NEAR-FIELD ACOUSTIC CAMERA

Sound source localization for non-stationary fields

Product leaflet

MICROFLOWN TECHNOLOGIES

Near-Field Acoustic Camera

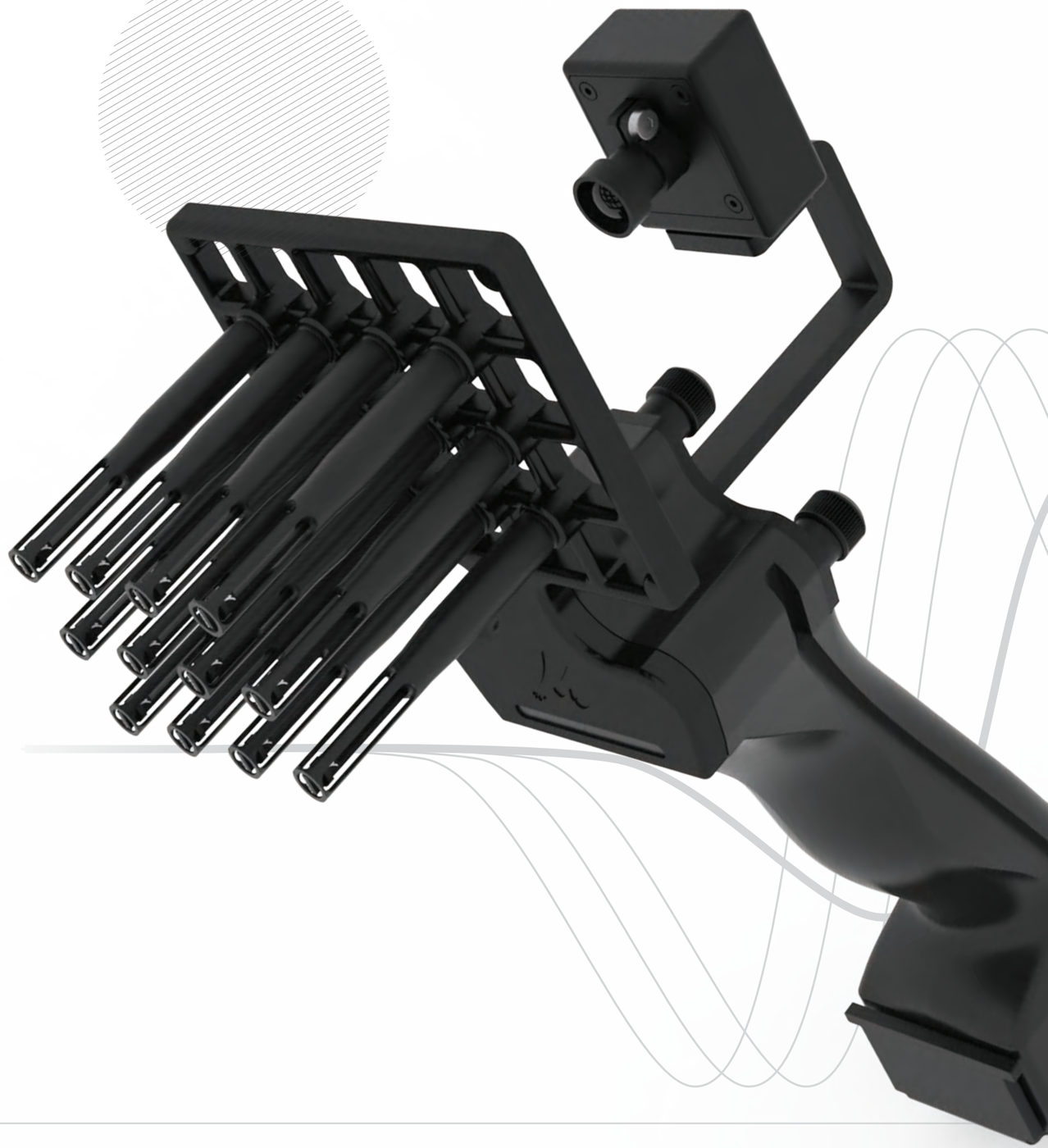
BEYOND TRADITIONAL BEAMFORMING

Traditional acoustic cameras use beamforming to localize sound sources. It's a well-known technique, but one that relies on physical assumptions and that has a constrained performance depending on the frequency of interest. In real-world conditions, where reflections, low frequencies, or complex surfaces dominate, these assumptions may lead to misleading results.

