Zonal Differentiating Soundbar

Ryan, Dylan (School: Lyman High School)

Sound technologies are developing at an exponential rate. Headphones have become integrated into everyday use which leads to the problem of listener separation from ambient auditory environments. This project attempts to eliminate the need for a user to wear headphones and to determine the feasibility of a soundbar to create at least two different auditory environments within a planar space via the principles of acoustic interference, phase shift, and focal plane array design. If the emitted waves from the speaker array contained within the zonal-differentiating soundbar exhibit auditory interference, then at least one zone with increased sound pressure relative to the surrounding region should exist. Creating an array through which the phase angle between multiple speakers can be altered, this project attempts to determine the boundaries of different sound pressure zones at a frequency of 5 kHz. The data shows that zones of minimal sound pressure, including zero sound pressure, were created within a 5 kHz sound field. Also, the data shows that the zones of minimal sound pressure can be moved within the plane by adjusting the relative phase angle of the speaker signals. An algorithm can then be developed, using these principles, that can control the zones of interference, creating the movable, differing, auditory zones that were sought after in this experiment.

Awards Won: