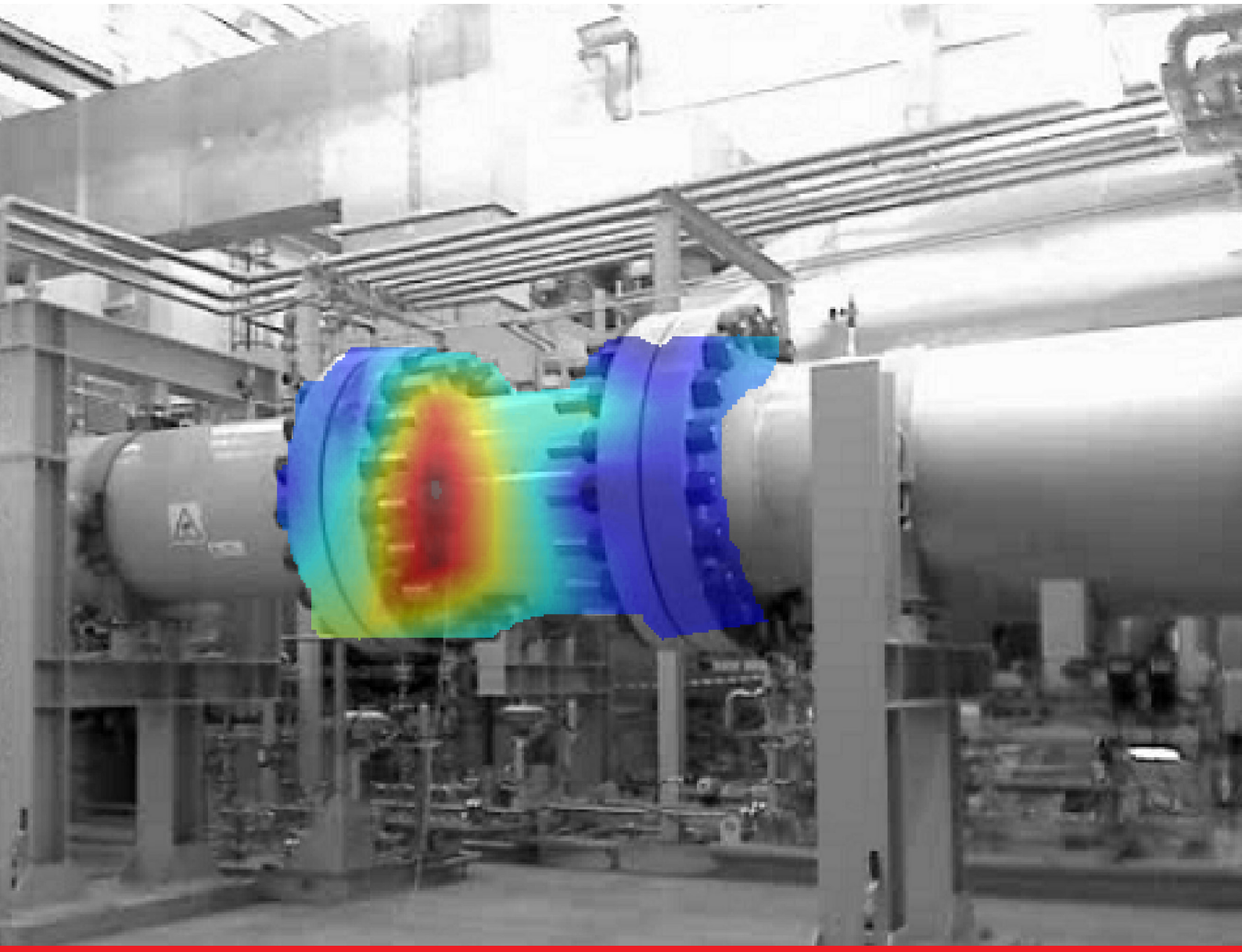
Microflown Technologies
Charting sound fields