The Near-Field Acoustic Camera takes a different approach. By measuring both sound pressure and particle velocity, it captures the key information to define the acoustic field in more detail. When measurements are performend in the near-field key information is preserved, allowing for accurate estimations of the surface radiation of a machine, characterization of a inside cabins, or understand how a complex source changes over time on a given environemt.

What sets it apart from traditional solutions is its dynamic range and spatial resolution. Even at low frequencies or in reflective rooms, the Near-Field Acoustic Camera produces precise and intuitive sound maps. Engineers can see what is really happening, and which components are responsible.

In short, this a tool that reveals what others can't, bringing full-resolution insight into the near-field of sound.



Main system features

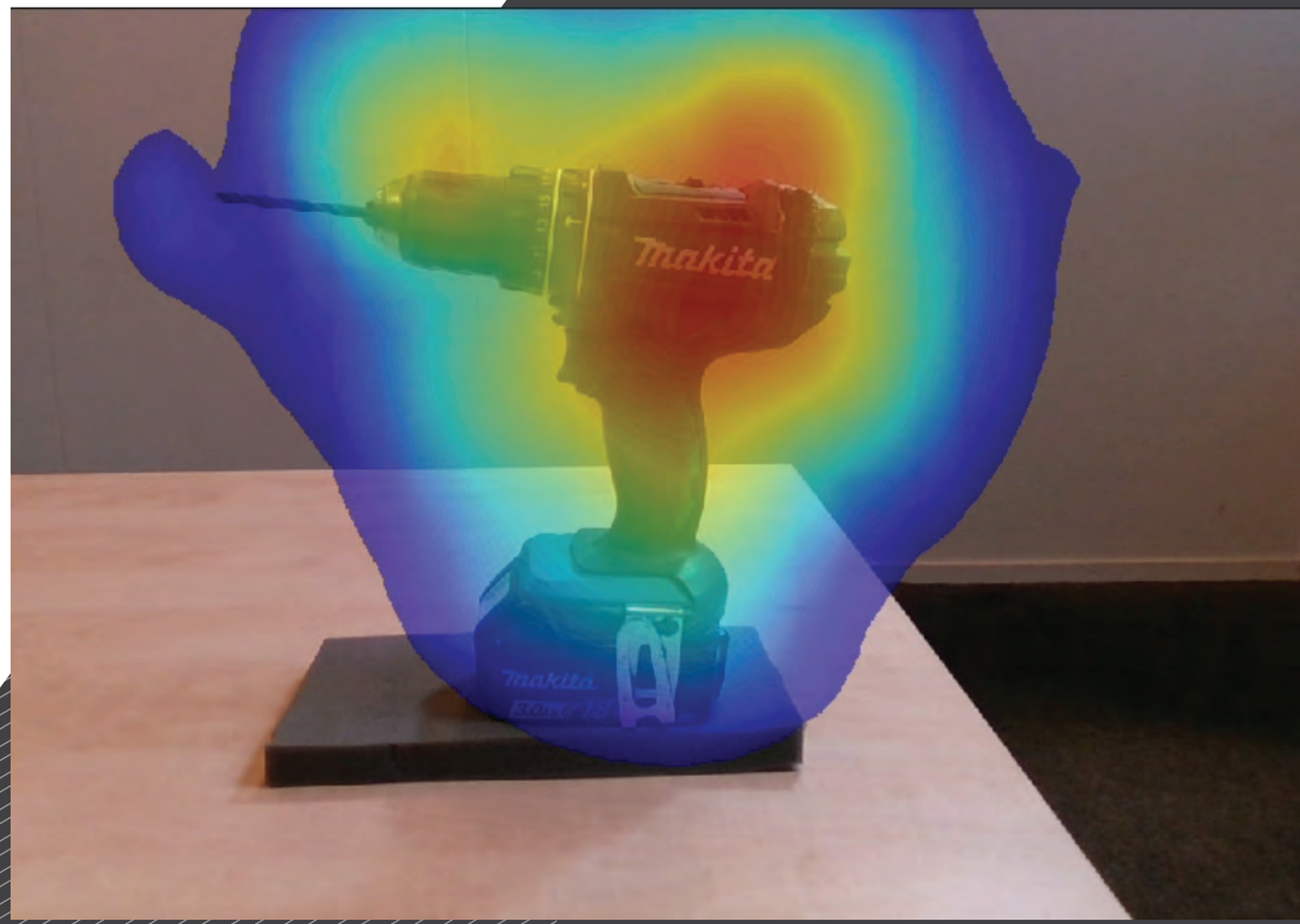
NEAR-FIELD ACOUSTIC CAMERA AT A GLANCE

The Near-Field Acoustic Camera (NFAC) is a versatile solution for visualizing complex and non-stationary sound fields. Instead of relying on far-field beamforming, it measures particle velocity and sound pressure directly in the near field, precisely where traditional acoustic cameras lose accuracy.

This approach makes it possible to localize sound sources even in highly reflective, noisy, or confined environments, and to analyze sound behavior across the full audible range, including very low frequencies down to 20 Hz.

Depending on the measurement task, the system can be configured as a handheld array for flexible field use or as a modular setup with adjustable probe arms for detailed laboratory analysis. This adaptability ensures the right balance between mobility and precision for every acoustic application.

All data is processed through the VELO software platform, which combines intuitive 2D sound mapping with advanced analysis tools. The result is a clear, time-synchronized visualization showing how sound sources evolve over time or with changing conditions such as RPM.



Key features

- Broadband Solution: 20 Hz – 10 kHz
- Localization of transient and non-stationary sound fields
- Near-field measurement principle: independent of array size or far-field assumptions
- 2D sound intensity and particle velocity mapping
- Hand-held or modular array configurations (regular/flexible grid)
- Applicable in reflective and non-anechoic environments
- Ideal for vibro-acoustic troubleshooting and benchmarking
- Automatic synchronization of audio and video data
- Portable and scalable design for lab or field applications

From hand held inspections to full modular arrays.

