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**HARMAN**

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## THE CHALLENGE

Gestures are the most natural way and an integral part of human communication. They play a key role in our daily interaction with one another as they are used to accompany speech and makes it possible to control enabled systems in a natural way. However, traditional interaction by e.g. keyboards, buttons or knobs, is almost totally free of gestures, and depends merely on direct manipulation.

Especially in the automotive environment with its increased level of functionalities and customizations, the driver needs natural and instinctive ways to control their surroundings without having to redirect their full attention away from the primary task of driving. The use of gestures in the context of direct input-output coincidence and partial attention user interfaces, allows for exactly that.

## THE SOLUTION

HARMAN has developed an advanced system for in-car use called Gesture Enabled Sound Space (GESS). It allows intuitive, convenient control of volume and perceived location of audio events via natural gestures, including grasping, pulling and swiping.

Areas of control encompass ambient source representations like music as well as point sources such as phone calls. Natural gestures can also be used to activate audio events, e.g. answering a phone call in the car.

## THE BENEFITS

- Enhanced driving safety thanks to greatly reduced distraction from traffic.
- Intuitive and user-friendly control based on input-output coincidence just like natural interaction with everyday objects. Grabbing a sound and moving it in space is just as easy as grabbing and moving a physical object.
- Ergonomic due to touch-free operation – no need to lean forward or sideward to reach for a knob, control button or touch screen.
- Enhanced, enjoyable, richer and unified user experience with more flexibility.
- Any sound can be easily placed anywhere in the driver's auditory panorama with a simple gesture, just by grabbing and moving the sound in space.

## HOW IT WORKS

The recognition of gestures is ensured via a camera-enabled, image processing tracker system similar to that of devices used in the gaming context, but specifically designed for in-car application.

