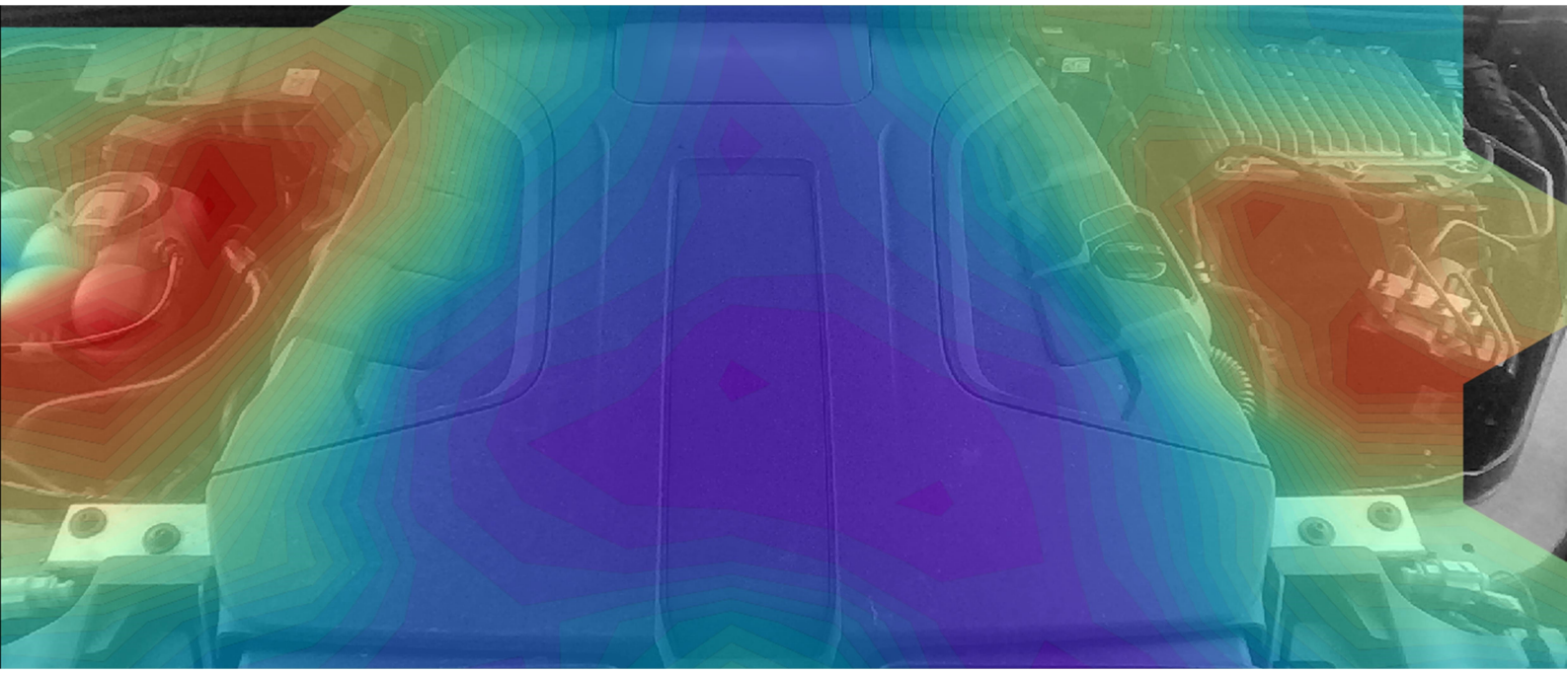
WELES SIMS

Sound Intensity Mapping System



KEY FEATURES:

- Rapid mapping of sound intensity, particle velocity and sound pressure
- Broad operating frequency range 20Hz to 10 kHz
- Real-time probe tracking

Weles SIMS is a quick and robust measuring system for generating sound maps of stationary sound fields. Weles SIMS is a single probe solution which relies on a scanning measurement technique to create high resolution sound maps.

