ABOVE ALL WAS THE SENSE OF HEARING
Pleasant sounds are a symbiosis of art and technology, which arouses emotions and awakens associations.
SOUND IS OUR LINE OF BUSINESS
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> Innovation begins with a concept.
HEAD acoustics GmbH was founded in 1986 to establish the innovative concept of integrating “head-related” recording and playback systems with measurement technology. This concept offers a holistic evaluation of sound events, vibration phenomena and human perception that has spawned many innovative technologies. These technologies have paved the way for analytical procedures for measuring sound, vibration and communications that relate to human hearing in a meaningful way.

Our technology quickly became popular, making the aurally-accurate recording, playback and analysis of sound events possible for the first time. Disturbing noise events and components could now be readily pinpointed and mitigated for product optimization. Expansion of the technology led to the introduction of a range of multichannel data acquisition and analysis systems for a detailed examination of a product’s multi-sensory noise and vibration (NVH) aspects, and underlying structural vibrations and mechanisms from which sound arises. Further expansion of the technology into the area of communication systems, led to the development of special procedures for the testing and optimization of speech quality.

> HEAD acoustics sets standards.
Today, binaural recording and playback technology is an essential part of acoustic measurement technology. Especially in areas, where human auditory experience is the decisive factor in evaluating sound, HEAD acoustics aurally-accurate recording and playback systems and hearing-related analysis software is the standard. Our customers, including all leading automobile, IT and telecommunications manufacturers worldwide, appreciate the competitive advantages of sound optimization and benefit from our technology and expertise. Furthermore, HEAD acoustics is making key contributions to the international standardization of modern processes for measuring speech quality in telecommunications. HEAD Quality Standards are now synonymous with excellent speech quality.

> Bound by quality.
Maintaining our expertise is a commitment and an obligation. In close cooperation with business partners around the globe, our R&D teams are developing the technology of tomorrow. Benefit from our wide-ranging experience and innovative technology.
Hearing is one of the most important senses that humans have available.
SOUND IS EMOTIONAL, FASCINATING AND INEVITABLY LINKED TO YOUR PRODUCT TO FORM AN IMPRESSION OF QUALITY

> **Noise affects us constantly.**
Our sense of hearing helps us negotiate our environment, interpret its stimuli and react emotionally to them. We can close our eyes, but not our ears; they are always open. Our auditory apparatus is a high-performance reception and signal processing system. It has a very high level of resolution, both in the time and frequency domains, which can spatially localize and select sound sources. The system analyzes a wide range of binaural information and combines it to form one all-encompassing auditory impression.

> **We hear with your customers’ ears.**
The unique measuring technology provided by HEAD acoustics takes into account the capability of the human auditory apparatus. This is the only way to effectively reproduce a subjective sound experience. From conventional measurements to complex procedures that closely match the capacity of the human auditory apparatus, HEAD acoustics offers a complete range of analysis options. Nevertheless, the subjective evaluation of sounds always plays a central role and is thus tightly integrated into the measurement and analysis chain.

> **Functionality and image are reflected in sound.**
The characteristic sound of technical products such as automobiles, IT and office equipment and household goods influences purchasing decisions. The same applies to the transmission and speech quality of telecommunications equipment; poor speech quality triggers a negative assessment of the service provider. A combination of acoustic, tactile and visual perception affects the product’s image. Sound indicates performance, sportiness, comfort, reliability and individuality. If a sound does not meet the user’s expectations, the product is rejected or intuitively associated with a malfunction. If the auditory impression matches the customer’s expectations, the product’s benefits will be reinforced in the consumer’s mind.

Acceptance of a product is closely linked to its sound quality. Using our technology, we have created multifaceted tools for efficient and effective sound engineering. We provide state-of-the-art measuring tools and expertise in troubleshooting, sound design, and target sound determination.
If subjective experience can be measured objectively, a goal can be defined and reliably achieved.
Due to customers’ increasing demands, research into improving the sound quality of technical equipment is now indispensable. Therefore, products from HEAD acoustics are used extensively throughout the automobile, information technology (IT) and communications industries. They are also employed in the development of household goods, aircraft, ships, and in production-related quality tests (EOL). For many years, we have been providing complex system solutions for sound field analysis, sound diagnosis, sound archiving and for the in-depth examination of the acoustic and vibration behavior of products. In telecommunication technology, our innovative test methods are improving the communication quality of networks, terminals and their components. For example, an area of increasing importance is optimizing speech quality in noisy environments, which can be efficiently achieved using our technology.

**Individual and comprehensive.** AACHENHEAD® technology is a comprehensive overall concept, from aurally-accurate sound recording and analysis to calibrated reproduction. The analysis system combines objective binaural-sound and multichannel vibration analyses. The combination is the ideal tool for examining mechanical vibrations concurrently with sound quality. Special procedures can identify disturbing sounds, determine their causes and pave the way for successful troubleshooting and sound design. Precise modifications designed to reduce unwanted sounds can be made where necessary to significantly improve the quality of your product.

