gfai tech

CADMEN
Taiwan Auto-Design Co. (TADC)
虎門科技股份有限公司

Noise & Vibration

Precisely Measured and Visualized

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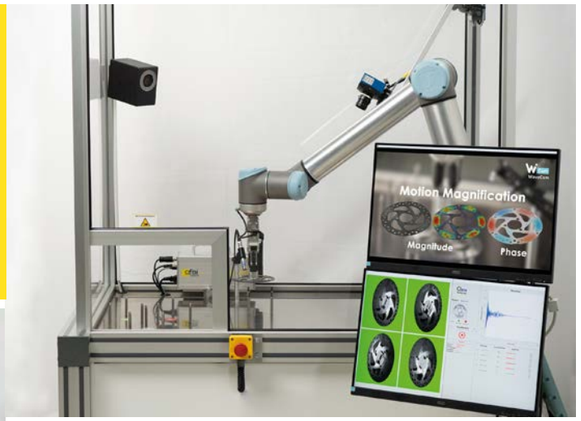
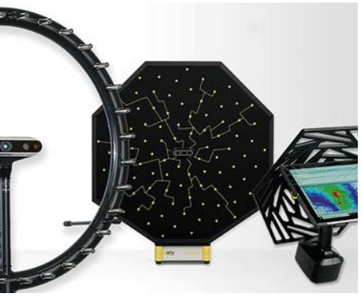
NOISE I VIBRATION I EXCELLENCE

STRUCTURAL DYNAMICS

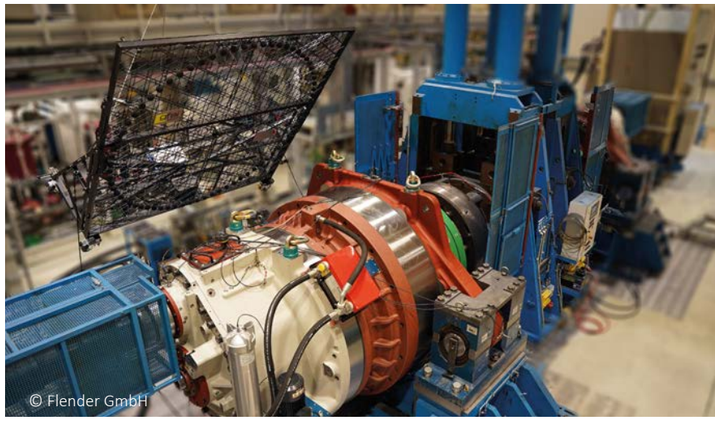


CUSTOM SOLUTIONS



ACOUSTIC CAMERA

QUALITY TESTING



1.

The Power of the Acoustic Camera:
Experience Sound as Never Before

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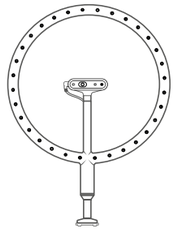
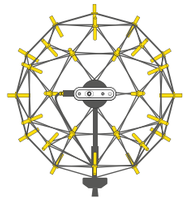
Metrics and Facts behind the Technologies

The name

„ACOUSTIC CAMERA“



was delivered by the curious mind of Dr. Ochel, science editor of Berliner Zeitung. He inquired about the function of this invention during an exhibition in Hannover in 1997. He proposed the name that would go on to represent our innovation – the „Acoustic Camera“.



One key aspect of our Acoustic Camera is precision. The microphones on the array are placed with an astonishing

0.1 mm ACCURACY

allowing the system to localize sound sources as precisely as possible.

Our quality testing system QAIros outpaces human experts in early failure detection by a

12-SECOND MARGIN.

Better not take the risk: Sound surpassing the

65 dB(A)

threshold for extended periods can gradually raise health issues. Sounds higher than 120 decibels can cause instantaneous hearing loss. Our Acoustic Camera arrays with analog microphones can withstand 130 decibels.

Our

WaveHit^{MAX}

is flexible – whether attached to a tripod, a table top, or even carried in hand – it delivers a 360-degree strike capability.

The Acoustic Camera has already been used in the jungle to locate and observe

NOCTURNAL FROGS

The cold-blooded frogs cannot be distinguished from their surroundings with the infrared cameras that are otherwise used.

With the remarkable capability to generate a breathtaking

192,000
IMAGES PER SECOND

the Acoustic Camera opens up a realm of slow-motion analyses. Thus, phenomena such as the trajectory of a rifle bullet in flight can be acoustically tracked.

The speed of sound has a secret: It tends to quicken its pace as the temperature rises. Generally,

WIND DIRECTION,
TEMPERATURE
HUMIDITY

and air pressure influence the propagation of sound.

While our remarkable ears can catch frequencies spanning the vast range of

20 – 20,000 Hz,

our Acoustic Camera exceeds this by a range of 10 – 96,000 Hz.

A Journey into Noise and Vibrations in Our Daily Lives

Have you ever wondered where that elusive hum in your car engines comes from? Or if the bridge you are crossing is moving, even though you can’t see it? Sound and vibrations surround us in various forms in our daily lives. What if we could capture, understand and visualize both like never before? Our technology takes you on a journey beyond what you can hear and see — a journey into the hidden dimensions of sound and vibrations.

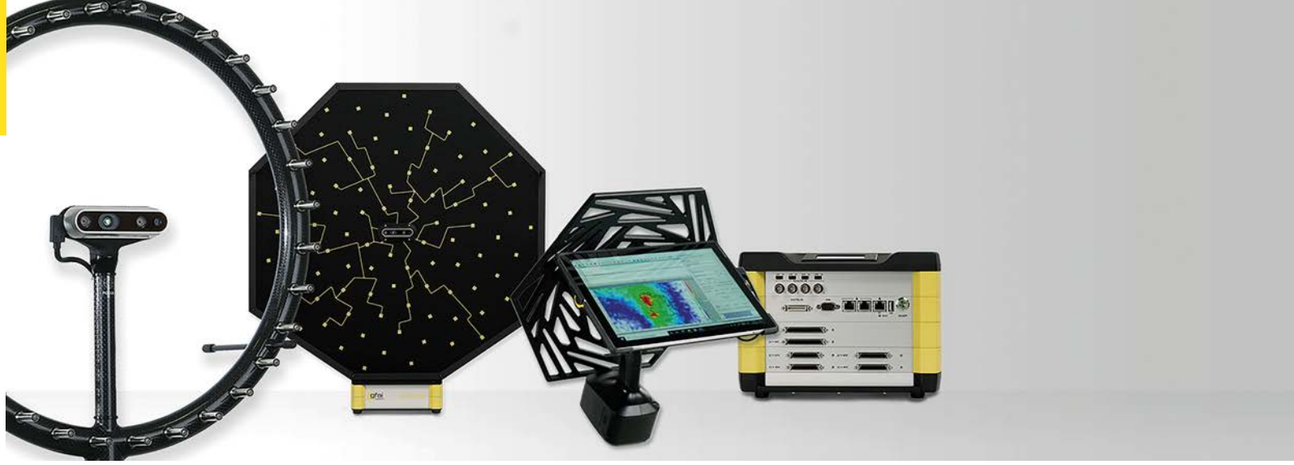
Our acoustical and structural dynamics solutions provide you with data-driven insights that can be applied to various fields, ranging from automotive engineering and aviation to architecture as well as environmental noise monitoring in urban areas, near highways or on construction sites. Beyond industries, our technology becomes an essential ally in perfecting the sound design of various products. From household appliances to electronic devices and machinery, our solutions ensure that each product meets acoustic standards and requirements.

