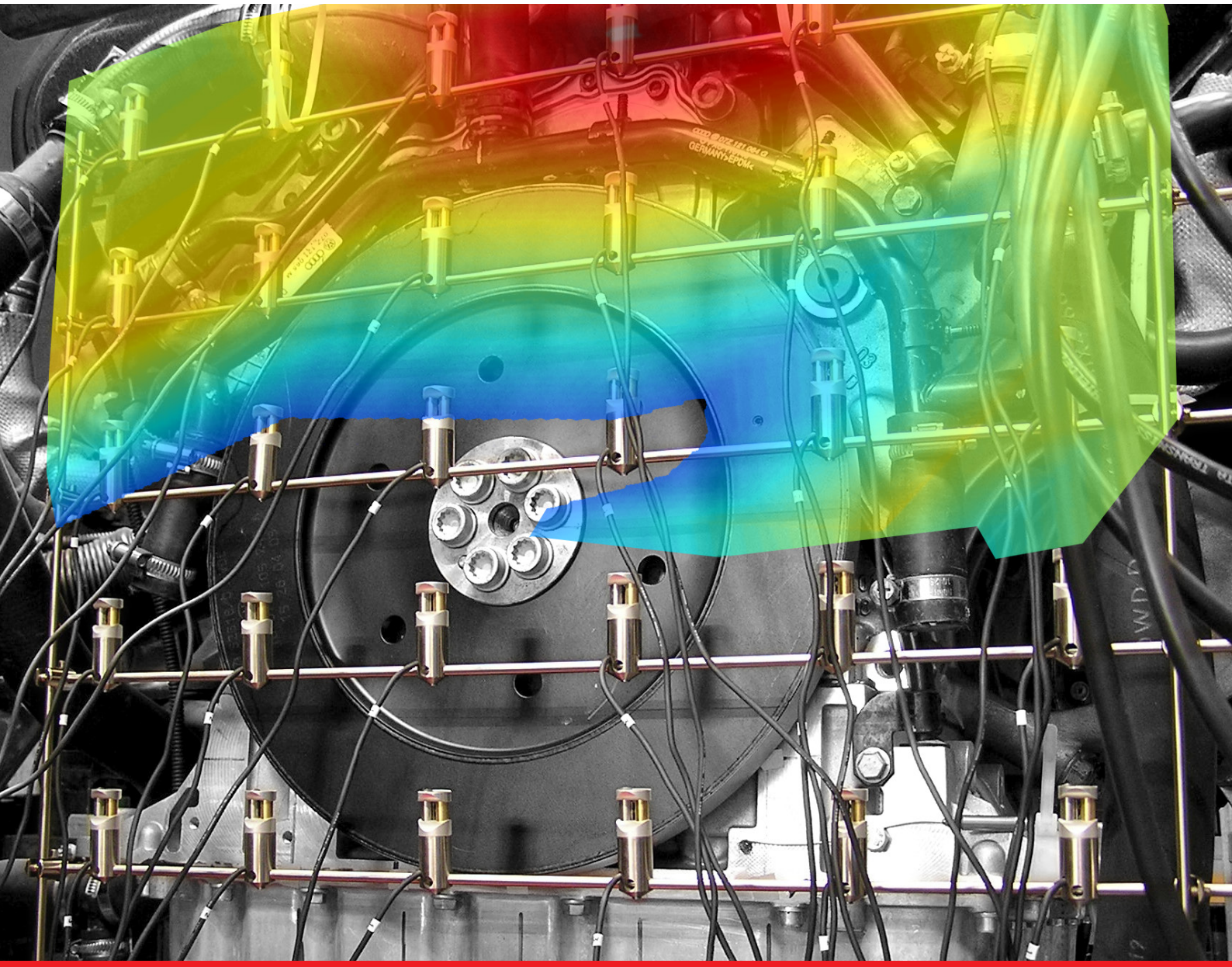
Microflown Technologies
Charting sound fields



Product Leaflet

ACOUSTIC CAMERA

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MICROFLOWN // CHARTING SOUND FIELDS

