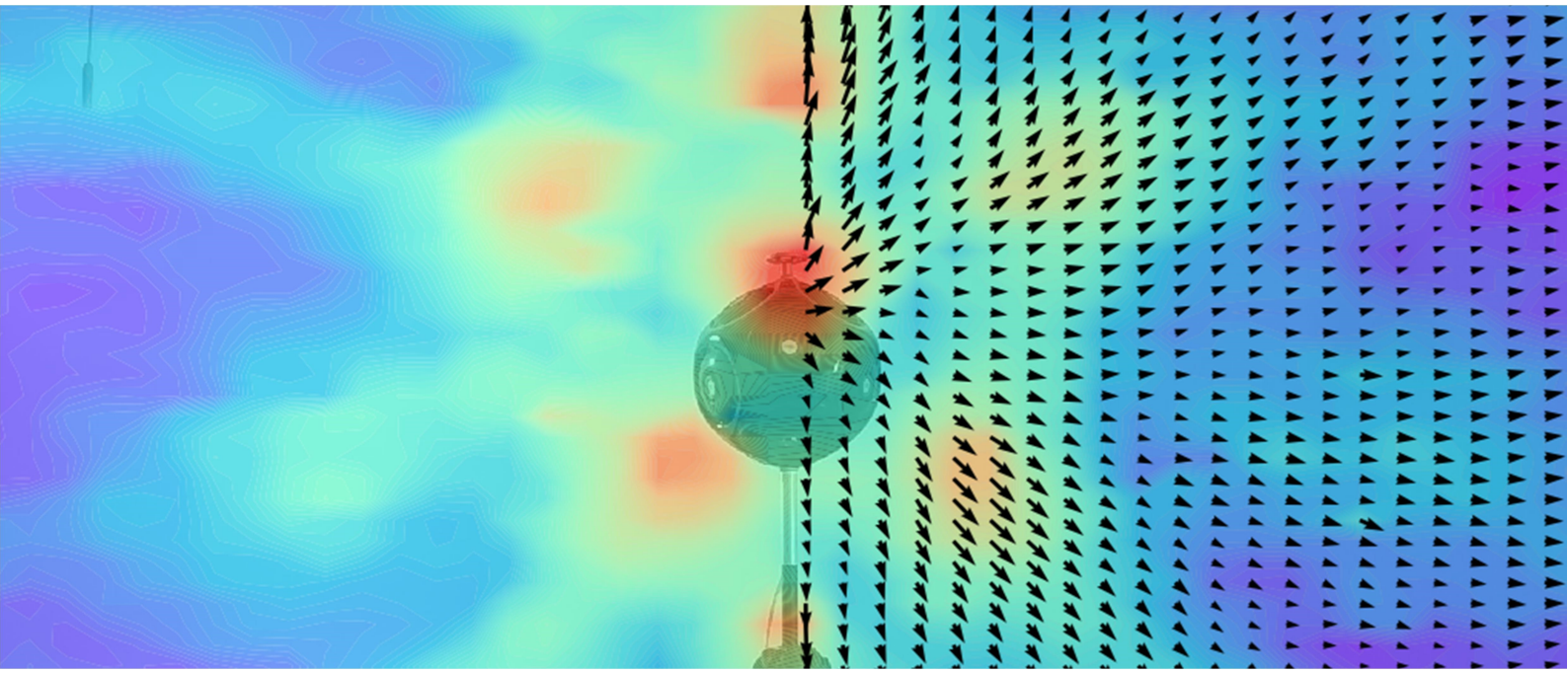
WELES SIMS

Sound Intensity Mapping System



KEY FEATURES:

- Rapid mapping of sound intensity, particle velocity and sound pressure
- 2D sound intensity vector mapping – available with WA301 3D PU probe
- Broad operating frequency range 20Hz to 10 kHz
- Reference sensor support
- 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.