We go one step further in the field of vibrations. Our powerful analysis tools offer a comprehensive assessment of the condition of machines and systems. By analyzing vibration data, you are able to detect early signs of wear, misalignment and imbalance. This allows you to prevent breakdowns and optimize the performance and longevity of your systems.

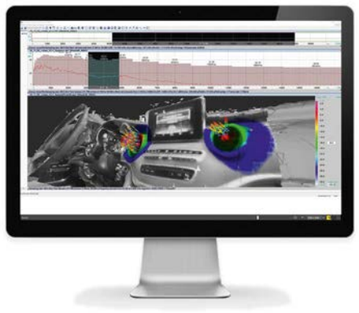
Join us on revealing the unseen world of sound and vibrations within minutes, and discover the endless possibilities our technologies can unveil. Together, we can create positive environments that enhance our well-being and overall quality of life, ensuring the reliability, safety and efficiency of machinery, structures as well as products across a wide range of industries touching our daily lives.

The Power of the Acoustic Camera: Experience Sound as Never Before

The Acoustic Camera is a breakthrough technology that goes beyond the boundaries of audio recording: It not only captures sound but also visualizes it. Sound becomes visible in colour maps similar to thermographic images. These acoustic images or videos offer a detailed view of the acoustic landscape, allowing you to pinpoint the origin of sounds, identify the sources and even see how the sound interacts with the environment. The capabilities of the Acoustic Camera cover a range of measurements from small objects like PCB boards to environmental measurements of vast industrial complexes.



Components of the Acoustic Camera System AC Pro



Capturing Sound: The Role of Microphone Arrays

A core element of acoustic imaging is the array of precisely calibrated microphones recording sound below the threshold of human hearing up to the level of jet engines. The microphone distribution is highly optimized to guarantee the highest precision in dynamic and resolution. All the microphone channels are fully synchronized to record the slightest time invariance for mapping of transient noise or fast-moving objects.

Recording with Precision: Multifunctional Devices for Data Acquisition

Quality of data defines the quality of your results, so we provide data acquisition at highest standards. Analog channel counts of up to 1,000, recorded with highest sampling rates at perfect synchronization guarantee precision and data quality. With our system, you won't miss any transient noise and can analyze up to ultrasound in complex measurement tasks. Our data recorders are designed and produced to seamlessly work within our Acoustic Camera systems. Thus you can benefit from their high data transfer rates and maximum speed.

Visualizing Complexity: Acoustic Analysis Software NoiseImage

NoiseImage – The recording and post-processing software of the Acoustic Camera allows you to easily handle complex data of sound, video and other physical parameters. With a few clicks, the sound is visualized in 2D or 3D and exported into various file formats. Any type of spectral analysis can be performed, sound sources can be erased or used for correlating the data and order analysis can be conducted. Moreover, there are several special modules for different applications which are constantly optimized and extended.

Variations of the Acoustic Camera

In the world of sound exploration, gfai tech offers the greatest variety of expertise and equipment to unlock the full potential of the Acoustic Camera. Our system takes on different forms, presenting varying numbers of microphones and different array sizes for any area of application. Those who require flexibility and mobility, our portable Acoustic Camera is the answer. If extended studies and large-scale noise control efforts are planned, our fixed installations come into play.

Find more about our AC Pro system

All-in-One Solutions

Our two all-in-one Acoustic Cameras are complete solutions that integrate an advanced microphone array with a high-performance data recorder.

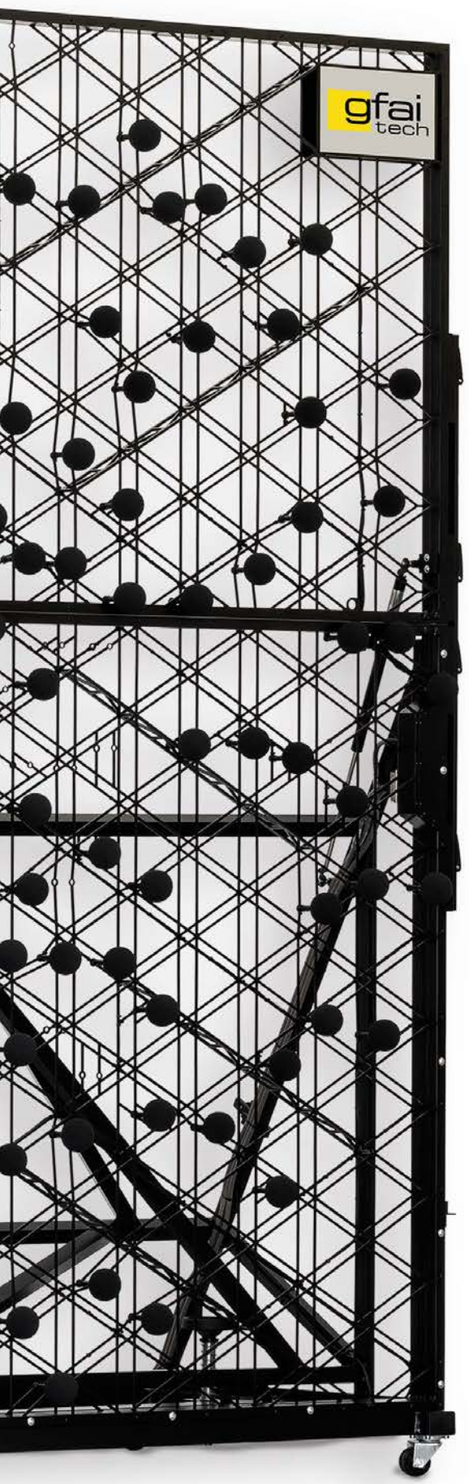
All of our systems are used with our software NoiseImage to offer a solution for precise sound source localization and in-depth acoustic analysis. With user-friendly features and advanced capabilities, NoiseImage simplifies the process of capturing, recording, and visualizing sound.