ACOUSTIC CAMERA

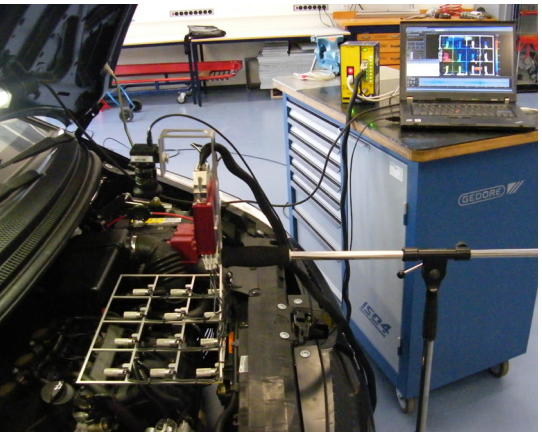
SOUND SOURCE VISUALIZATION FOR NON-STATIONARY SOUND FIELDS

Sound source localization of transient and other non-stationary noises requires a simultaneous measurement with multiple sensors. The Microflown Acoustic Camera is a flexible and versatile all-in-one box solution. It allows localization and real-time analysis of non-stationary noises such as squeaks, rattles and clicks. Additional features make the Acoustic Camera software a great solution for your application.

The Acoustic Camera is a tool for real-time sound field visualization. It is a perfect tool for diagnostics and localization of non-stationary noise sources from the product development stage to end of line quality control.

Thanks to the unique properties of the Microflown sensor, the localization task can be performed not only in real-time, but also in any measurement environment, and in a broad frequency range (20 Hz -10 kHz). Making the Microflown Acoustic Camera the only system capable of accurate sound source localization below the barrier of 200 Hz.

Microflown probes enable the direct measurement of both sound pressure & particle velocity, thus the sound intensity can be obtained by taking the time averaged product of both signals. This allows for direct sound intensity measurements across a broad frequency range (20Hz to 10kHz). Additionally, when the size of the measured area is known, the sound power of the object under test can easily be calculated within the Acoustic Camera software.



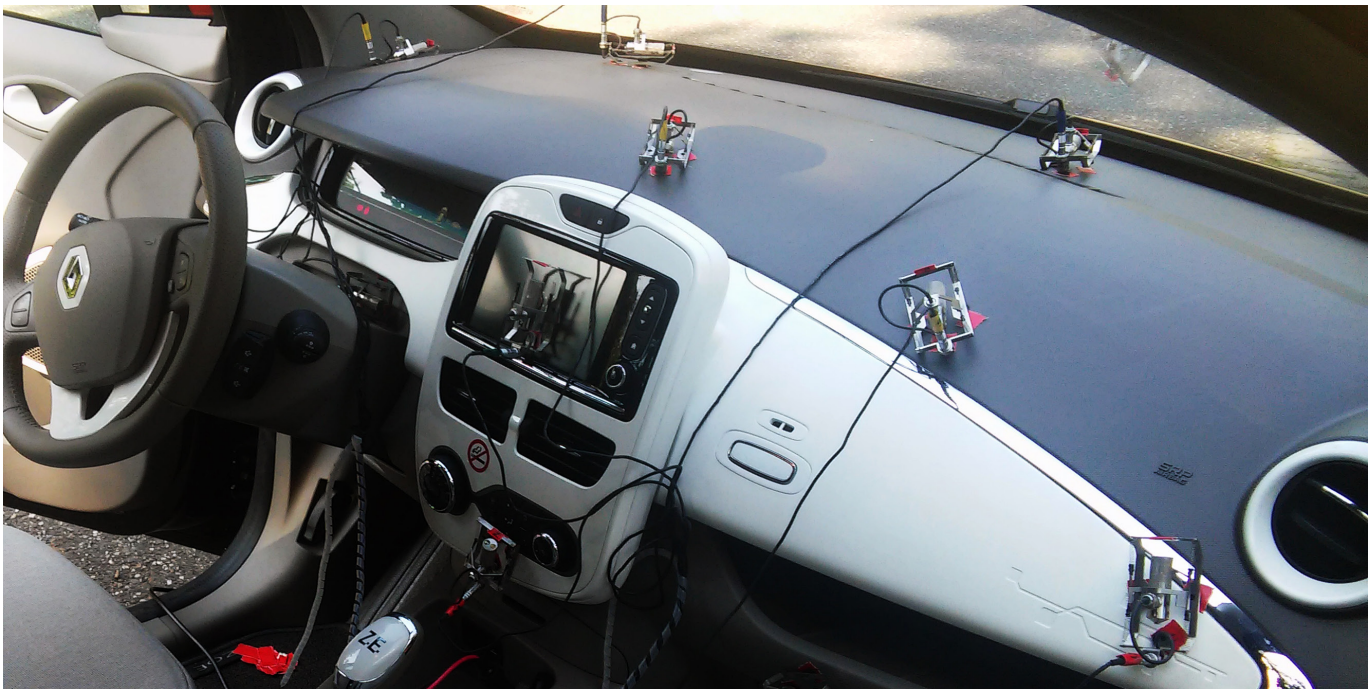
The physical properties of particle velocity and the design of the sensors make our systems less susceptible to background noise. Therefore accurate sound intensity and sound power results can be obtained in situations with a high sound pressure over sound intensity ratio (P/I index). This unique feature makes this system a superb engineering tool for troubleshooting, benchmarking or quality control of all kinds of objects on the spot. In practice, there are many cases where anechoic conditions are not applicable, for instance in an industrial manufacturing enviroment, or a car interior. The Acoustic Camera is a solution which does not require any compromise when taking measurements even in acoustically challenging environments.

