

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Far-field noise predictions of imperfectly expanded jet flows JUNHUI LIU, KAILAS KAILASANATH, Naval Research Laboratory, NICHOLAS HEEB, DAVE MUNDAY, EPHRAIM GUTMARK, University of Cincinnati — The far-field noise levels of imperfectly expanded jet flows are predicted using the Ffowcs Williams & Hawkings (FW-H) surface integral approach, where the information on the integral surfaces are generated from large-eddy simulations. Three FW-H surfaces are used to test the dependence of the far-field noise prediction on the location of the integral surfaces. The near-field pressure distributions on these FW-H surfaces are first examined to see if those surfaces are located in the acoustic propagation region. The variations of the monopole and dipole sources on the integral surfaces are also examined. The contribution of the shock-associated noise to the far-field noise level is well predicted. The difference between numerical predictions and measurements is within 1.0dB, whereas the contribution of the mixing noise is within 2.0dB. The contribution of the end cap is found to be small, but this contribution is sensitive to the mesh size used in the integration.

Junhui Liu
Naval Research Laboratory

Date submitted: 13 Aug 2012

Electronic form version 1.4