Sound

Scape

Realistic simulation of driving situations

*lab*COMPACT12 – Compact "one-module" system

HEAD Recorder 4.0 – New Options

HEAD VISOR PROBE

HELLA environmental test laboratories certified

Psychoacoustics and soundscapes

In May of this year, the seminar "Psychoacoustics and Soundscapes" takes place for the first time in Herzogenrath near Aachen, Germany. Prof. Dr. Brigitte Schulte-Fortkamp and Prof. Dr. Klaus Genuit explain how psychoacoustics and the soundscape approach can be used to effectively deal with the increasing noise levels in today's cities. The seminar will also teach participants how to use acoustic measurement technology, how to calculate suitable psychoacoustic analysis functions, and how to conduct surveys in order to derive effective measures for improving a soundscape. Please visit our web site for more information.

↗ www.head-acoustics.de/eng/seminar_psychoacoustics_and_soundscapes.htm
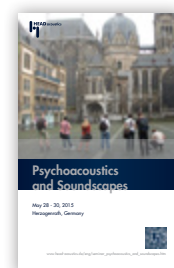
Soundscapes as places of relaxation

Prof. Dr.-Ing. Klaus Genuit

Today our everyday lives are dominated by loud, sometimes ear-splitting sounds. We are often besieged by the noise of the modern world to such a degree that we no longer find room for recreation. Instead, our everyday lives are ruled by a soundscape shaped by urbanization, industrialization, and modern technology.

To counteract this acoustic overload, many new noise protection laws, regulations, and guidelines have been enacted based on various sound pressure level quantities. The success of these efforts can only be rated as poor, since according to the German Federal Environmental Agency, more than half of all Germans still feel disturbed by noise.

We need a stronger focus on people's fundamental need for quietness and acoustic comfort. It has become a matter of urgency to assess and improve our acoustic environment from a perception-oriented perspective. We at HEAD acoustics taking on this challenge and drawing upon our extensive experience in the areas of psychoacoustics and sound quality in order to improve the soundscapes of our everyday lives.

| Information |

Acoustics Tutorial now available for download!

Understanding, analyzing, and assessing sound and vibration: These are the goals of the Acoustics Tutorial, which introduces you to the analysis and evaluation of sound events by means of easily comprehensible, practical sound examples. Numerous audio files illustrate the methods and applications of sound and vibration analysis, providing a solid basis for your daily work in this area. Feel free to contact us to request and download the contents of the DVD. Just fill in the form you will find at the URL provided below. Have fun discovering the world of sound analysis.

↗ www.head-acoustics.de/eng/nvh_acoustics_tutorial.htm

Realistic simulation of driving situations

New SoundSeat for assessing vehicle interior noise

Noise in the interior of a vehicle often correlates with vibrations that have a direct influence on the perception and judgment of the noise. The perceptive auditory assessment of this noise is therefore a multi-dimensional task requiring a multi-modal playback of the stimuli. A listening test therefore not only requires authentic playback, but also the consideration of psychological and cognitive aspects. This can be achieved by offering test subjects an authentic context related to the sound.

For multi-modal playback of vehicle interior noise, HEAD acoustics has developed the new SoundSeat. This calibrated 4-channel playback system allows a realistic playback of airborne sound components as well as vibration from the steering wheel and the seat. In combination with the proven H3S simulation system for interactive, realistic acoustic simulation of driving situations, interior noise of vehicles is presented in an authentic context. Systems like this allow target sounds to be defined in consultation with decision-makers and test subjects even before building a prototype. This greatly reduces the effort in the development process for building prototypes and performing real test drives to assess the driving experience; all of which results in significant cost savings.

The SoundSeat allows test subjects to operate it as if they were driving a real vehicle (accelerating, braking, shifting gears), where noise and vibrations adapt to the corresponding driving situation (vehicle speed, revolution speed, engine load). The interactive control and playback of modified sounds and sound design concepts allow subjects to obtain a realistic overall impression in real time and to perform direct comparisons of variants.

The airborne sound components are played back binaurally via headphones with the correct equalization. For optimal vibrational excitation, shakers are mounted under the seat and in the steering wheel. The H3S simulation is controlled via high-quality pedals for the accelerator and brakes, and a gearshift lever. Furthermore, a touchscreen with a swivel arm is mounted on the operating console for convenient operation of H3S, e.g. for switching between different noise variants. During the simulated drive, H3S can display visual scenery as well as the current rpm and speed values on a large screen placed centrally behind the steering wheel.