There is no need to preserve a defined spacing between the probes in the array. Thus the Acoustic Camera can also be configured as a scattered array, allowing to accurately measure curved surfaces and complex geometries.

FEATURES

The Acoustic Camera system at glance

- **Broadband Solution | 20Hz - 10kHz**
  Independent of geometry and size of the array
- **Large dynamic range | up to 45 dB**
- **Spatial resolution does not depend on the frequency**
- **Real-time sound field visualization:**
  - **Sound pressure**
  - **Particle velocity**
  - **Sound intensity**
  - **Sound power**
- **Order Tracking Module and extensive order analysis tools**
- **Signal processing matrix**
- **Fast | Easy setup, measurement and analysis**
- **Flexible | Free configuration of a measurement grid**
- **Applicable in (real) operating environments**
- **Multiple sensor solution**



SOUND POWER MEASUREMENTS

Thanks to the unique features of the Microflown sensor, sound power measurements can now be done in-situ and in acoustically challanging environments.

The Acoustic Camera is equiped with PU probes. Each probe measures sound pressure and particle velocity at the same point in time and space. Sound intensity is calculated by taking the time averaged product of both quantities. If the measured area is known, the software can visualize the distribution of sound power in real-time in a broad frquency range (20 Hz - 10 kHz).

Furthermore the unique properties of particle velocity reduce the requirements for the acoustic treatment of the measurement environment. Accurate sound power results can now be obtained in-situ, or in industrial manufacturing environments. Benchmarking and quality control has never been easier.

ORDER TRACKING AND ANALYSIS

The system is equipped with an extensive order analysis module. It allows to track the rotational orders both with and without a tacho sensor.

The Order Tracking Module is a perfect tool for studying rotating machinery, as it allows to analyze the frequency content of a signal with respect to the speed of rotation. What makes this module unique is the capability to extract the rotational orders without the necessity to record the RPM signal.

Order extraction is done with just a few mouse clicks. You only need to define and highlight a known order in the spectrogram of a recorded sound signal. An efficient algorithm will then track the order and translate it into a tacho signal. The tacho signal synthesized this way, can now be used to determine the distribution of any other orders of your choice, in a simple and easy to understand ordergram.

