

# Connected Entertainment

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Audio, Sound & Speech



# Connected Entertainment

The mega trend in infotainment is “always on”: basic functions such as radio reception are handled on a permanent or situational basis via the mobile internet or standards such as DAB, depending on the reception situation. Automated driving is also bringing about fundamental changes. While in the past the infotainment system was aimed at the driver, also in spatial terms, in future it has to serve all passengers in the same way. With our end-to-end approach to engineering, we develop complete derivatives for infotainment.

When it comes to connected entertainment, IAV provides expertise across the entire mobility chain, keeping customers entertained and informed on their journeys from A to B. We offer our customers a comprehensive package, from specifying the features via the interfaces through to the final tests, including CE conformity. Our global presence gives us profound knowledge of all automotive markets so that we take account of all local requirements.

## State-of-the-art development tools

We set great store by always using the very latest, state-of-the-art development methods and tools. It is our aim to be the industry benchmark here. For instance, we have our own sound labs and tuning test benches for vehicles. We continue to develop our capabilities all the time. For example, we use artificial intelligence for smarter description of vehicle interiors with their complex shapes and many different surface materials, resulting in more precise acoustic simulations and better development results.



# Audio & Sound

## Sophisticated audio solutions

The demands made of vehicle audio systems are increasing all the time. Lightweight design, for example, results in louder disturbing noises inside the passenger compartment.

Manufacturers use active noise cancellation (ANC) to deal with this. ANC enhances comfort and makes a contribution to interference-free communication in the vehicle. Furthermore, the trend towards voice assistants in the car puts an even greater focus on the audio properties of vehicles. OEMs are facing up to this challenge with ever better microphones and loudspeakers, combined with smart algorithms. Thanks to our experience, we guarantee our customers the best sound with minimum noise interference for optimum acoustics in the passenger compartment.

## Integration and algorithm development

For many years, IAV has stood for innovative, production-ready solutions for audio and sound systems. Our experts accompany their customers throughout the entire development process, from technical and strategic consulting through to subsequent release for volume production. Their role extends beyond integrating the solutions in the vehicle. They also develop customized functions such as algorithms for better understanding in the vehicle or for cancelling disturbing noise. They use state-of-the-art measuring equipment and proprietary calibration tools and heed “golden rules” to guarantee perfect sound in the vehicle. They perform benchmarking tests to compare various audio solutions on the basis of objective and subjective quality indicators.



# Speech

## Speaking to the car

Speech plays a key role in modern vehicles. Hands-free systems, solutions for communication in the passenger compartment and emergency call systems are meanwhile standard or even required by law. These are joined by voice assistants to control vehicle functions. Development here is particularly challenging due to the large number of services and the complexity of the systems. For example, it should be possible for several passengers in the vehicle to use the entertainment system, speak with the voice assistant and use their phones all at the same time without disturbing each other. Future voice assistants will be expected to behave like human interlocutors. Autonomous driving will result in the vehicle being controlled almost entirely by speech. We use cutting-edge technology such as virtualization and AI to deal with the growing system complexity. For example, we have developed an automated method that validates speech recognition systems for reproducible testing of the system's recognition accuracy without expensive test runs.

## Production-ready solutions and future technologies

Our experts develop use cases, compile specifications and implement showcases for new voice assistants. To this end, they combine various speech technologies in a proprietary framework and carry out automated tests of voice assistant systems in the vehicle for unhindered communication with the vehicle.



# Engineering & Innovation

## Working at the future of infotainment

As one of the world's leading engineering partners, we develop the mobility of the future and offer innovative infotainment solutions over and beyond the physical limits of the vehicle.

In the framework of the „Speaker“ funded project, we are working with partners on developing the platform for a new voice assistant system „made in Germany“ that stores all data generated in Germany, thus guaranteeing optimum data protection. We are also involved in integrating existing voice assistants, such as Alexa or Siri, in the vehicle, and are working on a new generation of smart voice control with an individual, appropriate and predictive reaction to every occupant.

For many years, we have also been assisting our customers with developing and testing phone systems and hands-free kits. We produce specifications for new device functions and behavior and test the whole system including the cell phones, with a focus on function and system development for the end users.

Ever-growing customization in the passenger compartment is another topic. Our experts develop concepts and interfaces to create personal listening zones in the vehicle interior.



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