Product Leaflet

SCAN & PAINT 2D

Microflown Technologies
Tivolilaan 205
6824 BV Arnhem
The Netherlands

Phone : +31 088 0010800
Fax : +31 088 0010810
Mail : info@microflown.com
Web : www.microflown.com

MICROFLOWN // CHARTING SOUND FIELDS

SCAN & PAINT 2D

FAST AND EASY HIGH RESOLUTION SOUND MAPPING

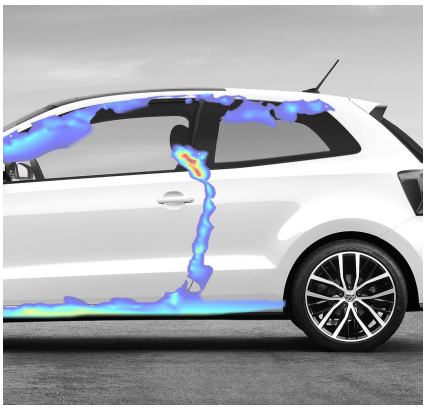
Scan&Paint 2D is a tool to visualize stationary sound fields with an unmatched spatial resolution in full acoustic bandwidth. The system is a superb engineering tool for troubleshooting or benchmarking all kinds of objects on the spot. It only takes a few minutes to complete and entire measurement campaign. Results of the scan are translated by the software into a color map, superimposed on a photograph of the measured object, allowing to find the origin of noise.

Sound source localization is an important topic in the field of sound & vibration, from the product development stage to the end of line quality control. Scan & Paint is a fast, easy and accurate tool to visualize stationary sound fields with unmatched spatial resolution and full acoustic bandwidth coverage (20Hz to 10kHz). The system is a superb engineering tool for troubleshooting or benchmarking all kinds of objects on the spot. No requirement for anechoic conditions or chambers. In practice, there are many cases where anechoic conditions are not applicable, for instance in an industrial manufacturing environment or a car interior.

PU probes allow direct measurements of particle velocity, which are not highly affected by background noise or reflection. Sound intensity measurements can be taken in situations with a high sound pressure to sound intensity ratio.

The Scan & Paint method is very simple; the surface is scanned with one PU probe while a camera is positioned toward the surface to film the scanning. The recorded video and audio data are automatically synchronized by the software.
The measurements are directly ready for further processing. In the post-processing, for each frame of the video the position of the probe is extracted. The auto-tracking function in the software enables to automatically recognize the probe and its position by a color marking. Results of the scan are translated by the software into a color coded color map superimposed on a photograph of the measured object, thus allowing to visualize the origin of noise.

A reference sensor can be added to preserve the relative phase of the measured particle velocity distribution. This feature enables the user to plot and study the dynamic behavior of samples (Operational deflection shapes). Furthermore, the capabilities of the Scan & Paint system can be easily expanded thanks to additional software modules, like the Scan & Paint TPA or the Scan & Paint TL. The transfer path analysis module (TPA) will allow you to calculate and visualize the sound pressure contribution to an arbitrarily chosen reference point, using the measured near-field particle velocity as the basis for all calculations. The Transmission loss module (TL) is a tool specifically designed to allow using the Scan & Paint system for in-situ transmission loss measurements. Regardless of the purpose of your measurement, it will only take a few minutes to complete an entire Scan & Paint measurement campaign – fast, accurate and easy to use.



FEATURES

The Scan&Paint 2D system at glance

- **Broadband Solution: 20Hz - 10kHz**
- **Fast Method: short setup, measurement and processing time**
- **High resolution mapping of:**
  - **Particle velocity**
  - **Sound intensity**
  - **Sound pressure**
  - **Sound pressure contribution** (available with the TPA module)
  - **Transmission loss coefficient** (available with the TL module)
  - **Absorption coefficient** (available with In-Situ Absorption add-on)
- **Applicable in operating environments e.g. reverberant environments;**
- **Sound Power calculation**
- **Reference sensor option for phase correlation**
- **Intuitive tool for troubleshooing and benchmarking**
- **Easy to operate**
- **Portable single sensor solution**

SOUND INTENSITY PROBE

The state of the art sensor used in the system is the 1⁄2 inch PU regular probe. The sensor consists of two transducers, one particle velocity sensor and a sound pressure microphone. Such configuration allows for direct measurements of 1D sound intensity.