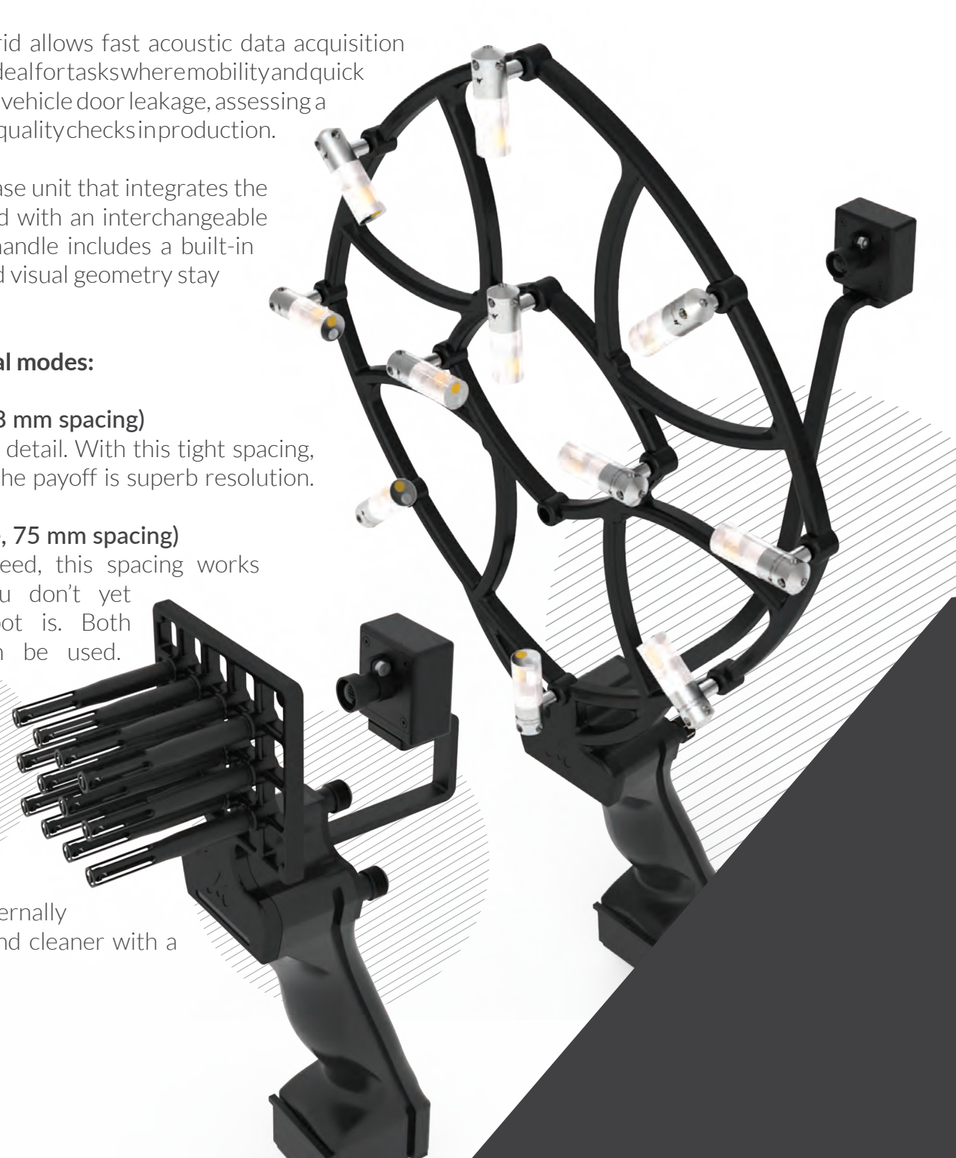
ADAPTABLE BY DESIGN

Noise problems rarely look the same twice. Sometimes the task is a quick on-site inspection of a machine or component; other times, it's a detailed laboratory analysis that requires repeatability and precision. The Near-Field Acoustic Camera adapts to both situations with two complementary configurations built around the same measurement principle: particle velocity sensing.

HAND HELD ARRAY GRIDS

Designed for modularity, the handheld grid allows fast acoustic data acquisition directly near the surface of a test object. It's ideal for tasks where mobility and quick feedback are key such as troubleshooting a vehicle door leakage, assessing a prototype component, or performing quick quality checks in production.

Each handheld system is composed of a base unit that integrates the handle, camera, and electronics, combined with an interchangeable grid that defines the probe layout. The handle includes a built-in mount for the camera, so acoustic data and visual geometry stay perfectly aligned.



Three grid types for different operational modes:

- RECT-1.8 (40 mm x 55 mm aperture, 18 mm spacing)
Use this when you need maximum spatial detail. With this tight spacing, only PU Match probes are practical but the payoff is superb resolution.

- RECT-7.5 (230 mm x 155 mm aperture, 75 mm spacing)
Ideal when you need coverage and speed, this spacing works well for larger surfaces or when you don't yet know where exactly the noise hotspot is. Both PU Mini and PU Match probes can be used.

- BIHEX (250 mm x 250 mm, irregular spacing)
The BIHEX is a grid optimized for near-field acoustic holography (NAH) measurements, compatible with PU mini or PU match probes.

