

**THE ROLE OF EARLY REFLECTIONS IN ELICITING
PERCEIVED AUDITORY SOURCE WIDTH**

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ABSTRACT

Of the many calculated, single-value quantities intended to correlate the perceived spatial impression of a sound field with the environments impulse response, the most common, including IACC and LF, do so utilizing limited temporal ranges within the impulse. Previous research, convention, and international standards generally utilize time windows split before and after 80 milliseconds, computing only using energy contained within those boundaries, assuming that there is no overlap between regions of perceptual relevance and that all reflections therein equally contribute to spatial impression. This study reviews and tests the existing literature on the relative importance of the range of reflections in a soundfield by examining the role of the range of delayed reflections in an impulse response, most notably those also involved in eliciting the precedence effect, in eliciting the perception of apparent source width. Nine test subjects were asked to match the perceived auditory source width of a variety of music and speech selections by altering the levels of varied delays presented at $\pm 40^\circ$ azimuth relative to a non-delayed signal versus a set of delays fixed both in duration and amplitude relative to the direct sound. The chosen amplitude of the varied delay relative to the direct sound was recorded as a measure of the relative significance of the information at each delay length to producing the sense of source width. Consistent trends in the results were recorded for each participant and for each music/speech selection, and correlation between experience and expertise as a critical listener and accuracy in a directly reproducible condition by the test subjects was noted. These results confirm prior research, offer detail and direction regarding the role of different signal characteristics on perception, and give direction essential to further study integrating the results into perceptual models and enhanced metrics.