The SoundSeat consists of a seat and operating console and also a 19" rack. For easy transport, the console divides in the middle and is fitted with caster wheels. The electronics in the 19" rack use silent components in order to ensure an undisturbed sound experience. A powerful computer serves as the central control unit and is ideally suited for running the H3S simulation software. For aurally accurate headphone playback, the audio signals are output via a *lab*P2 unit and the vibration signals via a *lab*O2 unit and amplifier.

*lab*COMPACT12

Compact and silent "one-module" system

*lab*COMPACT12 is a compact and simplified HEAD*lab* system combining the basic functionality of a *lab*CTRL unit (without CAN, Pulse, and HMS inputs) and a *lab*V12 unit. The "one-module" technology is a flexible and affordable solution for multi-channel analysis particularly in the development of household and office appliances. Like the *lab*V12 unit, *lab*COMPACT12 is a 12-channel Line/ICP module with optional per-channel high-pass filters. Sensors are connected via the D-Sub connectors on the front side. The analog inputs work with sampling rates up to 48 kHz on all twelve channels, or 96 kHz on up to six channels. The handy module excels with high phase-accuracy, 24-bit data and a signal-to-noise ratio of typically 107 dB(A). The HEAD*link* interface allows you to easily extend your system with an additional HEAD*lab* module. Or cascade and synchronize your *lab*COMPACT12 with other HEAD*lab* systems via the SYNC connectors. A direct connection to a laptop or PC via USB or LAN ensures reliable data transmission. As with all HEAD acoustics front ends, the module can be configured and controlled using the HEAD Recorder software.

HEAD Recorder 4.0

New options for an optimized workflow

Load up the latest version of the HEAD Recorder software and take advantage of important new functions designed to optimize and enhance your workflow. Your workflow when recording measurements has been simplified with features including new Flow Control blocks, additional configuration options for the user interface, as well as new functions in the channel list and the offline frontends. Some of the new features are highlighted below. For complete details of the new version, please visit our Download*Center* at: www.head-acoustics.de/eng/nvh_head_recorder_software_download.php.

Automation projects in Flow Control programs

Complex measurement procedures are easy to perform in the HEAD Recorder using the Flow Control functionality. An editor allows users to assemble simple or complex program sequences without any programming knowledge, which can then be executed at the click of a button or triggered by events.
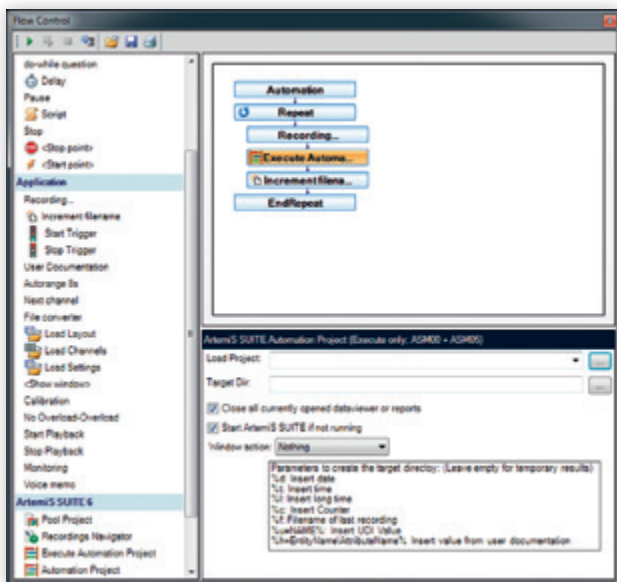
The extension of the Flow Control functionality with new program blocks now allows, for example, voice memos to be recorded to conveniently document measurement events. But more importantly, you can now include automation projects in your Flow Control programs, e.g. to process recordings without user interaction (see top figure). Various possibilities for including an automation project in a Flow Control program are available depending on the licenses you have. With ASM 01, a new or existing automation project is opened in ArtemiS SUITE, and the current recording is automatically added to the Source Pool of this project for further processing. ASM 05 allows recordings to be processed

by an existing automation project without opening the project. The advantage of this is that the entire process – recording, processing, and output of the results – can be executed with a single click and without further interaction. An extension of the customizable buttons in the user interface allows you to restart the Flow Control program with a single click.

Support of new front ends in the offline front end

With the new version 4.0, the "offline front end" function now additionally supports the new HEAD*lab* modules, such as *lab*V12 DualLink, *lab*SG6, or *lab*T6, in addition to the familiar HEAD*lab* system. In the front end view, you can (pre-)configure front ends without the need to have them physically connected. That way, the offline front end allows you, for example, to create and save channel lists in order to use them at a different workplace. When you later connect the real front end, the entire configuration you created in offline mode is transferred to it.