BENEFITS

- High precision sound source localization
- Cost-effective and time-saving measurements
- Detection of low frequencies up to ultrasound
- 2D and 3D acoustic spectral photos and movies
- Complete workflow: measurement, analysis and reporting
- Usable for beginners and experts

APPLICATIONS

- Automotive and aeroacoustic testing
- Industrial maintenance and leakage detection
- Acoustic imaging on buildings and structures
- Quality control and product design
- Research & development and bioacoustics
- Troubleshooting for transient noise



Evo AC Pro

Unlocking a New World of Sound with 2D Microphone Arrays

Experience sound in a whole new dimension with our 2D microphone arrays. With the ability to capture sound along the horizontal and vertical axes, they open up a world to capture sound in two-dimensional acoustic images or videos. An optimized microphone distribution enables the precise localization of sound sources. Paired with our software NoiseImage, captured sound emissions can be analyzed.

Whether you require a compact and light array with 32 microphones for confined spaces or an extensive configuration featuring up to 192 microphones, our arrays can be chosen according to requested applications. Our array Evo AC Pro, for example, is specifically designed to localize effects generated by aeroacoustic phenomena, which makes it ideal for wind tunnel testing applications.

Ring72 AC Pro

Ring32 AC Pro

Star48 AC Pro

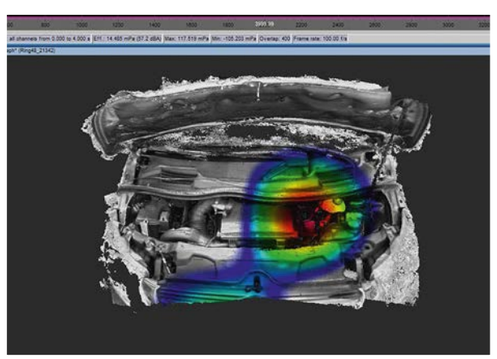
Integrated Beamforming and Near Field Holography Cameras

While beamforming shines in far-field scenarios, near field acoustic holography is primarily used for pinpointing sound sources on or near surfaces. Our beamforming and near- field cameras combine both systems into a single one. This offers flexibility, seamlessly transitioning between far field and near field measurements, allowing diverse acoustic scenarios.

Fibonacci AC Pro

Soundcam Mikado

Soundcam Octagon



Selected Applications of 2D Acoustic Measurement

2D Acoustic Cameras are commonly used in situations where the exact source of the noise remains uncertain. With just a single measurement, these cameras accurately determine the noise's true origin within minutes. This makes them valuable for noise control, product development, environmental studies and research.

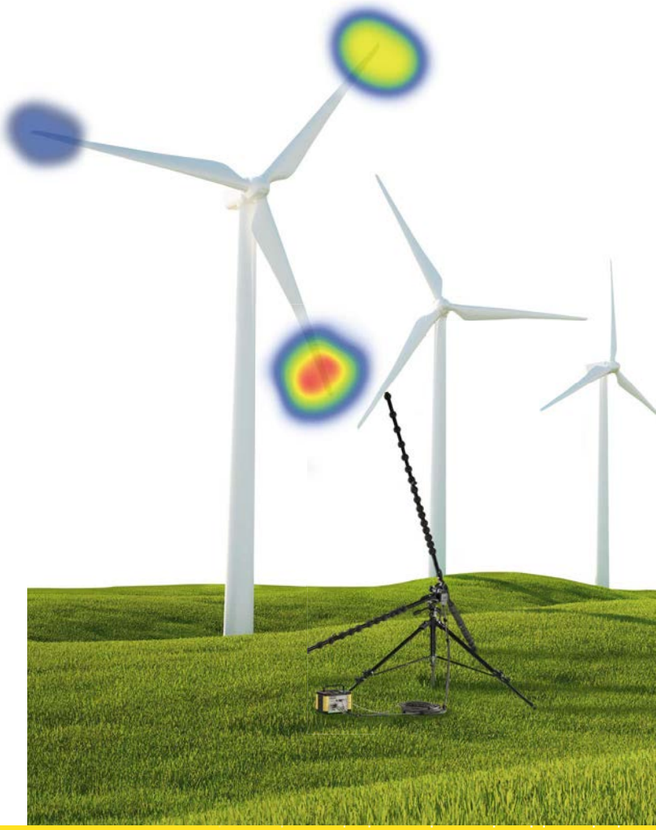
Find more about our microphone arrays for 2D measurement

Our ring array with 48 microphones is the most popular and universal microphone array in our portfolio. In vehicle development, our Ring48 AC Pro array enables the precise acoustic observation of ignition, intake, and exhaust noises emanating from individual cylinders. Teamed with NoiseImage, our ring array unravels noise pathways, isolates active sources and identifies reflections. This facilitates easy identification of potential issues through side-by-side acoustic image comparison.

Designed for outdoor measurements, our Star48 AC Pro enables acoustic sensing from up to several hundred meters distance in the open field. It precisely localizes acoustic anomalies of wind turbines during operation, indicating variations in performance or mechanical issues at different wind speeds.

Whether detecting defective rotor blades or issues in tower joints, the Star array is a crucial tool for engineers to maintain optimal functionality. Furthermore, the sound level analysis helps with the approval or construction of plants and can strengthen acceptance among citizens in the immediate vicinity.

Choosing the right Acoustic Camera is essential for achieving optimal outcomes. Our team of experts gladly assists you in identifying the perfect array for your specific application.



Sphere120 AC Pro

Unlocking Sound in Three Dimensions

Imagine the ability to capture sound from all directions, unveiling its origin without prior knowledge of its location, and then visualizing its journey.

Our Acoustic Cameras for three-dimensional measurement are precisely designed to do just that: capture sound sources from all angles — front, back, up, and down and everything in between. These arrays, configured in a spherical shape, have microphones distributed evenly across their surface.

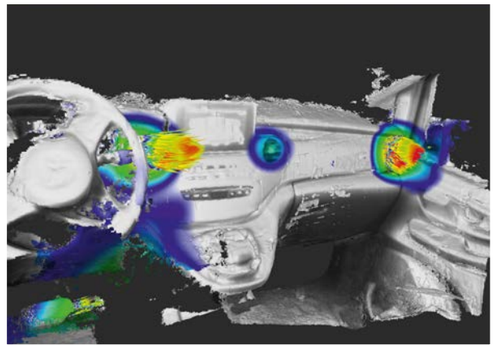
The different positions and heights serve as the key to not only determine the horizontal and vertical direction but also provide depth information about sound sources. The combination of several microphones captures sound sources with remarkable accuracy, much like your eyes perceive depth in the world around you.

