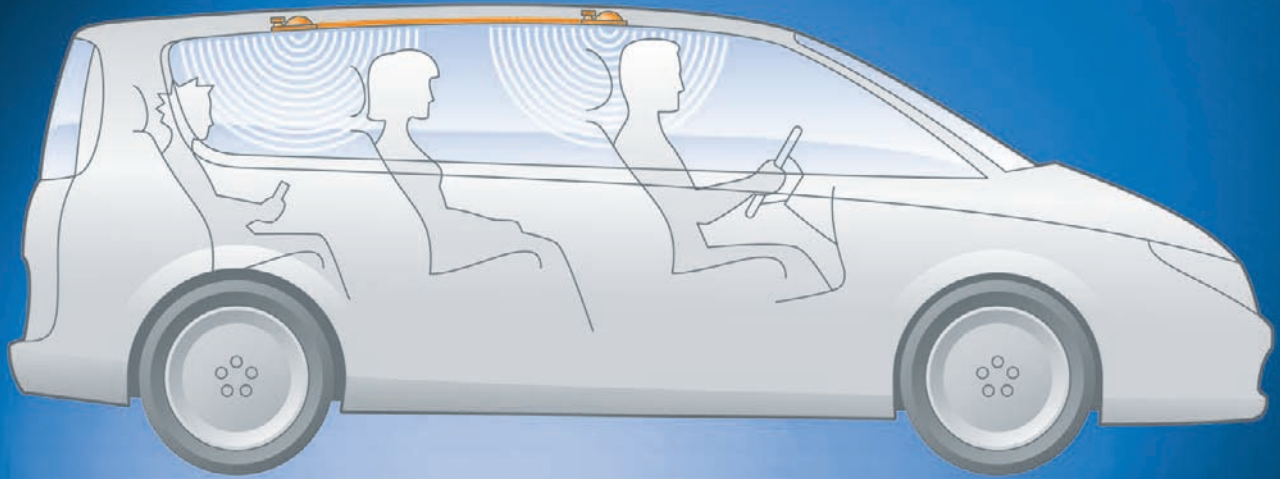


In-Car-Communication

Digital Speech Enhancement (DSE) - the IAV System Solution



Electroacoustic Process for Optimizing Speech Intelligibility

While travelling, background noise and the sound-absorbing properties of the vehicle cabin hinder communication in the car. This is particularly the case when travelling at high speeds and on uneven roads. In order to make himself better understood over the high noise level, the driver often turns away from the road and towards his listener in the rear seat. Similarly, the passenger in the rear seat leans forward to make himself heard. The increased effort involved in speaking and listening reduces the level of comfort and safety on the road.

Improving Comfort and Safety

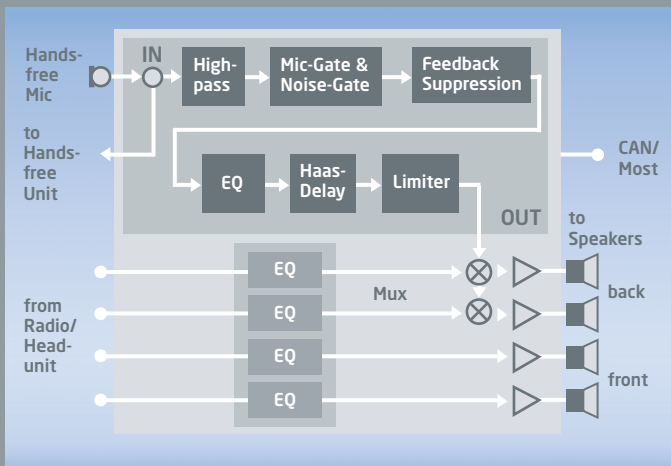
IAV has developed various solutions to improve voice transmission thereby increasing intelligibility while travelling. Our electroacoustic process, for which a patent has been filed, improves speech intelligibility for passengers. Communication with people not present in the vehicle via mobile telephony using a loudspeaker is also improved. Consequently, "mobile meetings" can be held. Comfort and safety while travelling are increased.

