



## Directional speakers for warning systems

### Brief Description

Directing a beam of sound at any angle

### Inventor

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### STATE OF DEVELOPMENT

Prototype System

### INTELLECTUAL PROPERTY

Provisional pending

### DESIRED PARTNERSHIPS

License

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### Problem

Most audio warning systems have no way of targeting the individuals that need to receive a message. These warnings might be ignored or missed by the people that need to hear them. Directed sound systems can create a narrow “beam” of sound rather than a wave that spreads in all directions. These systems work by emitting a directed, high-frequency ultrasonic signal that demodulates in air, producing sound focused in a narrow beam. This technique has been known for some time, but it can only travel in a straight line perpendicular to the source. A controllable beam of sound could change the angle of the beam to track a target and direct a warning at a specific person

### Solution

Researchers at the University of Pennsylvania have created a phased array directed speaker that can change the beam angle. By using a series of ultrasound sources, each with a different time delay, the beam can be angled and moved. This system could be used to target a specific individual and direct a warning message to one person specifically. Additional applications could include variable audio directionality for audiovisual and entertainment systems.

### Advantages

- Directed sound at a variable angle
- Warnings can be directed at a specific target
- Beam of sound can move as targets move

### Applications

- Pedestrian warning systems and other audio warning systems
- Audiovisual personalized entertainment