Direct link to remote control

For measurements where your computer is not located nearby, it is useful to control the HEAD Recorder remotely. This is possible by opening the software in a web browser and controlling it from a smartphone or tablet. To make it easier for you to load the web interface, the new HEAD Recorder not only displays the web URL, but also a QR code containing the link to the remote control interface.
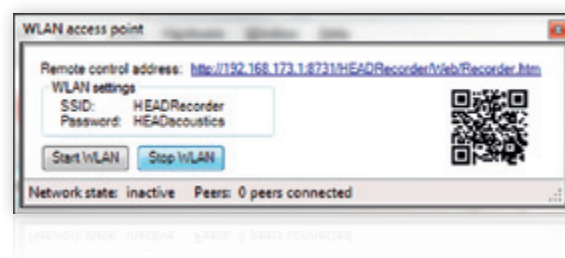
HEAD VISOR PROBE
Hunting down hums

Deep droning, loud humming – low-frequency noise that is frequently excited and emitted by machines can lead to nuisance. In order to effectively reduce the sometimes very loud noise components emitted by machine parts, it is essential to identify the source of the sound events. The HEAD VISOR PROBE is a useful tool for localizing low frequency airborne sound sources.

At frequencies below 400 Hz, sound waves are emitted with wavelengths of 80 cm or more. In the far field, these wavelengths cannot be resolved precisely enough with the beamforming method, making it impossible to track them back to their source. Measuring the sound pressure level in the immediate near field of the machine, on the other hand, allows the sound to be mapped precisely. Facilitating these analysis procedures is the HEAD VISOR PROBE, which acts as a supplement to a HEAD VISOR system.

The tip of this lightweight and flexible probe carries two microphones, which are guided along the surface of the measurement object. They detect all frequencies emitted by the surface along with their exact location and direction. The current position of the probe is automatically tracked by the three cameras of the HEAD VISOR (Tool Pack 01). For this purpose, twelve LEDs are mounted on the head of the probe, by means of which the system reliably detects the position of the sound source in any orientation. Built-in push-buttons allow measurements of individual portions of the test object, which can be composed into an overall image.

The near-field measurements are evaluated directly in the intuitive workflow of the HEAD VISOR software (see bottom figure). The HEAD VISOR PROBE thus provides you with a useful solution allowing you to acquire both near-field and far-field measurements in a single recording. In this way, you can evaluate the entire emitted frequency range from 20 Hz to 20 kHz.
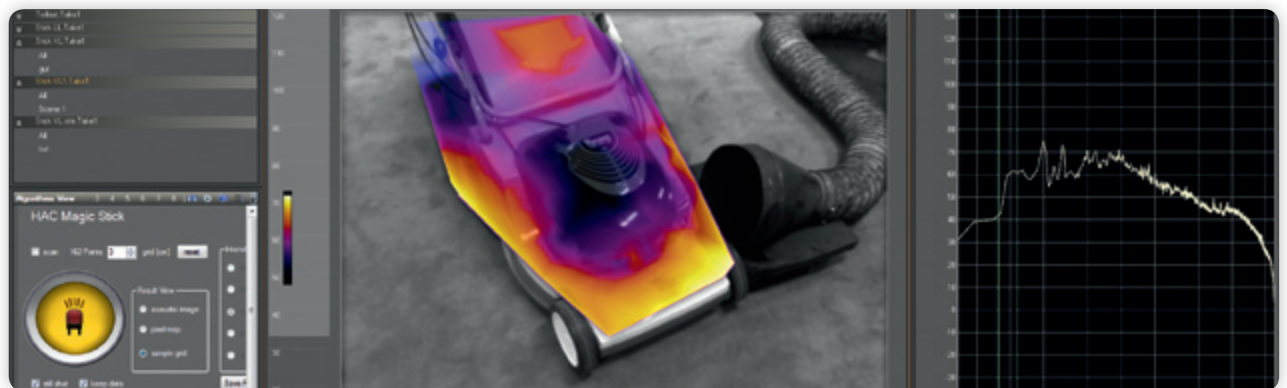

Figure: Sound radiation of a lawn mower at 100 Hz, not arising from the motor.

Accredited measurements based on HEAD technology

The NVH laboratory of HELLA relies on products from HEAD acoustics to achieve the highest laboratory standard ISO/IEC 17025

In the collaborations with their suppliers, automotive manufacturers demand reproducible and precise results. Compliance with the laboratory standard ISO/IEC 17025 is the necessary basis for meeting this requirement worldwide. For this reason, HELLA has had several of its environmental testing labs certified according to this standard.