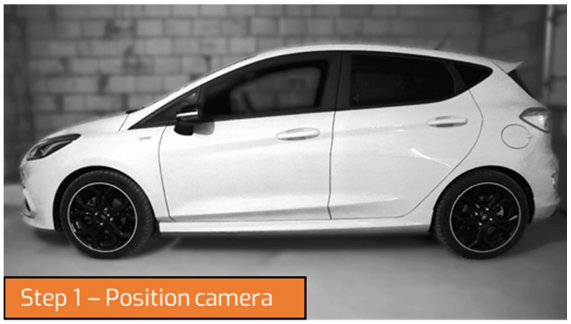
WELES ACOUSTICS SP. Z O.O.
PRZEMYSŁOWA 13, 44-200, RYBNIK, POLAND

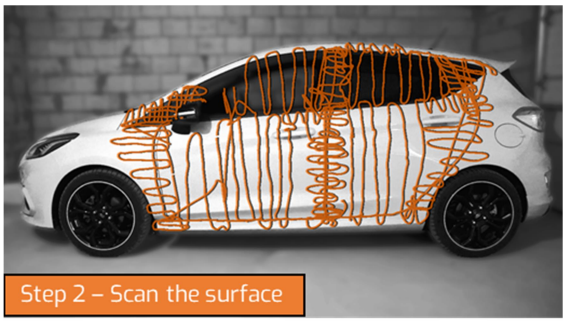
KEY APPLICATIONS:

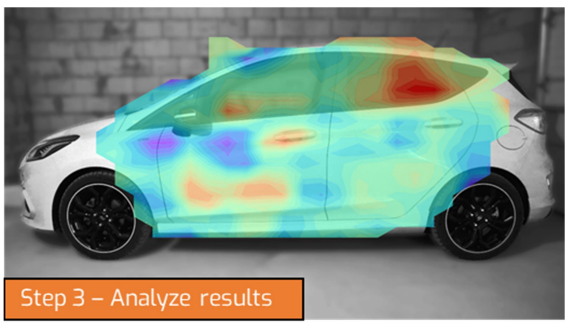
- Sound source localization and ranking – highest performance, spatial resolution and accuracy is achieved with near-field particle velocity measurement
- Particle velocity mapping
- Sound intensity mapping
- 2D Sound intensity vector mapping - Available with WA301 3D PU Probe
- Sound pressure measurement
- Sound power measurement
- Operational deflection shapes (ODS) mapping/Relative phase mapping – available for all measurements with reference sensors
- 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 either the WA101 PU Sound intensity probe or the WA301 3D PU Sound Intensity probe. Thanks to the unique properties of the PU 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 PU sound intensity probe (WA101 or WA301 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 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 PU 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 PU 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:

The Weles SIMS system can work with all types of Weles PU probes. Choice of the measuring instrument delivered with the system will affect its functionalities. All Weles SIMS system components are listed below:

- WA101, WA101H or WA301 Sound Intensity probe – depending on your choice.
- 24 bit, 4 IEPE channel, 52.7 kS/s/ch data acquisition system – DT9837A
- PU probe tracker
- Web camera
- Tripod (Optional)
- Weles SIMS software suite
- Protective case
- All required cables

Weles SIMS feature	Weles SIMS with WA101 Probe	Weles SIMS with WA101H Probe	Weles SIMS with WA301 3D probe
Sound source localization	✓	✓	✓
Sound Pressure/Sound Intensity/ Particle velocity mapping	✓	✓	✓
Sound power measurement	✓	✓	✓
Reference sensor support	✓	✓	✓
2D Sound intensity vector mapping			✓
Live listening option		✓	



SPECIFICATIONS:

Weles SIMS with WA101 or WA101H PU Probe – Measurement performance and limitations	
Measuring instrument	WA101/WA101H 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
Live listening option	Available with WA101H 1/2" PU Sound Intensity probe only.
Mapping of 2D Sound Intensity vectors	No – Available with WA301 3D PU probe.
Data acquisition system:	DT9837A - USB based device, 24 bit, 4 IEPE channel, up to 52 kS/s
Other supported data acquisition systems:	MicroQ devices from MECALC Technologies 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. If used with WA301 3D PU probe, any sound map can also be overlaid with 2D sound intensity vectors
Additional data representation:	Narrow band power spectral densities and 1/3rd octave band representation of sound pressure particle velocity, sound intensity and sound power.
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 – latest version
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

