

ACOUSTICS2008/2828
Metric assessment of subjective annoyance due to low frequency aircraft noise

Kathleen Hodgdon^a, Matthew Nickerson^b, Anthony Atchley^c and Thomas Gabrielson^c

^aApplied Research Laboratory, The Pennsylvania State University, P.O. Box 30, State College, PA 16804, USA

^bIBM, 3039 Corwallis Road, Durham, NC 27709, USA

^cThe Graduate Program in Acoustics, The Pennsylvania State University, PO Box 30, State College, PA 16804, USA

A low frequency noise study was conducted at the Pennsylvania State University to investigate human response to the low frequency content of aviation noise. Metric assessment included level based and loudness metrics, including time-varying loudness. Current predictive noise models and metrics may underestimate the impact of low-frequency noise produced by aviation noise. Assessing the role of low frequency noise on human response will facilitate understanding how this type of noise can impact communities. Indoor recordings of aircraft arrivals and departures at Washington Dulles International Airport made in 2004 were used to assess subjective noise annoyance. These recordings and low-frequency variants of these recordings were reproduced for subjects through the Gulfstream Supersonic Acoustic Signature Simulator II (SASS II); the signatures were then rated for annoyance. Subjective judgments were statistically analyzed and compared against objective metrics that were calculated for each signature. Results are shown that all things being equal higher levels of low-frequency content in aircraft noise can result in increased annoyance in subjects. The C-weighted sound exposure level was found to correlate well with the subjective annoyance response.