Because the wiring of probes is done internally (to a 50-pin connector), setup is faster and cleaner with a single cable.

FLEXIBLE ARRAY

When a fixed grid is not sufficient, the flexible array steps in. With this configuration, you gain full freedom to position probes around complex geometry, and target specific areas with precision.

Each probe is mounted on an adjustable arm. Each arm can be extended, bent, or repositioned independently so that you can reach around curved surfaces, cavities, or obstructions. To simplify mounting, each arm often ends in a magnetic or modular base that attaches to nearby ferromagnetic or structural surfaces.

The design allows irregular spatial arrangements rather than a rigid planar layout. You are not constrained to a grid shape; you can wrap probes around a shell, reach behind components, or angle them to face parts of interest.

Intuitive & comprehensive

NEXT LEVEL ACOUSTIC TESTING SOFTWARE

Turning raw data into insight is where the Near-Field Acoustic Camera truly stands out. Integrated within the VELO software suite, it offers an intuitive environment for recording, visualizing, and analyzing sound fields in two dimensions. Audio and video streams are synchronized automatically, creating a live connection between the measurement and its visual representation.

Engineers can display sound intensity or particle velocity maps over time, filter by frequency, or highlight transient events. With just a few clicks, the acoustic behavior of a complex system becomes clear and easy to interpret. The software is available in three configurations (Lite, Standard, and Pro) each combining core functionalities adapted to different user needs.

