Abstract Submitted
for the 4CF14 Meeting of
The American Physical Society

Influence of source level, peak frequency, and atmospheric absorption on nonlinear propagation of rocket noise MICHAEL PEARSON, KENT GEE, TRACIANNE NEILSEN, BRENT REICHMAN, Brigham Young University, MICHAEL JAMES, ALEXANDRIA SALTON, Blue Ridge Research and Consulting — Nonlinear propagation effects in rocket noise have been previously shown to be significant [M. B. Muhlestein et al. Proc. Mtgs. Acoust, (2013)]. This paper explores the influence of source level, peak frequency, and ambient atmospheric conditions on predictions of nonlinear propagation. An acoustic pressure waveform measured during a full-scale solid rocket motor firing is numerically propagated via generalized Burgers equation model for atmospheric conditions representative of plausible spaceport locations. Cases are explored where the overall sound pressure level and peak frequency has been scaled to model engines of different scale or thrust. The predicted power spectral densities and overall sound pressure levels, both flat and A-weighted, are compared for nonlinear and linear propagation for distances up to 30 km. The differences in overall level suggest that further research to appropriately include nonlinear effects in launch vehicle noise models is worthwhile.

Michael Pearson
Brigham Young University

Date submitted: 13 Sep 2014 Electronic form version 1.4