The Microflown PU probe is the only sensor that has the unique capability of allowing for a direct measurement of all acoustic quantities: sound pressure and single-axial particle velocity. The sound intensity can be calculated by taking the time averaged cross spectrum of particle velocity and sound pressure. Sound intensity can be obtained without any frequency limita¬tions covering a range from 20 Hz to 10 kHz. The ac¬tual sensor configuration without the protective cap, occupies a volume smaller than 1cm^3. This small size allows measurements to be taken with an unmatched spatial resolution, making the PU regular a perfect probe for any scanning measurement.

AIRBORNE TRANSFER PATH ANALYSIS

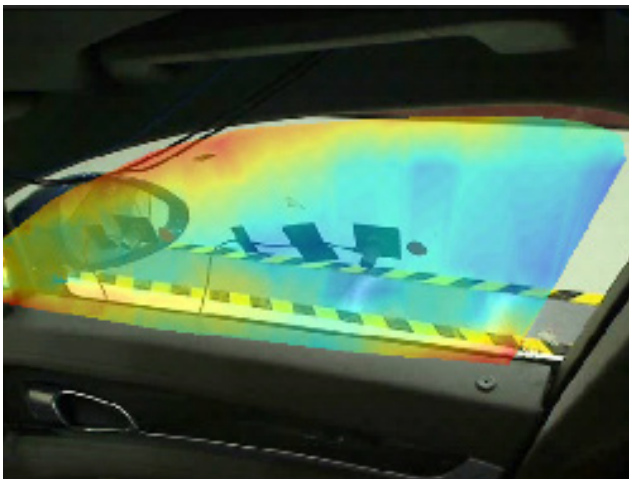
The combination of a direct near-field particle velocity measurement along with a transfer path measurement, allows to calculate and visualize the sound pressure contribution to a certain listener point, thus providing a ranking of the noisiest areas of a cavity interior from the perspective of listener.

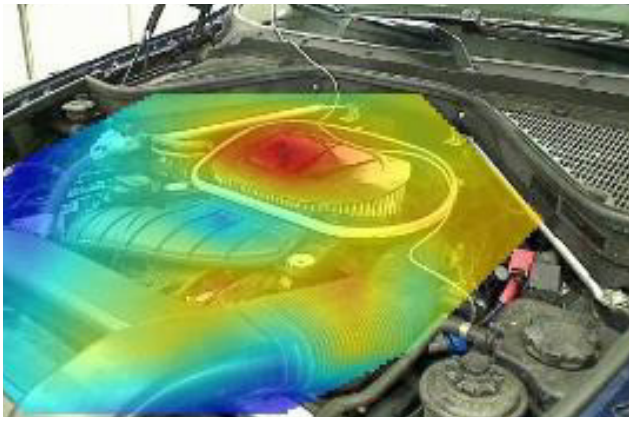
A high velocity at the surface does not necessary mean a high pressure contribution to a certain position. In a complex environment such as a vehicle interior, the surface velocity can only give an indication about the source ranking of different areas. Traditionally transfer path analysis (TPA) offer a solution to rank sources but requires a multichannel frontend system with multiple sensors. An advanced version of the traditional Scan & Paint, called Scan & Paint TPA, is a solution for airborne TPA. This system introduces a fast method and requires a low number of channels. The Scan & Paint TPA not only maps the surfaces' source strengths, but transfer functions and phase references as well. This opens the option to preserve relative phase information between various measurement positions and their contributions to a defined location. All this with only 3 channels (two sensors solution) and an omnidirectional sound sourcesor orientation.