**Subjective auditory impression forms an integral part of the analysis.**

Even with this fascinating technology, the human ear remains an irreplaceable analyzer. Individual assessment is, after all, the decisive criterion in relating sound and communication quality to product acceptance. Our technology uses human hearing and enables users to “eavesdrop” on research and analyses at any time.

We are pleased to offer you our expertise to acoustically optimize your products and help you achieve your individual goals.
Tuning instruments creates the technical basis for a harmonious appearance.
FROM ANALYSIS TO SYNTHESIS AND BACK

> Integrated product optimization.
Integrating sound and communication quality into the product development process early on reduces the need to eliminate irritating noises later. Increasingly, flexible simulation tools are replacing the costly and time consuming construction of prototypes. This trend enables us to comment on the future product and its perceived quality at an early stage.

> Flexible and efficient simulation.
Vehicle components, for instance, can be modified virtually using innovative procedures such as binaural transfer path analysis and synthesis. The resulting sounds inside the vehicle can be simulated and heard. With virtual engineering tools from HEAD acoustics, you can exchange components interactively, select the operating mode you desire and hear the overall effect immediately. You can also predict, directly and precisely, the effects of potential design changes on the acoustic and vibration comfort of your product.

> Virtual reality.
Using our simulation systems with multi-modal playback options, you experience your future products in a realistic and interactive way. Prototype systems and components can be experienced and evaluated “virtually” during early development phases. With our simulation systems you can develop interactive sound designs and target sounds. Here, the optimum sound for your product can be realized through selective sound modifications. Virtual engineering for product development and optimization saves time and money by reducing costly iteration loops with expensive prototypes.

Tap into the potential of our simulation tools and develop your products effectively from the outset. Various hardware and software tools, a range of procedures and our expertise are available. Experience tomorrow’s products today.
AN OVERVIEW OF OUR APPLICATIONS

> Recording
The artificial head from HEAD acoustics is the world’s best-known binaural recording system. We also offer additional binaural recording systems, special artificial heads with oral playback for measuring communication products and a comprehensive range of mobile, modular front-ends for multichannel needs, which are used throughout the world. The easily configurable software for data acquisition supports many widely available systems and can be integrated seamlessly into existing systems. HEAD acoustics offers you recording technology for all NVH applications as well as measurements in other areas.

> Analysis
The software provided by HEAD acoustics features high-performance analysis systems for acoustic and vibration evaluations of measured data. The software is characterized by a high level of efficiency and flexibility and offers a multitude of analysis options, while remaining intuitive and simple to use. Using the wide range of analytical methods, sound and vibration can be evaluated rapidly and in great detail. A specialized set of analyses enable speech and communications quality to be measured.

> Playback
We are conducting research into human perception and integrating this knowledge into our playback systems. The systems are designed to play back recordings faithfully. Aurally-accurate reproduction is via equalized headphones or, optionally, loudspeaker systems. We also provide a range of solutions which take into account different realistic playback environments.

> All-in-one/system solutions
For mobile use, HEAD acoustics offers systems of minimum size and weight. Our customers use these systems in the field as a combined recording device and playback unit. Coupled with a measurement computer, the systems offer countless analysis options.

> Jury testing systems
HEAD acoustics has taken note of the increasing importance of jury testing. The efficient implementation of jury tests, using aurally-accurate playback technology, is used for determining a product’s optimum acoustic image. Jury testing systems from HEAD acoustics can be used individually for all areas of sound design and speech communication.

> Simulation/virtual reality
Sound simulation systems from HEAD acoustics simulate different sound scenarios authentically and in real time. In a driving simulator, for instance, our systems generate vibrations simultaneously with engine, tire, wind and background sounds, and noise from other vehicles. In this way, different scenarios are experienced authentically and interactively, thereby significantly reducing the need for time-consuming and costly real test procedures. Special systems for background sound simulation enable speech communication systems to be optimized under realistic environmental conditions.

> Systems for automatic noise detection
HEAD acoustics offers intelligent solutions for the interactive and automatic detection of unwanted sounds. These solutions enable you to record, analyze and identify the corresponding sources of noise easily and efficiently. User-friendly and individually adjustable hardware and software solutions are available for this purpose.

> Communication technology
In addition to high-performance communication measuring technology, HEAD acoustics offers you comprehensive advice on speech and audio quality. HEAD acoustics is your expert partner for measuring, analyzing and optimizing communication quality in complex configurations for all types of terminals in vehicles, networks and mouth-to-ear. We cooperate closely with ETSI, ITU-T and other standardization bodies to develop quality standards for speech transmission and speech communication.

> Consult
HEAD consult successfully couples measurement technology with a wealth of experience gained during decades of industrial practice. Knowledge gleaned from research, scientific work and practical application is channeled into our investigations and analyses of sound and communication quality as well as the acoustic and vibration optimization of a wide range of products. We apply innovative methods, use various test and measurement facilities available within our company and draw on our broad experience to provide cost-effective and timely measurement and analysis results.
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Additional data is available from www.head-acoustics.de and info@head-acoustics.de