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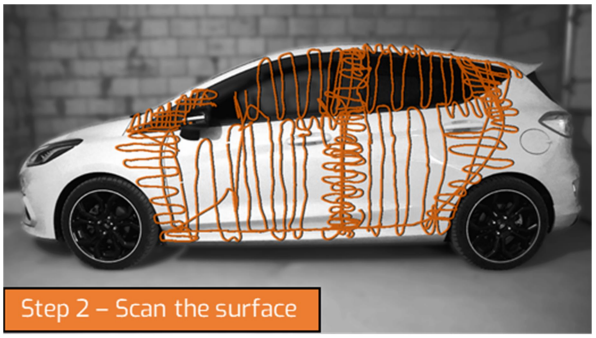
KEY APPLICATIONS:

- Sound source localization and ranking – highest performance, spatial resolution and accuracy is achieved with near-field particle velocity measurement
- Particle velocity mapping
- Sound intensity mapping
- Sound pressure measurement
- Quick troubleshooting – listen to particle velocity

TECHNOLOGY:

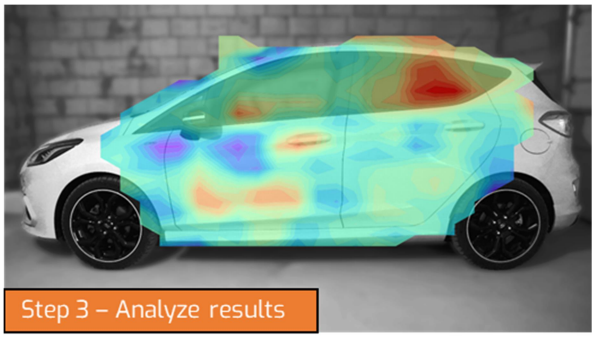
Weles SIMS is a quick and robust measuring system for generating sound maps of stationary sound fields. Weles SIMS is a single probe solution which relies on a scanning measurement technique to create high resolution sound images overlaid on a picture of the measured noise source - A perfect tool for localizing sources of buzzing, squeaking and rattling noises.

Weles SIMS is designed to take advantage of measuring capabilities of the WA101 PU Sound intensity probe. Thanks to the unique properties of the WA101 probe, Weles SIMS can be used to create sound maps depicting the distribution of sound pressure, sound intensity and particle velocity - all that without any frequency limitations. The system will allow visualizing almost any sound field from 20 Hz all the way up to 10 kHz. Furthermore, thanks to the properties of the Weles particle velocity sensor, measurements can be carried out in the presence of background noise and without the need for specialized facilities.



MEASUREMENT PROCEDURE:

Weles SIMS relies on a scanning measurement technique to visualize sound fields. In order to perform a measurement with the Weles SIMS, the surface of the measured sound source is manually scanned with the Weles WA101 PU sound intensity probe. The entire scanning process is recorded with a camera delivered with the Weles SIMS system. While the scan is being performed, the position of the probe within each recorded video frame is being established thanks to a dual-LED tracker attached to the probe. Simultaneously a data acquisition system is recording the measured sound pressure (P) and particle velocity (U) signals. Pieces of the recorded sound pressure and particle velocity data are assigned to a particular location on the surface of the captured image. Once the scanning process is completed, Weles SIMS will analyze individual data pieces along with their corresponding location and calculate a sound map superimposed on the image of the measured area.



PROBE TRACKING:

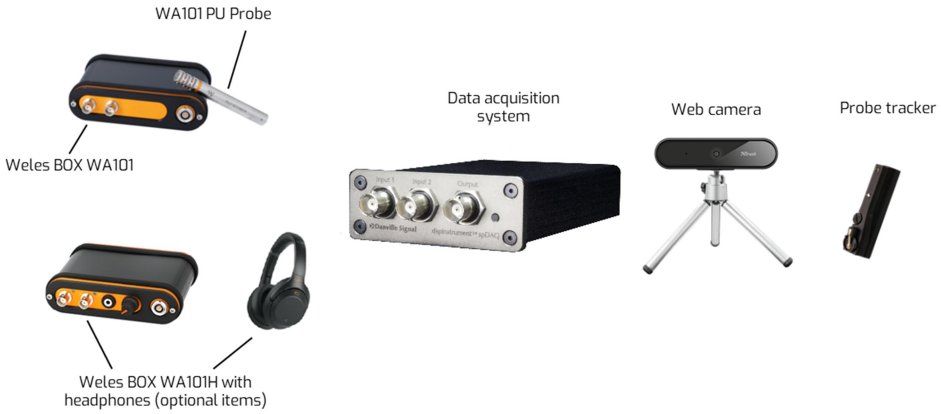
The WA101 PU probe tracking process is carried out thanks to an image processing algorithm which analyzes images captured by the Weles SIMS camera. Each recorded camera frame is analyzed in order to establish the location of a defined dual-LED tracker that is attached to the WA101 probe. The LED tracker is equipped with two diodes emitting a green and blue light. Two LED's are employed in order to compensate for possible angle changes in the WA101 probe orientation – This feature ensures that there is no need to hold the WA101 probe in a fixed orientation during the scan.