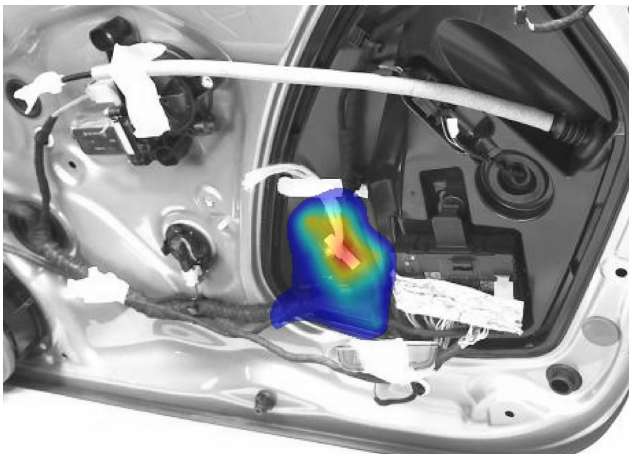
TRANSMISSION LOSS MEASUREMENT

The Transmission loss is an additional software module, which will allow you to use the system for in-situ transmission loss measurements. This new module provides means to visualize the transmission loss in a form of an easy to interpret color map.

The measurement procedure is as easy as the Scan & Paint system itself. All you need to do, in order to determine a transmission loss distribution, is to position a volume velocity source in the vicinity of the area you wish to measure. Drive the sound source with white noise, and carry out a scan with a Microflown PU probe over the target area. Two scans need to be carried out. One of the scans is done from the emitter side of the studied area the second one is done on the receiver side. Both scans are processed exactly in the same way as any other Scan & Paint measurement would be. In the post-processing stage, the transmission loss module would merge the two scans, calculate the local transmission loss, and overlay the image of the measured area with a color map.

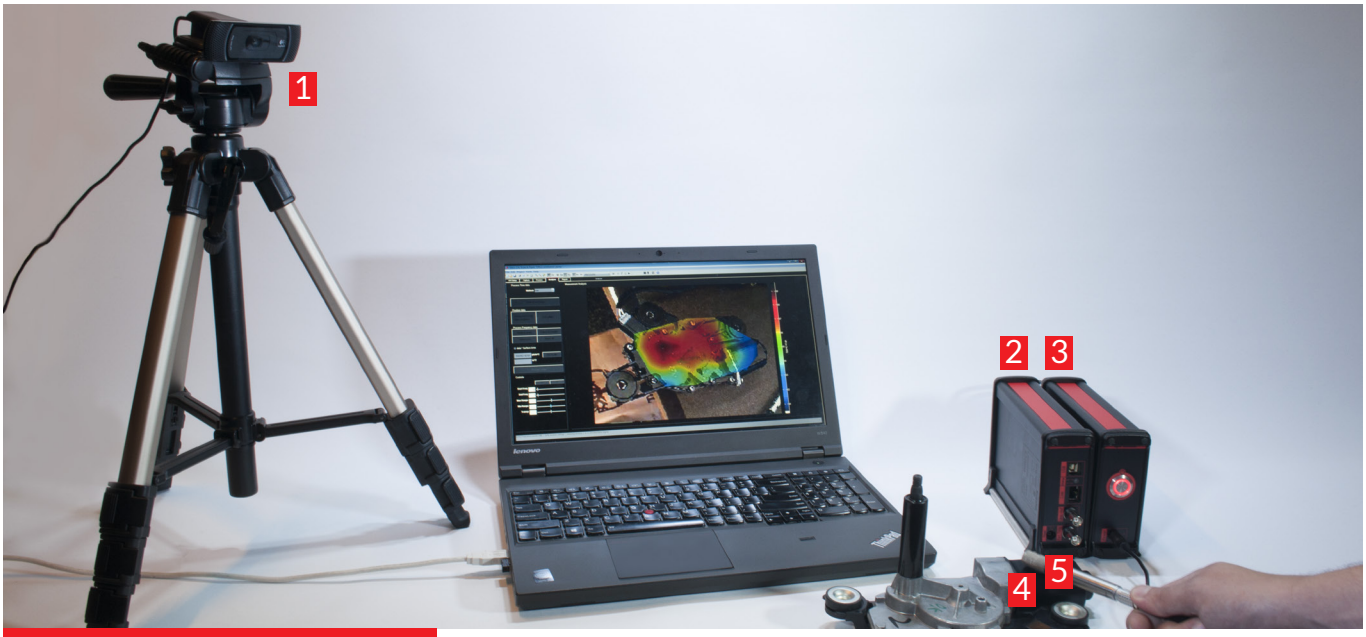






MEASURE, PROCESS AND VISUALIZE...

