

# Microphone Array

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## Abstract

We developed the super directional microphone array using two omni directional microphones for speech recognition technology in the vehicle. Thus we can offer an user interface using this microphone array that can recognize driver's speech in noisy environments, for example passenger utterances, direct airflows through windows or from an air conditioner.

The speech recognition technology is useful to safely operate car navigation systems and hands free telephones, etc. In these applications, the speech input interface which can reduce in-vehicle noises with small microphone array unit is one of the most important technologies.

## Technology

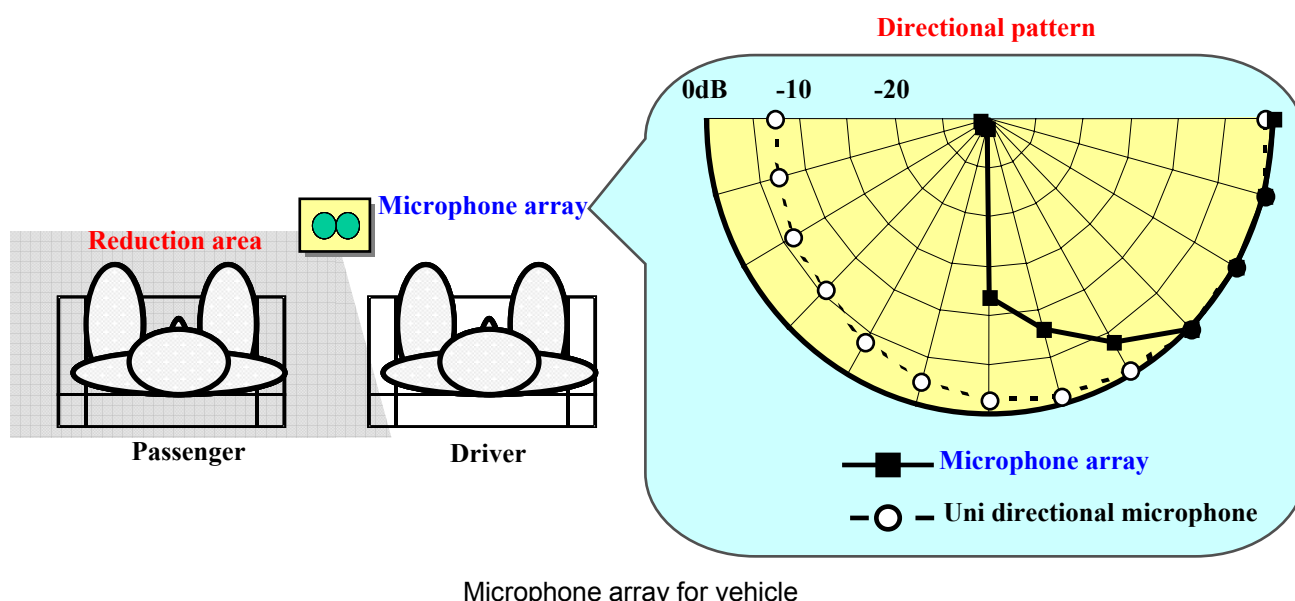
The ordinary microphone array needs many microphones for increasing noise reduction rates. In addition, uni directional microphones generate high level noise by direct airflows through windows or from an air conditioner.

Therefore, to realize high noise reduction rates using a few microphones and prevent direct airflow noise, we developed the microphone array with the features as shown below:

- **High noise reduction rates:** Realize over 20dB noise reduction rate using two omni directional microphones and non-linear signal processing based on detected directions of sound sources.
- **Prevention of direct airflow noises:** Uses omni directional microphones which are robust against direct airflows.

## Application Examples

The microphone array technology using two omni directional microphones can adequately reduce the passenger utterance as shown below. Therefore, this technology is effective for recognizing the driver's speech in vehicle.



Microphone array for vehicle