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# of Nonlinearity in Microbarometers

Accurate element-to-element correlation of incoming signals is important for good infrasound-station performance. For example, mismatches in phase response can result in errors in azimuth estimation. These mismatches can be identified through in-situ calibration. Although the impact of nonlinearity on array performance is not as well known, waveform distortion has the potential to affect classification of acoustic events. Furthermore, characterization of nonlinearity (including signal clipping) should be a part of the specification for microbarometer performance to avoid acceptance of new sensor types that might have good small-signal performance but poor large-signal performance and to establish limits for existing-sensor applications. In a previous task, Penn State developed a portable apparatus for on-site measurement of acoustic impedance of pipe- or hose-based wind-noise reduction systems. Since this probe can generate high acoustic pressure amplitudes, the probe has since been modified to measure departures from linearity in microbarometers. The actual transfer curve of the microbarometer (voltage out as a function of pressure in) can be measured directly, which avoids the difficulties in interpretation of indirect methods like harmonic distortion or two-tone intermodulation. This paper describes preliminary experiments in nonlinearity determination for several microbarometer types.

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