SIGNAL PROCESSING MATRIX

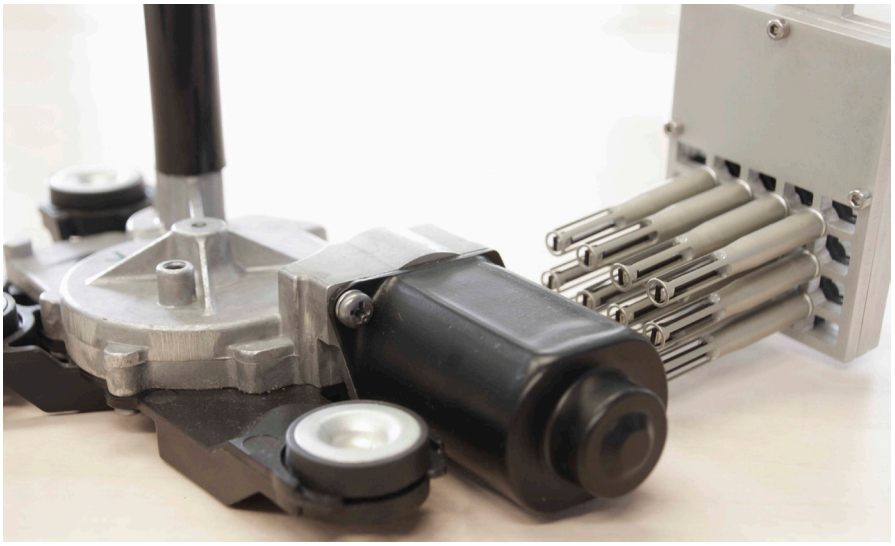
Use the Basic Signal Processing Matrix and choose any two signals acquired with the system to perform simple signal processing tasks.

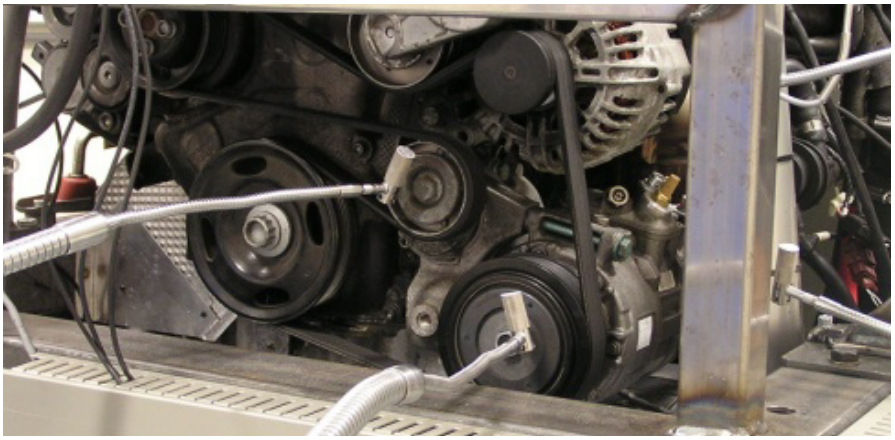
The Basic Signal Processing Matrix allows you to carry out simple signal processing tasks between any two signals acquired with the system. Simply select the time range and the desired signals to analyse their cross-spectrum, transfer function, phase differences and coherence.

Thanks to this new feature full flexibility in terms of data handling has been achieved.

"REAL-TIME SOUND FIELD VISUALIZATION...

