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**Comparison of 3D audio reproduction systems for hearing devices
evaluation**

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The use of Higher Order Ambisonics (HOA) and Vector-Based Amplitude Panning (VBAP) for hearing devices evaluation in an anechoic environment has been discussed in past studies [Oreinos et al. 2016, Grimm et al. 2015]. However, no comparison of these systems using hearing aids has yet been conducted in a real room at the sweet spot and for off-centered positions. The directivity of hearing devices beamformers was compared for HOA, VBAP, Distance-Based Amplitude Panning (DBAP), and Multiple-Direction Amplitude Panning (MDAP) at the center of the system, 10 centimeters off-centered, and 20cm off-centered. Measurements were conducted in two different rooms with two different loudspeaker setups. Results show that at the center, 5th order Ambisonics and VBAP give results closer to that of real sources than 3rd order HOA, MDAP, and DBAP. When getting away from the center, the performance of 5th order Ambisonics and VBAP decreases and is similar to that of MDAP.

A perceptual evaluation was then conducted comparing VBAP, 3rd and 5th order HOA. In this experiment, normal hearing participants, either fitted with hearing aids or unaided, were asked to localize bursts of noise in semi-random positions.