describe these results. It is concluded that the turbulent jet's path makes a crucial contribution to the 'shape' of the source spectrum and that unvoiced speech sound production depends as much on the local details of the source region aerodynamics and geometry as it does on the acoustic filter.

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