Enter a complete new dimension of sound analysis with our spherical Acoustic Camera systems and use our unique features to fully understand sound propagation of complex scenarios.

Furthermore, with DynaBeam we offer a technology to perform a 3D scan while recording sound. This will not only provide 3D models and improved 3D acoustic mapping, but also allows for indicating the directivity of the sound sources with animated arrows.

Sphere80 AC Pro

Sphere48 AC Pro



Selected Applications of 3D Acoustic Measurement

Spherical arrays play a vital role in sound field analysis, enabling a thorough understanding of how sound interacts with the environment. They find significant use in applications where capturing or analyzing sound from all directions simultaneously is essential, eliminating the need of being repositioned or rotated for data collection.

Find more about our microphone arrays for 3D measurement

In the fast-paced world of automotive engineering, every decibel, every vibration, and every intricate detail matters. Our small sphere array fits perfectly into the cabin, capturing sound sources from various corners of the vehicle. The 3D acoustic image enables engineers to identify and fine-tune the distinctive characteristics that shape your automotive experience.

In architectural acoustics, our sphere arrays can assess the acoustic properties of complex spaces like auditoriums and concert halls, where sound sources and reflections occur in three dimensions. They can provide support in finding the best environmental noise shape and internal volume as well as suitable type, quantity and positioning of the absorbent materials on the walls and ceilings, even when complex geometries are involved.

In aerospace, these cameras are used to study aircraft noise and understand how sound propagates inside. This leads to innovative solutions like acoustic curtains, sound-absorbent ceiling panels, or revamped air conditioning systems, all of which collectively contribute to a significant reduction of aircraft noise pollution and increase of passenger comfort.

Precision Meets Portability: Our All-in-One Soundcam Mikado

Whether it's the tight corners of industrial machinery or the expansive open spaces of outdoor appliances: The portable all-in-one Acoustic Camera Mikado is designed to deliver fast sound localization anytime and anywhere. The wireless design allows you to measure in different positions and angles. 96 MEMS microphones, arranged in a spiral configuration for best acoustic performance, can localize a wide range of frequencies: From 800 Hertz up to above 20,000 Hertz which is above the upper limit of human hearing.

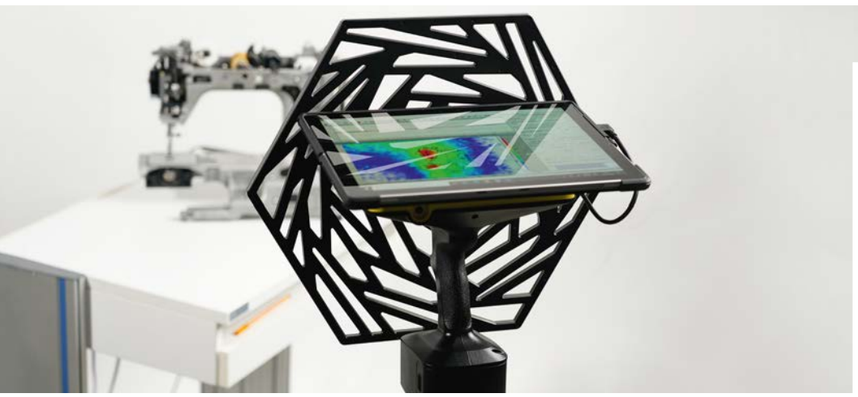
For example, household essentials have become integral parts of our daily lives, where both form and function matters. In order to achieve the best product, the role of sound quality as well as noise standards and limits gain more and more importance. Mikado is an Acoustic Camera which can investigate the sound layers of various everyday products like coffee machines, vacuum cleaners or sewing machines to make them sound as pleasant and quiet as possible.

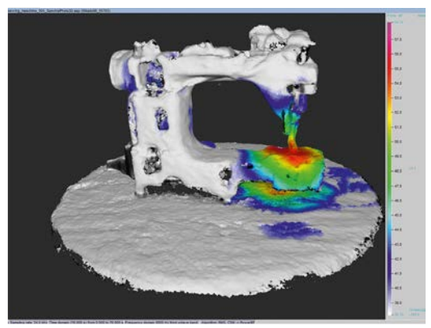
Mikado easily captures each source of noise, empowering manufacturers to pinpoint, identify, and analyze the loudest sources and possible faults. This comprehension of sound emissions lays the foundation for enhancing the sound design of devices and plants by incorporating advanced features such as silent technologies, insulated motors and innovative noise reduction solutions. Mikado plays a crucial role in achieving the optimal balance between operational efficiency and user comfort.

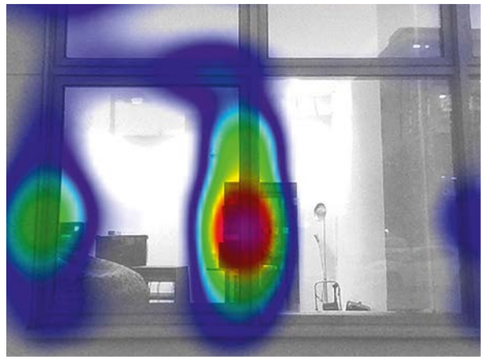
Find more about our soundcam Mikado

APPLICATIONS

- Troubleshooting noise and vibration problems
- Quality management of products and components
- Leakage detection
- Research & development
- Close-up measurements in aerospace, automotive, electronics and appliances, education and research







Eight Sides of Accuracy: Our All-in-One Soundcam Octagon

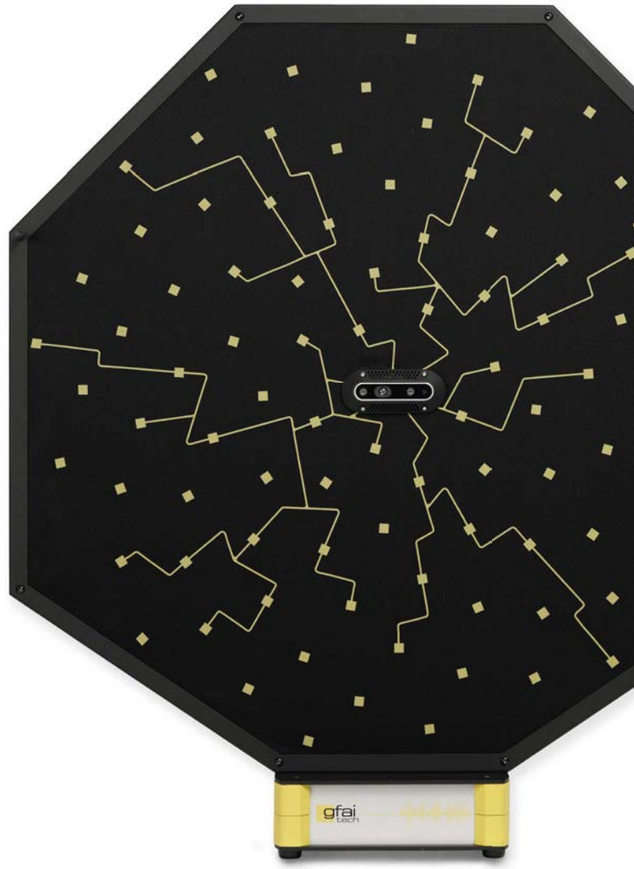
The Octagon is the ideal Acoustic Camera for complex measurements. 192 innovative MEMS microphones detect acoustic emissions in the audible and lower ultrasonic range of 30 to 24,000 Hertz. With an acoustically transparent array design inspired by the Fibonacci spiral, the Octagon effectively mitigates sound reflections, prevents sound pressure doubling at surfaces and minimizes resonance effects between objects and the array.