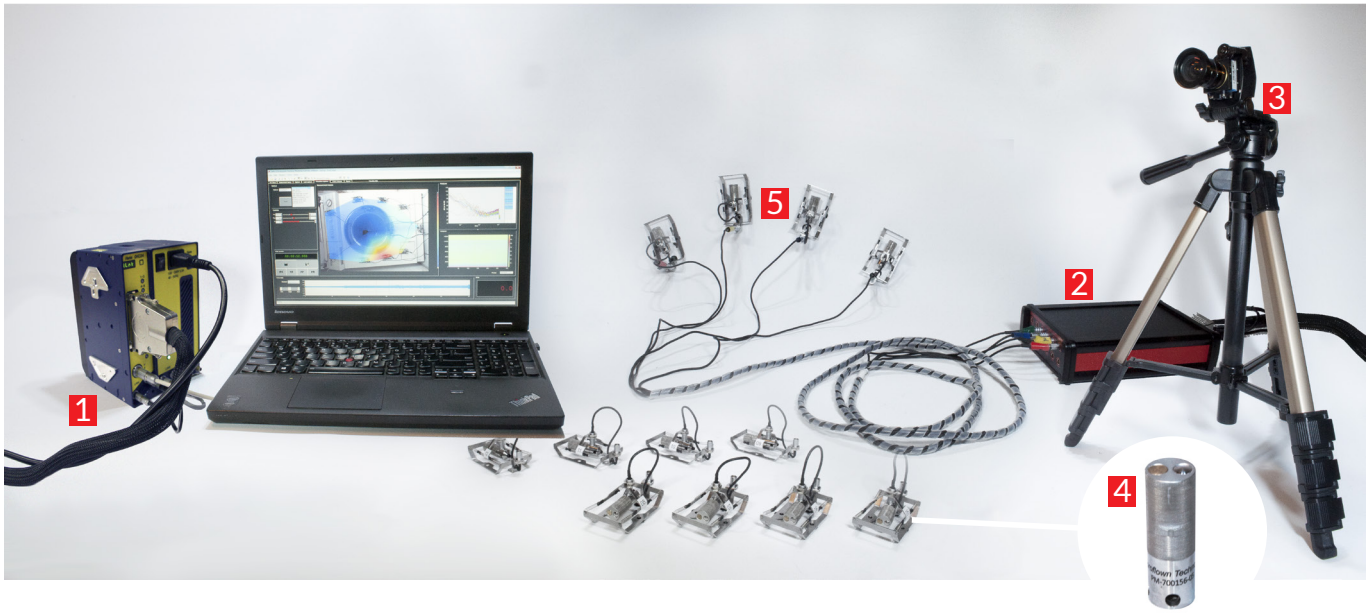
...NO MATTER IN WHAT CONDITIONS"





HARDWARE

Acoustic Camera



1 Heim | 24 Ch. Data Acquisition

Highly accurate 24 bit, 24 channel data acquisition. The device is powered from the attached Heim power module.

2 MFPA-12 | Signal Conditioner

Signal conditioning unit for 12 PU probes, supplying power to the sensors and preamplification of the acquired signals.

3 HD USB Camera

A high definition USB camera records the measured object with a frame rate up to 50 fps. The video recorded by the camera is overlaid with the acoustic picture in real-time.