IAV - Our Services

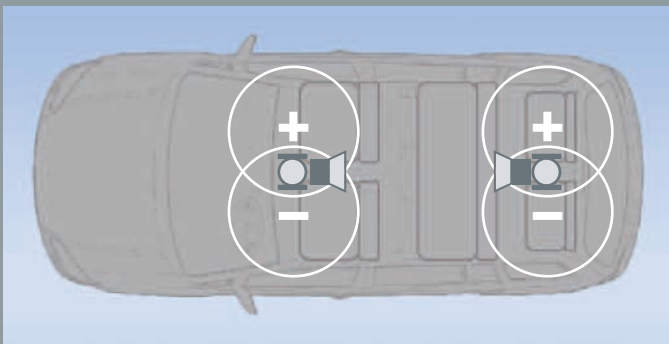
We develop digital speech enhancement systems and sound solutions for our customers. We take on full responsibility for engineering, project management and the necessary tests - i.e. development and integration into specific vehicle and (if required) infotainment architectures. We offer solution packages for the retrofitting market.

Advantages of the IAV System:

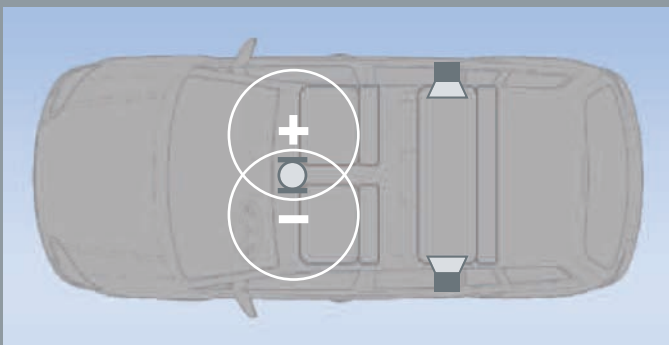
- ▶ *High-quality signal reproduction and natural sound quality*
- ▶ *Precise sound delay allows the source to be localized (using the Haas effect)*
- ▶ *Can be retrofitted*
- ▶ *Can be installed almost invisibly in all roof linings as a self-contained system*
- ▶ *Can be installed in family vans, off-road vehicles, SUVs, luxury vehicles, taxis and special-purpose vehicles*
- ▶ *Can be used to create a "mobile meeting room"*



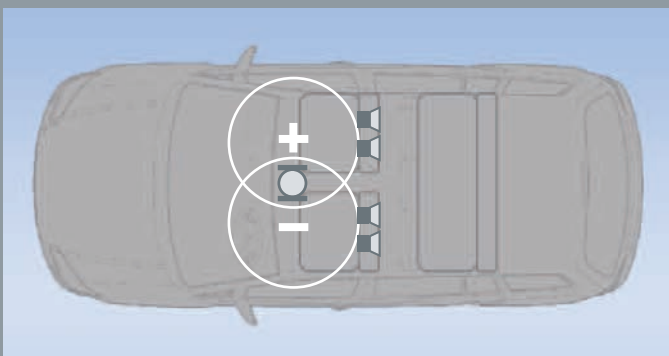
DSE Light: Block diagram showing signal processing



Bidirectional self-contained system; can be upgraded modularly



Unidirectional system for integration into existing components



Unidirectional system for integration into the rear seat entertainment system

Sound Amplifier with Integrated Speech Enhancement System

The digital speech enhancement systems DSE Light and DSE Light Plus are centered around the existing sound amplifier: The signal supplied by the hands-free microphone is processed in the amplifier's digital signal processor and adjusted for each vehicle type by means of equalization.

The resulting signal is added to the path for the rear loudspeakers.

One System - Three Different Versions of the Digital Speech Enhancement System (DSE)

DSE

As a self-contained system, the full-duplex-capable electro-acoustic device can be integrated unobtrusively into virtually any roof lining. The control unit containing the signal processor can also be positioned so as not to attract attention. If necessary, the modular system can be spread out over two or more rows of seats.

DSE Light

This simplified unidirectional system can be added to the existing infotainment system and uses the existing components (hands-free microphone/series loudspeaker). Costs are kept low for customers, since no additional hardware is required. The signal processor can be integrated into the amplifier or the head unit. The system's performance is optimized through the use of a microphone with bi-directional characteristics.

DSE Light Plus

This simplified unidirectional system uses the hands-free microphone and loudspeaker of the rear seat entertainment system.

Advantage: No infotainment system is required; the speakers can be localized almost perfectly.