Find more about our soundcam Octagon

The integrated data acquisition makes it a handy system with no set-up time. The high microphone density makes the Octagon an excellent system for both beamforming and acoustic holography measurements. Air leakages in buildings and pipelines can effortlessly be detected and faults on rotating objects can easily be found. Locate thermal bridges and leaks at windows and doors in the masonry in order to define measures for energy optimization. Thanks to the Power Beamforming method of our software NoiseImage, the measurement results are extremely accurate. The all-in-one soundcam can be used in a wide range of applications in research and development, quality assurance, predictive maintenance or environmental acoustics.

APPLICATIONS

- Detailed analysis of products and components
- Detection of masked sources
- Leakage detection for buildings and pipes
- Correlating measurements for rotating components
- Measurements in research and development, quality assurance, maintenance or environmental acoustics



Vibration Testing – Structural Dynamics Solutions

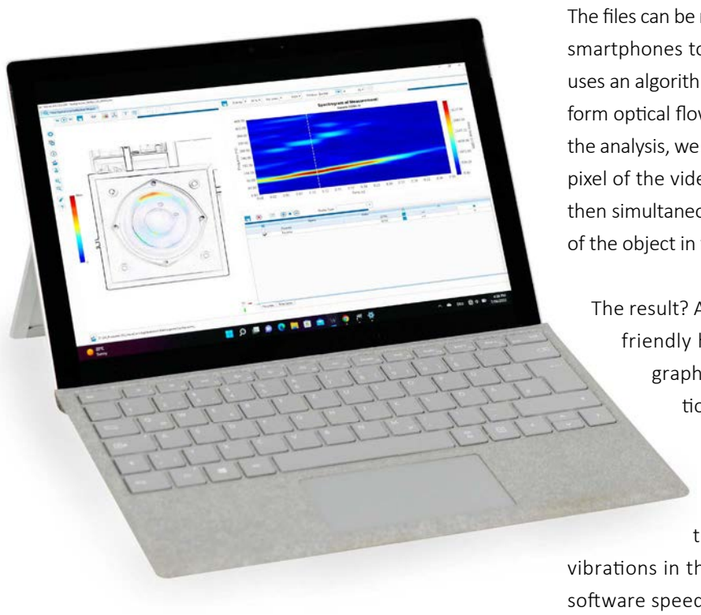
Mechanical vibrations can be observed in nature and our everyday experiences. Cars, motorcycles, and other vehicles generate vibrations as their engines and moving parts operate, whereas vibrations in buildings and bridges occur due to factors like wind, traffic, or seismic activity. gfai tech provides comprehensive solutions for vibration testing in the field of structural dynamics.

These solutions assess the dynamic behaviour of structures under various conditions. By conducting vibration testing, engineers can analyze and evaluate the structural integrity, performance, and response of components and systems to vibrations and dynamic forces. The results aid in optimizing design, identifying potential issues and ensure the overall reliability and durability of structures.

Find more about our structural dynamics solutions

Introducing WaveCam: Unleashing the Power of Motion Magnification

Dive into a world where the invisible becomes visible: Our WaveCam Vibration Analysis Software employs motion magnification based on simple video data to reveal vibrations that are too small or too subtle to see or feel. The hidden vibrations are converted into visible movements – with clear results and simple interpretation options.



The vibration analysis is performed from recorded video data. The files can be recorded on a multitude of devices ranging from smartphones to professional high-speed cameras. WaveCam uses an algorithm, powered by artificial intelligence (AI), to perform optical flow calculations for image processing. To execute the analysis, we use the pixel-as-sensor technology. Every single pixel of the video data acts as an individual sensor. WaveCam then simultaneously tracks hundreds of thousands of positions of the object in the video over a specified time.

The result? A two-dimensional animation that offers user-friendly heat maps and frequency vs. log magnitude graphs, all of them amplifying and visualizing vibrations that were hidden from your view before.

WaveCam revolutionizes the entire process without any direct physical contact with the measurement object to amplify vibrations in the dynamics of structures and surfaces. Our software speeds up the measurement process while increasing overall accuracy. Complex measurement setups with a large number of vibration sensors and cables, as well as costly measurement techniques are a thing of the past.

The Impact of WaveCam Technology

Find more about our software WaveCam

WaveCam plays a crucial role in facilitating damage detection by helping to identify the root causes of vibrations. It not only enhances safety measures but also serves to prolong the life cycle of critical structures of architecture and bridges, machines and other components.

The use of WaveCam extends to tracking mechanical vibrations in various scenarios. In the realm of occupational safety, it reveals shocks and impacts affecting individuals, allowing for the specific minimization of daily stresses on workers and the optimization of tools for future use.

In the context of a car engine, WaveCam amplifies subtle changes in vibration patterns under the hood that may indicate issues such as misalignments, imbalances or wear in critical parts. The analysis process, from measurement to results, is swift and takes only a few minutes.

Moreover, no specialized expertise is required for the analysis. WaveCam application in automotive settings ensures proactive measures, enhancing safety, reducing downtime and ultimately contributing to the longevity and reliability of car engines.

