PANPHONICS
Audio Innovations

Revolutionary directional audio technology

By intensely focusing and channeling sound waves, new technology developed by the Finnish company Panphonics, has the same impact on sound as laser technology has on light. This breakthrough represents a rare innovation in the loudspeaker industry, which has been selling variations of essentially the same technology for nearly 80 years.

"We believe that with this technology we are witnessing the start of something that is revolutionalizing sound transmission, and we believe that there is enormous potential for our unique technology," concludes Kari Mettälä.

Panphonics was founded in 1997 to develop and commercialize the patented technology. The products are intended to be used as components for audio applications across different industries and use cases. During its first five years of operation, the company focused only on R&D.

The first commercial products were sold in early 2003, and during 2004 the company moved from trial marketing into commercialization. Today the company is the world's leading provider of directional sound technology solutions.

Panphonics is a component manufacturer and technology licensor for industrial audio manufacturers and other audio solution providers, either directly or through resellers.

Panphonics also manufactures its own product line of direction speaker products.

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Sound from the Panphonics audio elements can travel much longer distances without dispersing than sound from traditional loudspeakers. This means that sound can be focused into small, specifically targeted areas, and can easily be heard over very long distances - even with low volumes. Panphonics audio elements are very light in weight and are only 4 millimeters thick, allowing them to be easily integrated into walls, ceilings and other elements of interior design, even lamps. As Panphonics' CEO Kari Mettälä explains: "This technology opens up enormous possibilities and any number of fascinating new applications. The only limit to its' potential is the imagination."

Plane wave technology

Panphonics' proprietary technology is based on the electro-mechanical film (EMFi) concept, which was invented and patented by the renowned Finnish inventor, Kari Kirjavainen., The initial technology study was carried out in cooperation with the Technical Research Centre of Finland during the early 1990's, with governmental funding from the Finnish National Technology Agency.

The Panphonics audio element is a plane source, which emits a very directional plane wave. Thus, the sound travels in a focused direction from the plane, unlike typical point source loudspeakers that emit sound waves in all directions.

Typical use cases

The directivity of the Panphonics audio elements enables a wide variety of interesting applications. For example, the elements could be used to make car speakers in such a way that parents sitting in the front could play different music than the kids in the back. Similarly, retailers can use the elements for in-store advertising so that different marketing messages can be targeted to different parts of the store. Customers in different areas of the store can hear separate messages relating to products in that particular area, while the audio elements can also be integrated into visual advertising.

Where customer privacy is important, such as in banks or pharmacies, Panphonics' elements can be used for sound masking purposes. With Panphonics elements built into the service area structures, low volume focused audio can be emitted that would prevent conversations from adjacent service counters from being overheard. The ambient noise levels would not be increased, and since the elements can be concealed with the interior furnishings, the sound sources are practically invisible.

Application development

Panphonics' technology is already being used in numerous applications and various market segments. The technology can be heard in local music stores and museums, as well as in banks and retail shopping outlets. Industrial applications, such as construction materials, vehicles and acoustical construction elements, have also been successfully tested and are being developed.

The company is actively negotiating with several potential application development partners, and expects the number of products in the range to further expand significantly in the near future. This will accelerate as the technology gains awareness, and application development partners move forward in their product development projects.

"The technology enables new, more productive ways of solving a number of traditional audio application problems," says CEO Mettälä. "The main benefits over traditional loudspeaker systems come from the unique acoustical properties, the design and architectural possibilities, as well as the considerable cost savings."

Creating silence

A particularly interesting potential application for this technology is the active noise cancellation (ANC) market. In simple terms, ANC means that a 'counter noise' is created as an exact mirror image of unwanted noise, allowing these conflicting sound fields to "cancel" each other out, with the net result that there is no sound at all. Even though the ANC concept may sound like science fiction, the Panphonics technology has already shown astonishing promise in this field. Possible applications include active sound control in vehicles - such as cars and airplanes, homes, conference rooms, industrial machinery enclosures and ventilation systems.