Weles SIMS with WA301 3D PU Probe – Measurement performance and limitations	
Measuring instrument	WA301 3D 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
Live listening option	Available with WA101H 1/2" PU Sound Intensity probe only.
Mapping of 2D Sound Intensity vectors	Yes.
Data acquisition system:	DT9837A - USB based device, 24 bit, 4 IEPE channel, up to 52 kS/s
Other supported data acquisition systems:	MicroQ devices from MECALC Technologies 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. If used with WA301 3D PU probe, any sound map can also be overlaid with 2D sound intensity vectors
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Maximum measurable object size:	Limited by camera view field – Measurements are possible as long as the camera is able to see the measured area
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AVAILABLE SYSTEM CONFIGUARATIONS:

WELES SIMS SYSTEM WITH **WA101** PU SOUND INTENSITY PROBE:

This is the basic configuration of the Weles SIMS system. In this configuration the Weles SIMS system is delivered with the WA101 PU Sound Intensity probe. The following items are included in this package:

- WA101 1/2" PU Sound Intensity probe
- 24 bit, 4 IEPE channel, 52.7 kS/s/ch data acquisition system – DT9837A
- PU probe tracker
- Web camera
- Tripod (Optional)
- Weles SIMS software suite
- Protective case
- All required cables

Weles SIMS feature	Weles SIMS with WA101 Probe
Sound source localization	✓
Sound Pressure/Sound Intensity/ Particle velocity mapping	✓
Sound power measurement	✓
Reference sensor support	✓
Live listening option	
2D Sound intensity vector mapping	

WA101 PU Sound Intensity probe 

Data acquisition system 

Web Camera 

PU probe tracker 

WELES SIMS SYSTEM WITH **WA101H** PU SOUND INTENSITY PROBE:

In this configuration the Weles SIMS system is delivered with the WA101H PU Sound Intensity probe. This version of the Weles SIMS system, apart from all other Weles SIMS functionalities, allows for real time listening to the signals acquired by your PU probe - a very useful feature for quick troubleshooting and increasing the efficiency of the measurement process. The following items are included in this package:

- WA101H 1/2" PU Sound Intensity probe
- Sony WH1000XM4 noise cancelling headset
- 24 bit, 4 IEPE channel, 52.7 kS/s/ch data acquisition system – DT9837A
- PU probe tracker
- Web camera
- Tripod (Optional)
- Weles SIMS software suite
- Protective case
- All required cables

Weles SIMS feature	Weles SIMS with WA101H Probe
Sound source localization	✓
Sound Pressure/Sound Intensity/ Particle velocity mapping	✓
Sound power measurement	✓
Reference sensor support	✓
Live listening option	✓
2D Sound intensity vector mapping	

WA101H PU Sound Intensity probe 

Data acquisition system 

Web Camera 

PU probe tracker 

WELES SIMS SYSTEM WITH **WA301** 3D PU SOUND INTENSITY PROBE:

In this configuration the Weles SIMS system is delivered with the WA301 3D PU Sound Intensity probe. This version of the Weles SIMS system, apart from all other Weles SIMS functionalities, allows for mapping of 2D Sound intensity vectors. The following items are included in this package:

- WA301 3D PU Sound Intensity probe
- 24 bit, 4 IEPE channel, 52.7 kS/s/ch data acquisition system – DT9837A
- PU probe tracker
- Web camera
- Tripod (Optional)
- Weles SIMS software suite
- Protective case
- All required cables

Weles SIMS feature	Weles SIMS with WA301 3D Probe
Sound source localization	✓
Sound Pressure/Sound Intensity/ Particle velocity mapping	✓
Sound power measurement	✓
Reference sensor support	✓
Live listening option	
2D Sound intensity vector mapping	✓

WA301 3D PU Sound Intensity probe



Data acquisition system



Web Camera



PU probe tracker