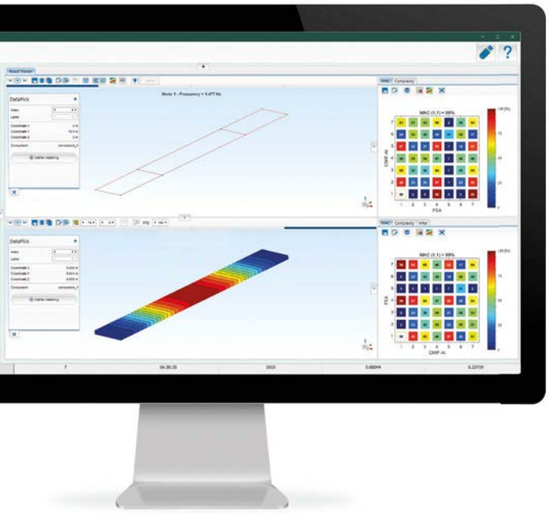
WaveCam is also ideal for quality control of consumer goods such as loudspeakers. Analysis tests can be used to ensure that loudspeakers offer optimal acoustic performance. They ensure that the desired frequency range is reproduced precisely and accurately without unwanted resonances or distortions. It is possible to animate the currently selected result frequency.

BENEFITS

- Easy workflow, short time-to-result
- Excellent to get a quick overview of the structural behaviour
- Whole part testing
- Simple set-up and automation
- Cost-saving analysis
- No expert knowledge required
- Artificial intelligence (AI) algorithms to amplify motion

APPLICATIONS

- Automotive sector
- Quality assurance
- Architecture and construction
- Predictive maintanance
- Mechanical engineering, R&D



Create a Digital Twin with our Add-on Simulation Software WaveSim

Are you ready to experiment with new designs, to fine-tune structures and observe their responses to various loads — all before it takes physical form? Thanks to the optimal addition to the vibration measurement software WaveCam, products or services across diverse physical conditions can be predicted fast and easily with our simulation software WaveSim. In combination, they unfold their full potential, enhancing the modal parameters of the finite element model and allowing a Finite Element Analysis (FEA).

With FEA, components of your object are dissected into finite elements, paving the way for a vivid representation of simulations through color scales. FEA visualizes pressure distributions across objects in an animation, calculating natural frequency, mode shape and damping of the structure. Our four different analysis methods provide insight into how structures interact with different static stress and strain as well as the response under external loads.

This powerful tool assists in development processes and prototyping to identify operation-critical or troublesome resonant frequencies. With FEA it is possible to optimize components in the design phase, to minimize the requirement for multiple physical prototypes and to save valuable resources. You can enhance your simulation with real-world data using WaveCam measurements through FE model updating. It is especially useful for safety compliance in automotive engineering, where clear understanding of the cause-and-effect relationships between specific vibration excitations on brake discs is necessary. This nuanced understanding allows for more precise adjustments and refinements.

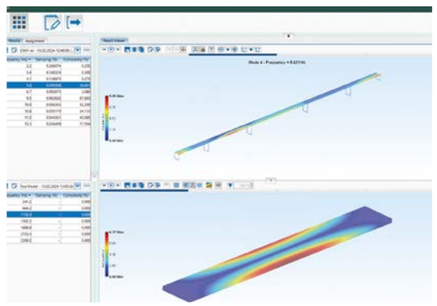
BENEFITS

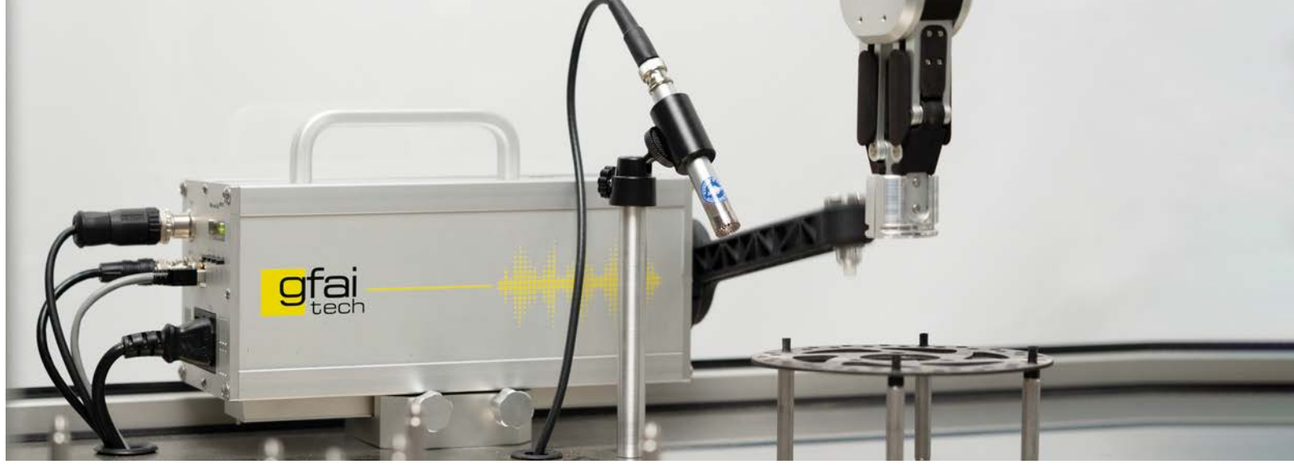
- Simplified geometry alignment between camera image and model
- Automatic mesh generation from STL and OBJ files
- Parameter library for most common materials
- Flexible selected boundary conditions and loads
- Diverse function types selectable

APPLICATIONS

- Prototyping
- Simulation of new designs and external loads
- Static, modal and transient analysis
- Research & development
- Validation and preparation of WaveCam measurements

Find more about our software WaveSim





The World‘s First Sensor Controlled Impulse Hammer: WaveHit^{MAX}

Find more about our WaveHit^{MAX}

Step into the future of structural dynamics using our revolutionary impact hammer with sensor-actuator control loop. The sensor signal adapts the motor control optimal to the real environment without any prior knowledge. A single hit on the test object reveals detailed insight into broadband vibration behavior and acoustic properties. This means a leap forward in usability, automation and precision – a unique feature that sets WaveHit^{MAX} apart from the rest of classical automated modal hammers.

Customize your impact features by regulating the frequency range based on impact weight, material and force using the included WaveHit^{MAX} software. Tailor hits to your needs, whether it‘s only one hit or continuous hits, a second or half a minute in between – all without the risk of any double hits.

WaveHit^{MAX} handles all presettings, including zero point calibration and impact force search, automatically for you. However, you can operate it manually via a control menu or by the included software. This adaptability ensures that WaveHit^{MAX} fits seamlessly into your workflow, offering a user-friendly interface for both experienced technicians and newcomers to structural testing. It‘s the ideal choice for structural investigation, particularly in serial testing or scenarios requiring repeated excitation.

In quality assurance, WaveHit^{MAX} can be used to quickly inspect, e.g., metal parts like brake discs for cracks or defects. Furthermore, it plays a crucial role in testing during the manufacturing process of sintered structural components for engines, transmissions, or clutches. This ensures the highest quality and reliability in your production.

