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An Experimental Investigation of Trailing Edge Acoustics
DANIEL W. SHANNON, SCOTT C. MORRIS, University of Notre Dame — Measurements of the convected vorticity field in the near wake of a blunt asymmetric trailing edge has lead to the hypothesis that large scale turbulence related to a vortex shedding modulates the broadband sound produced by smaller scale turbulent motions. This paper will focus on efforts to support this hypothesis through the simultaneous measurement of the unsteady pressure on the model surface and the far field acoustic pressure. The acoustic data were acquired in an anechoic wind tunnel utilizing a pair of phased microphone arrays containing 40 condenser microphones each. Correlations between the surface pressure and the acoustic pressure suggest that the tonal noise is more closely related to the unsteady surface pressure on the attached pressure side of the model and that the broadband noise is correlated with the surface pressures over the separated suction side of the trailing edge. An analysis of the broadband noise as a function of the phase of the vortex shedding process suggests that the both the surface pressure and the acoustic pressure are modulated by the vortex shedding motions.

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