Regarding the NVH laboratory this includes, for example, sound power measurements according to ISO 3744 as well as measurements based on customer-specific standards. Besides sound measurements, a multitude of standardized testing methods in the area of vibration tests have been certified. HELLA relies on powerful products at the cutting edge of technology for the tests they conduct. Apart from their anechoic and semi-anechoic rooms (both fully certified class 1 rooms) and a multitude of state-of-the-art vibration control systems, HELLA operates comprehensive software packages of ArtemiS SUITE and various frontends from the HEAD acoustics portfolio.

For sound power measurements, HELLA uses an 18-channel front end of the HEAD*lab* series. For vibration tests, up to two SQuadriga II frontends are used in parallel. The excellent flexibility of the mobile recording and playback frontend also allows HELLA to operate the measurement equipment at their customers' sites. 100-percent compatibility with existing microphones, accelerometers, artificial heads, and laser measurement systems completes the powerful solution for sound measurements and vibration tests.

As an indispensable support service, HEAD acoustics offers DKD calibration according to the laboratory standard ISO/IEC 17025. It is mandatory for hardware to be subjected to this in order to ensure that the parameters are reproducible. The precision of the measurement system tested in this way is the basis for compliance with the high requirements of the standard.

For the next stage of expansion of the NVH laboratory, HELLA is planning an additional measurement room. This room with special wall coating will be used for professional recordings and analysis of squeak and rattle noise at specific temperatures. The consistent use of HEAD acoustics hardware and software products provides the technological basis for these measurements.

Aachener Acoustics Colloquium 2015 – Call for Papers

This year, the Aachen Acoustics Colloquium will take place for the seventh time, particularly addressing experts from industry and research. We invite you to submit your abstract on subjects like sound quality, sound design, NVH measurements, measurement technology analysis, acoustics of engines, drive trains, and gearboxes, road-tire noise, numerical methods, multimodality, etc. by April 24, 2015. The conference will be held in English and German.

↗ www.head-acoustics.de/aac/de/pdf/call_for_papers_2015.pdf

Tradeshows and conferences

DAGA 2015 • Nuremberg, Germany; March 16 – 19, 2015
Abstracts NVH:
- Loudness perception and modeling of time-varying sounds; German; Authors: Dr. R. Sottek, T. Moll
- Determination of critical transfer paths in the BTPA; German; Authors: B. Philippen, Dr. R. Sottek
- The application of psychoacoustics in the context of environmental noise assessment; German; Authors: A. Fiebig, Prof. Dr. K. Genuit

Abstracts Telecom:
- Listening effort vs. speech intelligibility in car environments; Authors: Dr. H.-W. Gierlich, Dr. G. Mauer, J. Reimes
- Instrumental testing of in-car communication systems; Authors: F. Kettler, U. Müsch
- Detection of "silent calls" in emergency call scenarios; Authors: F. Kettler, S. Poschen, R. Serafimov

15. Internationales Stuttgarter Symposium • Stuttgart, Germany; March 17 – 18, 2015
International Conference on Fan Noise • Lyon, France; April 15 – 17, 2015
169th Meeting of the ASA • Pittsburgh, Pennsylvania; May 18 – 22, 2015
Abstracts:
- Environmental noise assessment by means of psychoacoustics and its relation to in-situ annoyance judgments of urban noise; Author: A. Fiebig
- The character of noise and its relation to noise effects; Author: A. Fiebig
- Status of psychoacoustics in noise analysis; Author: Prof. Dr. K. Genuit
- Psychoacoustically-based tonality model for the evaluation of noise with tonal components; Author: Dr. R. Sottek

EuroNoise 2015 • Maastricht, Netherlands; May 31 – June 03, 2015
Abstracts:
- Loudness perception and modeling of impulsive sounds; Authors: Dr. R. Sottek, T. Moll
- Influence of context effects on sound quality assessments; Author: A. Fiebig

SAE 2015 Noise and Vibration Conference and Exhibition • Grand Rapids, Michigan, USA; June 22 – 25, 2015
Abstracts:
- Application of a new perceptually-accurate tonality assessment method; Authors: Dr. R. Sottek, W. Bray
- Parameterizing mount models from in-situ measurements; Authors: B. Philippen, Dr. R. Sottek

inter.noise 2015 • San Francisco, California, USA; August 09 – 12, 2015
Automotive Testing Expo 2015 China • Shanghai, China; September 15 – 17, 2015
170th Meeting of the ASA • Jacksonville, USA; November 02 – 06, 2015
Aachen Acoustics Colloquium 2015 • Aachen, Germany; November 23 – 25, 2015