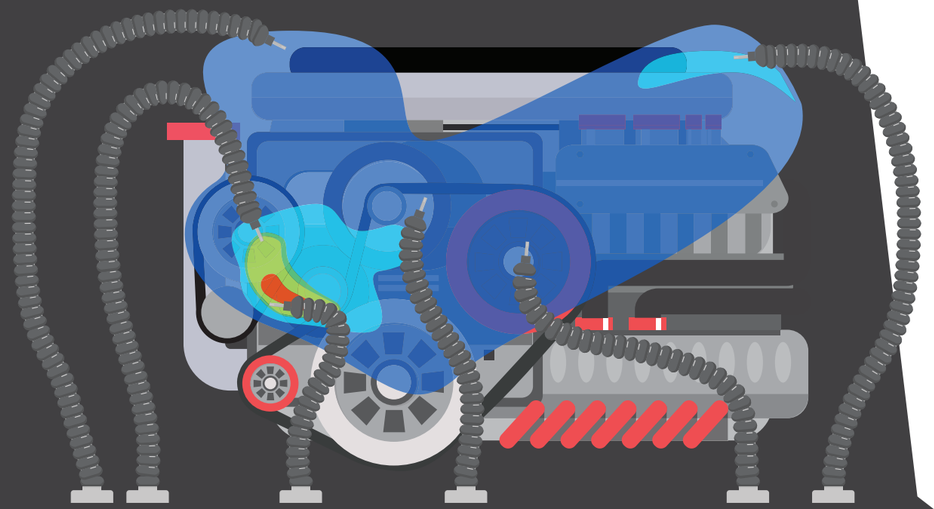
The software is designed for both quick troubleshooting and detailed reporting. Users can freeze a frame, replay a specific moment, or export data to common formats for further processing. When working with non-stationary or low-frequency phenomena, advanced time–frequency tools and playback functions help trace the evolution of noise events in unprecedented detail.

From setup to analysis, the workflow is seamless. VELO automatically recognizes connected hardware, manages calibration, and organizes measurement sessions.

VELO Platform

SOUND MAPPING WITH EXTENSIVE ANALYSIS OPTIONS

What originally started with sensor technology has become one of the world's most unique instruments for acoustic testing. Microflown Technologies integrates different hardware products with a powerful but user-friendly software package.



NEAR-FIELD ACOUSTIC CAMERA SOFTWARE	LITE	STANDARD	PRO
Data recording	✓	✓	✓
Audio-Video synchronization	✓	✓	✓
Sound power estimation	✓	✓	✓
Sound pressure, particle velocity, sound intensity (incl. active and reactive fields)	✓	✓	✓
Troubleshooting tools (section selection, playback, spectra, dynamic range filters,)	✓	✓	✓
Multi-view tools for result analysis and comparison	✓	✓	✓
Video export	✓	✓	✓
Multi-area selection tool (advanced comparison and ranking)		✓	✓
Full export options (incl. *.csv and *.mat)		✓	✓
Near-field acoustic holography		✓	✓
Advanced troubleshooting, section time export, cross-processor		✓	✓
Support for reference sensor processing		✓	✓
Order analysis & tracking			✓
Order-based sound power			✓

List of included items

VERSATILE HARDWARE OPTIONS

NFAC
MeCalc Frontend (no TACHO) DecaQ-3, QS-BNDL-02
MFPA-24B (Flexible Grid) / MFPA-24 (Fixed Grid)
12x PU mini probe array
Choice of one grid (BiHEX, RECT 1.8, or RECT 7.5)
Intel RealSense D455F (D415 camera (LITE))
Cables:
- 5 m LEMO 7pin male to male cable
- 3 m high-speed data USB-B to USB-B cable
- BNC cables
CAMLINK tripod
24x Voltage input
Pelicase inlay
Manfrotto PIXI Mini Tripod Black
32 GB USB stick (Calibration report/manuals/software)

Optional Items & Accessories
Starter Array Pack Array remote handle, camera, and Peli case with inlay
BiHEX Grid Grid including camera mount (optimized for NAH)
RECT 1.8 Grid Grid including camera mount (only for PU match probes)
RECT 7.5 Grid Grid including camera mount
Flexible Array Grid for 12 PU mini probes with magnetic bases and 15 m flexible tubing (excluding Peli case)
Frontend Case MeCalc Peli case for DecaQ-3

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