The probe tracking algorithm is based on recognizing individual color markers. For this reason the tracking process can be carried out on any user-defined color. Furthermore, the amount of colors that are being tracked can also be defined by the user. Any type of color marker can be used as a probe tracker. The only requirement is that the tinge of this color is different than the color of the area you are scanning. This feature ensures that any object, big or small, can be investigated with the Weles SIMS system.

SYSTEM COMPONENTS:

Weles SIMS comprises of the following items:

- WA101 Sound Intensity probe
- Weles BOX WA101 or Weles BOX WA101H (delivered with noise cancelling headphones)
- 24 bit, 4 channel, 52.7 kS/s/ch data acquisition system – DT9837A
- WA101 probe tracker
- Web camera
- Tripod (Optional)
- Weles SIMS software suite
- Protective case
- All required cables



SPECIFICATIONS:

Weles SIMS – Measurement performance and limitations	
Measuring instrument	WA101 1/2" PU Sound Intensity probe
Operating frequency range:	20 Hz – 20 kHz – For Particle Velocity measurements
	20 Hz – 20 kHz – For Sound Pressure measurements
	20 Hz – 10 kHz – For Sound Intensity measurements
Error margin:	Class 1
Dynamic range upper limit:	136 dB SPL*, SIL**, SVL***
Dynamic range lower limit:	30 dB (A) SPL, 46 dB (A) SIL, 46 dB (A) SVL
Data acquisition system:	spDAQ - USB based device, 24 bit, 2 IEPE channel, up to 192 kS/s
Other supported data acquisition systems:	MicroQ devices from MECALC Technologies DT9837A from Data Translation Inc. USB-4431 from National Instruments
Weles SIMS – system characteristics	
Type of noise that can be measured:	Stationary – constant in time
Measurement outcome:	Color sound map of either sound pressure, sound intensity or particle velocity overlaid on the image of the measured noise source
Additional data representation:	Narrow band power spectral densities of sound pressure particle velocity and sound intensity
Maximum measurable object size:	Limited by camera view field – Measurements are possible as long as the camera is able to see the measured area
Measurement environment:	No limitations. Measurements can be carried out in any conditions provided there is a sufficient signal to noise ratio. Outdoor measurements are possible. Usage of wind-cap is recommended for outdoor use.
Probe position tracking	
Probe tracking concept:	Optical tracking. WA101 PU Probe is tracked via tracker that is attached to the probe. The tracker is equipped with two LED's. The tracking algorithm is monitoring the location of both LED's. Using two LED's allows to automatically compensate for WA101 PU probe rotation. During the measurement camera image is darkened to increase the visibility of the tracker LED's and ensure smooth tracking of the probe during the scan.
Probe tracking features:	Tracking can be done in real-time or in post-processing. For special measurement cases tracking can be carried out on any user specified color.
Camera resolution:	1920 x 1080 (Full HD)
Camera view angle	64°
Software	
Modules:	Weles SIMS v1.4.6
PC Requirements	Windows 10 64 bit operating system
	2 GB RAM memory, 1GB disk space

*SPL – Sound pressure level; **SIL – Sound intensity level; ***SVL – Sound velocity level

ADDITIONAL PRODUCT CONFIGURATIONS:

WELES SIMS WITH WA101H - LIVE PLAYBACK OPTION FOR WA101 SOUND PROBE:

The WA101H is a very useful addition to the Weles SIMS system, as it allows for real-time playback of signals measured by two transducers embedded into the WA101 PU probe. The ability to listen to either the particle velocity or sound pressure during a scanning measurement presents a very powerful tool for quick sound source localization or quality control, especially in measurement environments with high levels of background noise. Simply put on the headphones, scan your sound source and listen to particle velocity - locating sources of squeaks, buzzes clicks and rattling noises has never been easier.

Weles Acoustics WA101H is a variant of the standard WA101 ½" PU Sound Probe product package. The WA101H consists of WA101 probe and the Weles BOX WA101H. Both systems rely on the same probe and deliver the same performance. However, unlike the standard version of WA101 Sound probe, the WA101H is equipped with an embedded high fidelity headphone amplifier. The headphone amplifier is installed in the Weles BOX. The WA101H is a fully portable system that can be powered from a USB 3.0 port.