...IN ONLY A MATTER OF MINUTES



FAST & EASY POSITON TRACKING

The Scan & Paint method is very simple; the surface is scanned with one PU probe while a camera is positioned toward the surface to film the scanning.

The recorded video and audio data are automatically synchronized by the software. The measurements are then ready directly for further processing. In the post-processing, for each video frame the position of the probe is extracted. The auto-tracking function in the software enables the automatic recognition of the probe and its position from a colour marking. At each measurement point the particle velocity, sound intensity and sound pressure are calculated from the relative time block of the audio data. A high resolution sound color map is produced as a result.

1 Camera
Camera capturing the video data that will automatically be synchronized with the measurement data.

2 Scout | Data Acquisition
Highly accurate 24 bit, 4 channel data acquisition. The device is USB powered, no additional power cables are required.

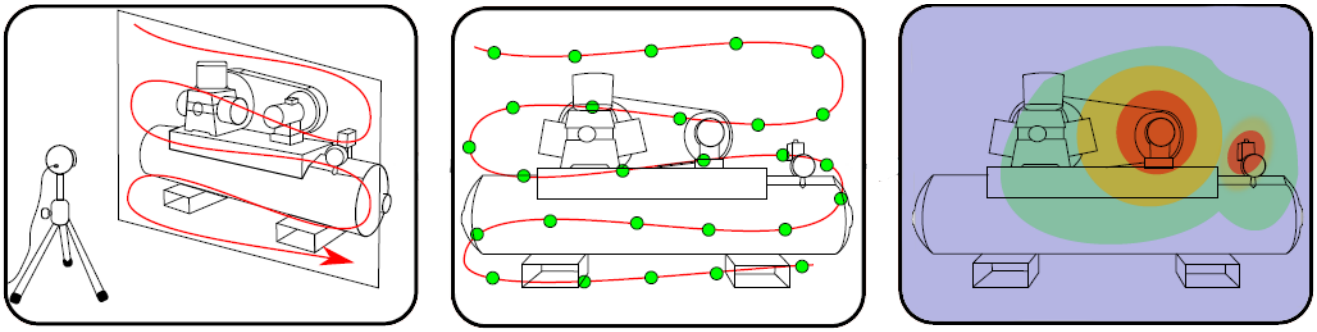
3 MFPA-2 | Signal Conditioner
Signal conditioning unit for the PU probes supplying power and preamplification.

4 PU Sensor
Broad band PU probe (20Hz-10kHz) 1x particle velocity sensor and 1x microphone

5 Colour Marking
Small colour marking on the PU probe that is used to auto track the sensors' positions through colour recognition.

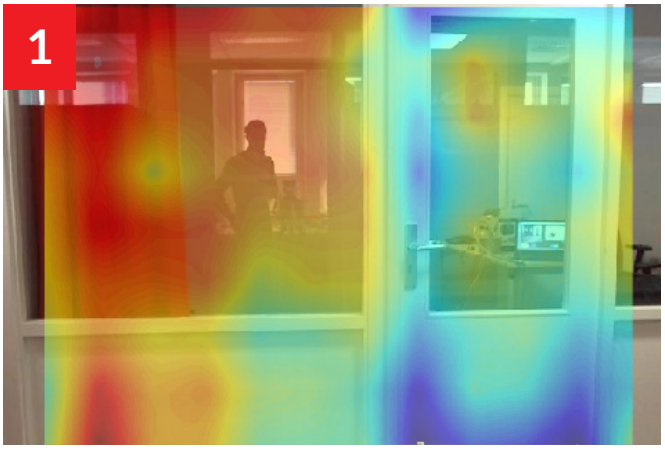
"MEASURE, PROCESS AND VISUALIZE...