BENEFITS

- Possibility of manual zero-point setting for low-weight test objects
- Reproducible single hit excitation
- Internal sensor evaluation and process control
- Automatic impact force search and adjustment
- Positional changes anticipated

APPLICATIONS

- Experimental modal analysis
- Acoustic resonance testing
- Condition monitoring
- Material testing
- Frequency response function testing

Quality Testing and Pattern Recognition

gfai tech offers cutting-edge solutions for quality testing and pattern recognition and enables customers to enhance product quality, efficiency, and performance. Pattern recognition involves the classification of data using previously acquired knowledge or statistical information extracted from patterns.

By employing advanced algorithms, these repetitions or regularities can be effectively identified. Resonant testing operates by analyzing the natural whole-body resonance of parts, test parts or components. It is a whole-part test, so measurements taken in one place can indicate defects anywhere.

Find more about quality testing and pattern recognition

Our AI-Powered Defect Detection System QAIros

Constantly growing demands on industrial production require preventive strategies for zero-defect concepts in production. Our AI-powered testing system QAIros is used for quality assurance and end-of-line control. Within seconds, it can test, evaluate and document a workpiece. Defects can be easily detected in no time.

Each physical object possesses unique natural frequencies, which depend on geometry and material structure. Together, they form a characteristic acoustic fingerprint. These acoustic fingerprints are used to identify the quality of the test object. Our QAIros software captures these fingerprints and employs them to train an AI model. The resulting data is stored in databases for future reference and analyses.

Any alterations in the workpiece, whether defects or changes in assembly, are reflected as shifts in resonant frequencies. QAIros skillfully detects these subtle variations and reliably classifies them.

Once sound is recorded by a microphone and fed into the software, QAIros automatically categorizes the test objects as either meeting stringent quality standards or as faulty components.

To conduct measurements, certain components are essential. These include an excitation source, such as our automatic modal hammer WaveHit^{MAX} or a striker, which initiates the vibration process. A simple microphone serves as the sound recording device to capture relevant data.

Application Examples of QAIros

Production lines where a hundred percent inspection ensures thorough examination of each manufactured product for defects or flaws are of especial siginificance. QAIros permeates industries where reliability is paramount, from automotive manufacturing to aerospace engineering. Each flaw detected by QAIros represents a potential hazard averted.

QAIros offers the necessary flexibility to be integrated seamlessly into the production process while guaranteeing the highest quality standards. Our innovative quality assurance system is developed for testing scenarios involving the integration of new components or modifications to existing products. Particularly in complex manufacturing processes, QAIros can detect deviations in material, geometry, or assembly, and reacts to them precisely.

QAIros plays a crucial role in ensuring quality and integrity in critical production areas of many industries. By detecting defects in critical parts like break discs, turbine blades, avionics systems, or structural components, it helps manufacturers maintain the highest standards of safety and performance in their products.

Our AI-powered quality assurance software can be used for rapid inspection of batches, such as sanitary installations. Sanitary ceramics, in particular, are relatively delicate. While material defects are typically detected during the firing process, the occurrence of stress fractures, which can cause the material to rupture without external force still can occur. QAIros easily detects faulty components.

BENEFITS

- Whole part testing
- 100 % testing
- Non-destructive testing (NDT)
- Cycle times less than 1 s for each object
- Integration into existing infrastructure with current hardware
- Up to 100 % conformity with AI approach
- No expert knowledge required

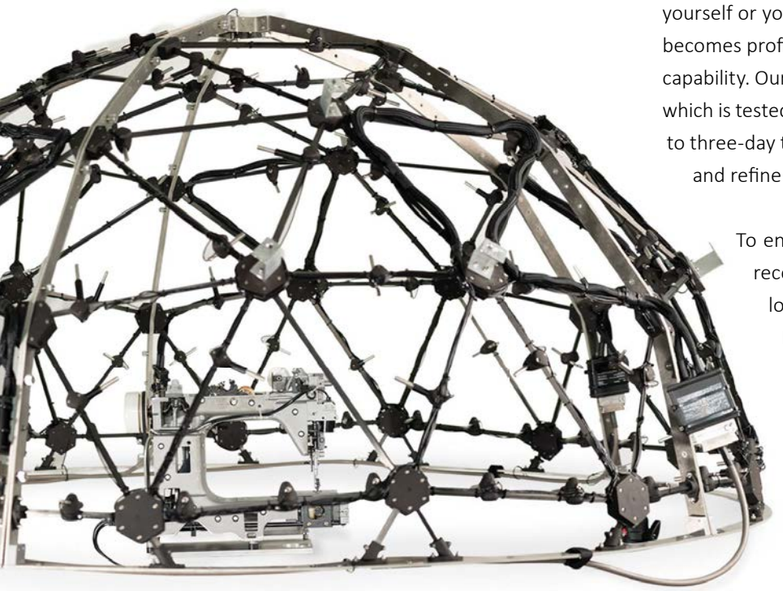
APPLICATIONS

- Automotive industry
- Household technology
- Industrial technology
- Mechanical engineering and aerospace
- Medical technology

Our Engineering Support for Your Individual Solution

Whether you are seeking specialized test benches like aeroacoustic wind tunnels or addressing unique applications with exceptionally high sound-pressure levels, our customized hardware and software solutions are designed to meet your exact specifications.

We understand that each project is unique. That‘s why we offer thorough support at every step of the process. From helping you choose the most suitable measurement approach to planning and executing measurements that cover acoustic imaging, vibration or quality testing, and pattern recognition, we guide you through it all. We provide you with comprehensive assessments, in-depth analyses, and detailed technical reports that not only identify challenges but also provide concrete recommendations for mitigation.



We want to enable you to use the full potential of our solutions. To achieve this, consider booking on-site training for yourself or your staff. Our experts will ensure that your team becomes proficient in utilizing our systems to their maximum capability. Our on-site seminars impart up-to-date knowledge which is tested in practical applications. Choose from one-day to three-day training sessions to deepen your understanding and refine your skills.

To ensure the quality standard in the long run, we recommend to calibrate the measurement technology regularly in well-equipped test laboratories. In the case of any damage to our measurement equipment, our expert team can promptly diagnose issues and efficiently replace any defective parts, thus minimizing downtime. This ensures that your equipment consistently delivers accurate and reliable results over the long term.

You are not sure whether one of our sound and vibration solutions is suitable for your application? We offer you to rent our measurement equipment. This enables your engineers to familiarize with the devices in practice and evaluate the results which is a flexible and cost-effective option before you decide to purchase. Partner with us and benefit from our expertise in the areas of hardware and software development, algorithms, root cause analysis, beamforming and modal analysis, immission control and machine dynamics.