4 12 PU Probes

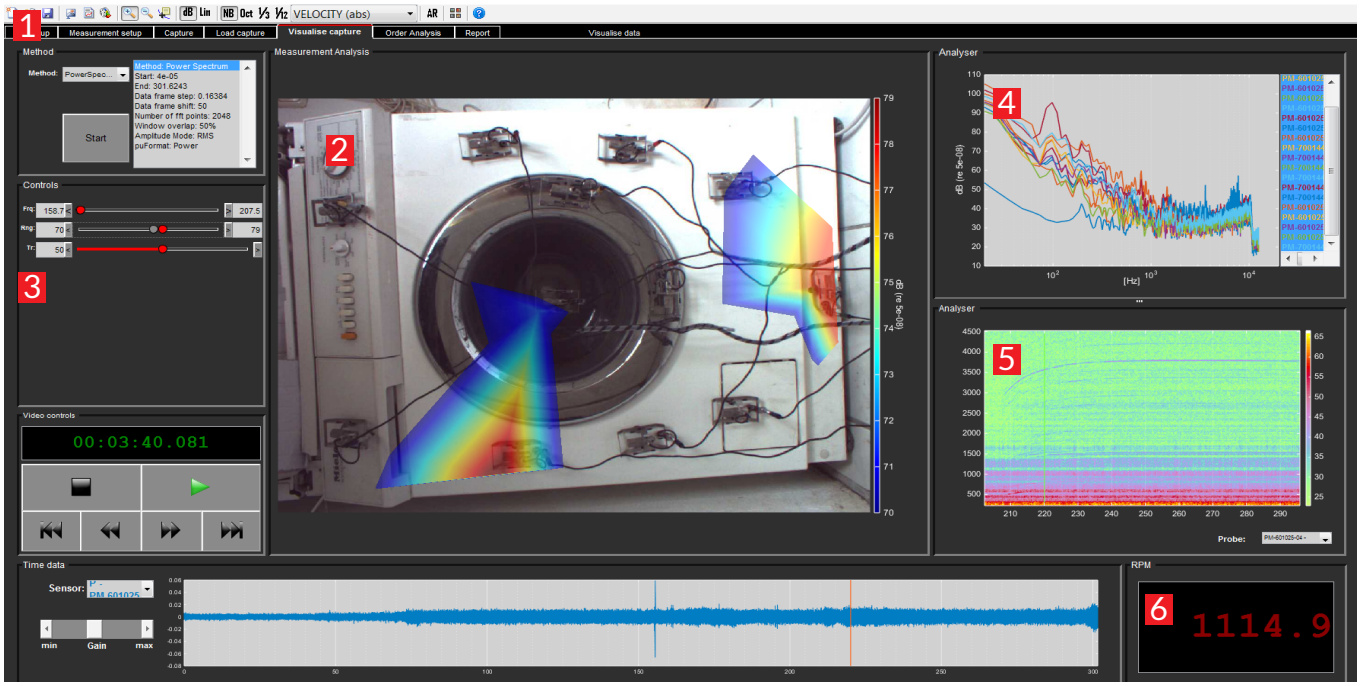
12 Broad band intensity probes (20Hz-10kHz) each consisting of 1x particle velocity sensor and 1x microphone. Choose between PU Mini (picture) or PU Match.

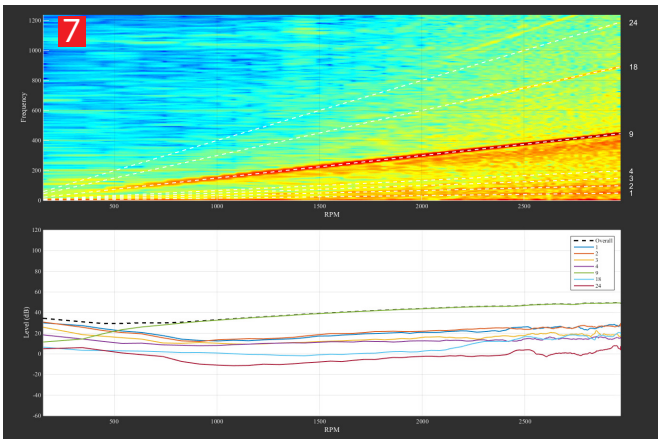
5 PU Mini Mountings

Instead of a fixed array, the mountings are used for scattered grid configurations and can be attached to any surface. When fitted in the mounting, the PU Mini is decoupled from the mechanical vibration of the surface under test.

SOFTWARE

Acoustic Camera





1 Tab workflow

Follow the 7 main tabs that guide you step by step from setup to report of your measurement. Capture, manage and visualize your measurements with full flexibility.

2 Sound field visualisation

A camera video is overlaid with a 2D acoustic image. View the results in your prefered settings e.g. narrow band, octave bands, etc.

3 Controls

Full flexibilty in setting the frequency range and dynamic range of the visualisation. Playback the video or manually walk through each video frame.

4 Spectrum

See the averaged spectrum for the selected quantity in octave or narrow bands. Such operations can be carried our for the whole measurment run or a defined time range.

5 Spectrogram

Zoom in to the spectrogram and easily select a time-frequency range to visualize.

6 RPM

RPM information is obtained from either a tacho sensor or extracted from any of the acquired sound signals using the Order Tracking Module.

7 Order analysis

Extensive order analysis tools. Analyse orders using a spectrogram or ordergram. Select orders to add to the order graph and export data as text or Excel files.

REDUCE THE PRESSURE IN YOUR WORK...

...GO FOR PARTICLE VELOCITY

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