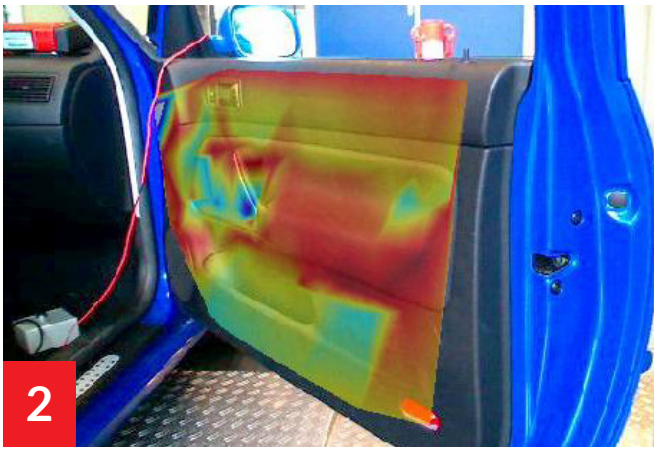
...IN ONLY A MATTER OF MINUTES"

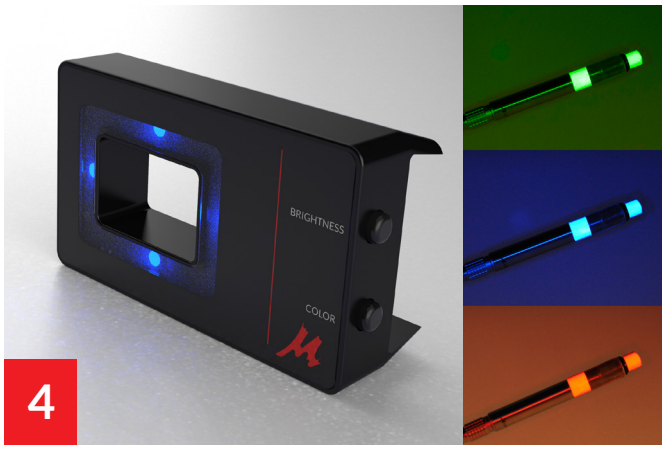


OPTIONAL EXTENSIONS

Scan&Paint 2D







1 Transmission Loss module

Camera capturing the video data that will automatically be synchronized with the measurement data.

2 In-Situ Absorption add-on

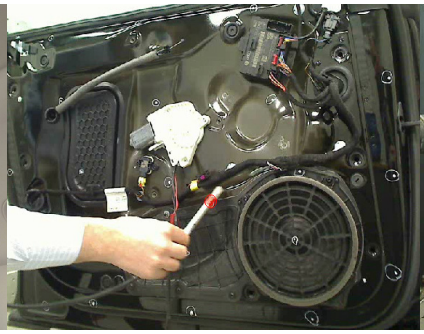
Highly accurate 24 bit, 4 channel data acquisition. The device is USB powered, no additional power cables are required.

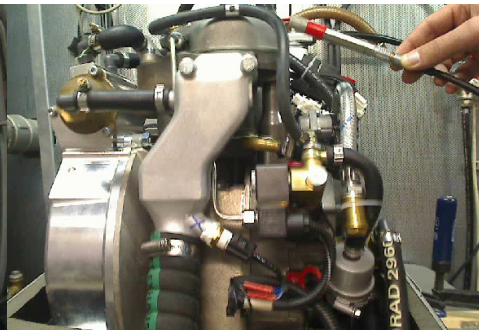
3 Transfer Path Analysis module

Broad band PU probe (20Hz-10kHz) 1x particle velocity sensor and 1x microphone

4 Advanced Tracking add-on

Small colour marking on the PU probe that's used to auto track the sensors' positions by colour recognition.





REDUCE THE PRESSURE IN YOUR WORK...

...GO FOR PARTICLE VELOCITY

Microflown Technologies
Tivolilaan 205
6824 BV Arnhem
The Netherlands

Phone : +31 088 0010800
Fax : +31 088 0010810
Mail : info@microflown.com
Web : www.microflown.com