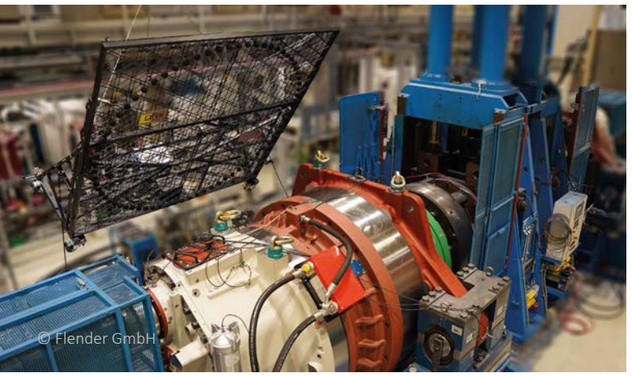
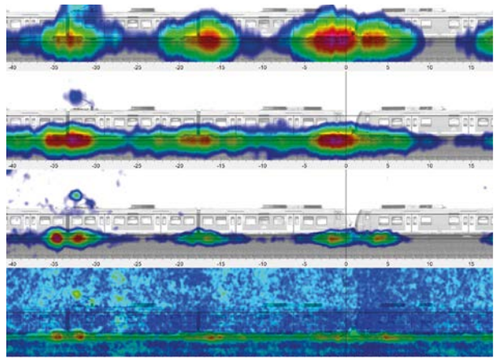


Fig. 1: Acoustic Camera Evo AC Pro localizing sound emissions of a rotating gearbox for a wind turbine from Flender GmbH



Your Testing Experience with Customized Solutions

At gfai tech, we understand the critical nature of testing in various industries. Our NoiseImage modules are meticulously designed to meet your unique testing requirements, providing solutions that set new standards in precision and efficiency.

Find more about our engineering services

Pass-by Measurements

Optimize pass-by measurements effortlessly with our PassBy module, which is perfect for long vehicles in motion such as trucks or trains. Our Acoustic Camera captures both acoustic and optical data simultaneously. It generates a panoramic image of the entire object, even of trains spanning several hundred meters. A robust algorithm calculates vehicle speed and eliminates frequency shifts.

Order Analysis

Analyzing rotating machines is a very complex task. Our Order Analysis module opens up new dimensions in the field of motor diagnostics. It is characterized by its unique ability to detect different sound emissions of certain parts in an assembly, especially at changing speeds. Furthermore, additional sensors such as acceleration sensors can be recorded simultaneously, which enables detailed testing and troubleshooting of resonance effects.

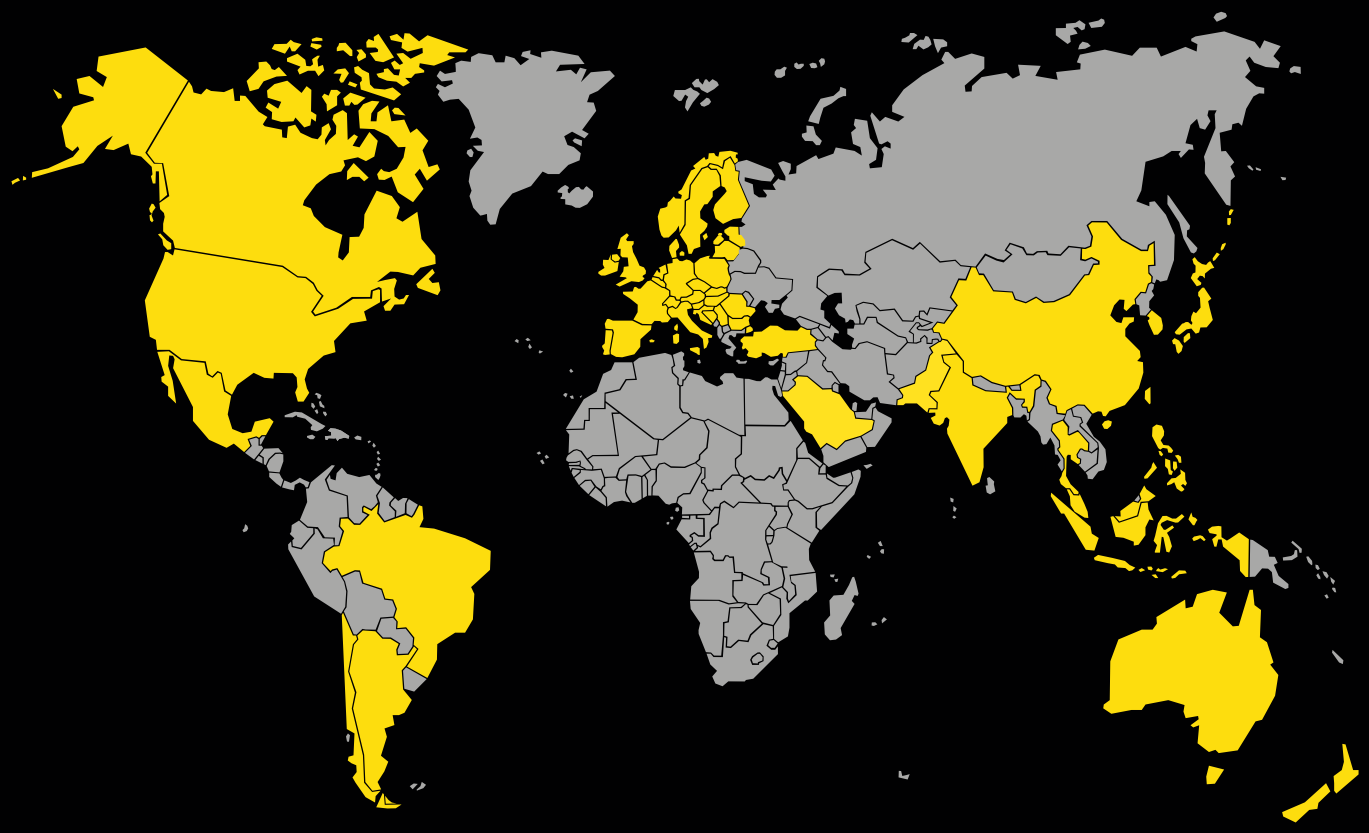
Wind Tunnel Application

Customized array design, high channel counts and a number of optimized algorithms in our wind tunnel NoiseImage module guarantee the best possible results for acoustic imaging in wind tunnels. We ensure the quickest data transmission and processing, prioritizing time efficiency without compromising on accuracy.

WE OFFER YOU:

- Customized software solutions
- Customized hardware solutions
- Rental of equipment
- Calibration & maintanance

Fig. 2: Customized FlexStar array capturing acoustic emissions of a moving passenger train (top image)
Fig. 3: A newly designed acoustic array for advanced aerodynamics analyses of automobiles



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