“The car will be like a concert hall and the passengers will be sitting in the middle of it.”

- **Interview with sound strategist Dr. Tobias Gründl**
- **Holistic sound philosophy as a core competency of the brand**
- **E-mobility is changing the audio architectures of the future**

Ingolstadt, May 19, 2021 – “For good sound, not only is measurement technique crucial, but a trained ear as well,” says Dr. Tobias Gründl. The head of Audi’s Sound and Acoustics Development department shines a light on what premium sounds like – and what makes Audi sound distinctive. With Sonos, Audi is presenting a new technology partner. In the future, the car will become a streaming center – and electromobility is driving the audio architecture of tomorrow.

Dr. Gründl, a car is, if nothing else, a refuge where a person can enjoy music freely and without interruption. What distinguishes the particular sound experience that the Audi brand represents?
It is unadulterated and emotional sound that we emphasize most. Music should develop as the musicians recorded it or as we know it from, for instance, a live concert. Take the mid-range frequencies, for instance: they are important for sound quality because the mids determine the timbre of a voice and, of course, its reproduction as a result. Audi aspires to reproduce mid-range frequencies perfectly. We abide by that across all audio system configurations in order to avoid what’s known as zonal hearing. If you can spatially perceive that the bass is booming in the floor and the high end is coming from the ceiling, that has a negative psycho-acoustic effect: it doesn’t sound harmonious and the music doesn’t form a balanced whole. That’s why we pursue a holistic sound philosophy with consistently mutually aligned frequency responses from low to high. Music really flows through the interior of the car like warm sunlight and envelops the listener. Incidentally, a recent study from the International Federation of the Phonographic Industry indicated that 70 percent of the people surveyed identified the car as their preferred place for listening to music. That's why our goal is for music to sound better in a car from Audi than it does at home.

What has been the challenge in the conception behind the sound systems for the various Audi car models?
Audi sound is distinctive. The challenge for us has been to create this sound pattern in every vehicle segment with their different kinds of spaciousness. Whether they get into an A1 or an A8, it always sounds uniquely like Audi. That continuity of quality requires a lot of expertise in the impact and balance of frequencies. What effect does the equalizer that handles low

frequencies have on overtones? If nothing else, experience and a trained ear are critical for good sound. In the compact A1, we've been able to integrate intelligent sound architecture that can absolutely keep up with the higher segments – quite simply by using the windshield as a reflective surface for 3D sound.

Does the slogan "the more, the merrier" apply, where hardware is concerned?
No, not at all. Audi sound's premium quality is characterized by its smart deployment of hardware. For example, it's nonsense to use lots of different equalizers when the sound, as we imagine it, can be so optimally adjusted to the acoustics of the space with two or three filters.

How important is software?
Software is increasingly emerging as the crucial component. We're thinking, of course, of over-the-air updates that the vehicle receives via the mobile communications interface and of offerings that can be booked retroactively via functions on demand. On the other hand, digital audio engineering is evolving at a furious pace. We are working closely with scientists from the Fraunhofer IIS to develop new software components and integrate them into our sound strategy. Audi is a leader in creating a unique, three-dimensional stereophonic experience – to that end, an extremely wide range of technologies will be used in the future. Software gives us a lot of new possibilities for sound presentation because the hardware is already there. In the future, the interior will become more and more like a concert hall and the passengers will be sitting in the middle of it.

How would you strategically assess the trend toward immersive sound?
That technology has great potential. To put it very briefly, it's a matter of sounds no longer being completely bound to particular speakers. Instead, the audio data also contains information about how and where the sound is perceived in the space. So the music no longer comes from the front, as is customary with stereo sound, and it is no longer directed only toward one sweet spot. In the future, as a component of an immersive, holistic listening experience, alerts and indicator sounds will be able to be adjusted intelligently via the audio system. We have a lot of ideas. We will be rigorously testing the new possibilities and presenting the perfectly integrated immersive sound architecture – when the right time comes. As a strategy, I think in the longer term and don't immediately chase after every trend. My aspiration is: we only bring well-engineered solutions to the Audi series and then we assume technological leadership in holistic implementation through our commitment.

Audi is collaborating with Sonos for the first time with the new, electric Q4 e-tron compact SUV. What is the background behind that?

Sonos' authentic, energetic sound fits perfectly with our sound philosophy and our compact models. The new Q4 e-tron is Audi's entry point into the premium world of electric vehicles. It is increasingly aimed at younger generations and young families. And those customers know Sonos from home. It is a brand that stands for modern design and somewhat for freedom as well: Sonos has grown up as a wireless home sound system. Now, for the first time, we're bringing Sonos where people like listening to music most. At the start of our collaboration, we are presenting a few exciting new features: for the first time, people can use familiar sound settings to make tonal changes in the timbre that will create more emotionality in the interior. The back seat can have more bass and be filled with louder sound while the driver and front seat passenger can listen at half the volume and a more neutral balance so they can concentrate more on traffic – or spare their nerves.

How does music come into the car and what does that mean for its quality?

Playing music from a smartphone via Bluetooth is very convenient, of course. But as a sound engineer, it makes my heart bleed a little, because Bluetooth reduces the sound quality significantly. That's because of the limited bandwidth: the audio data have to be converted for the transmission. As a transfer technology, Wi-Fi offers a better solution for this, given that the bandwidth for the transfer is significantly larger. Personally, I would prefer to use an SD memory card for WAV with 24 bit and 48 kilohertz. Soon it will be possible to use the 5G mobile communications standard to stream high-resolution source material. Then the car will finally become a streaming center for sound and image.

How will increasing electrification influence sound design in the future?

E-mobility now offers us the chance to make sound come alive even more intensively. Soft sounds accentuate the feeling of comfortably gliding and a passionate sound properly asserts the power of the electric drive system when it accelerates. We also can't forget that people who get themselves an e-car for the first time will miss one familiar sound: the engine. E-mobility is presenting us with new acoustic challenges and making new sound strategies necessary. For that, we're keeping the holistic approach of immersive stereophonic sound in mind. Autonomous driving and communication with the vehicle in the form of voice-operation are also important factors in the conception of Audi's future sound and acoustic architecture.

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Product and Technology Communications
Michael Crusius
Spokesperson Product and Technology
Phone: +49 151 54330810
Email: michael.crusius@audi.de
www.audi-mediacenter.com

Product and Technology Communications
Christoph Lungwitz
Spokesperson Product and Technology
Phone: +49 151 54331109
Email: christoph.lungwitz@audi.de
www.audi-mediacenter.com

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