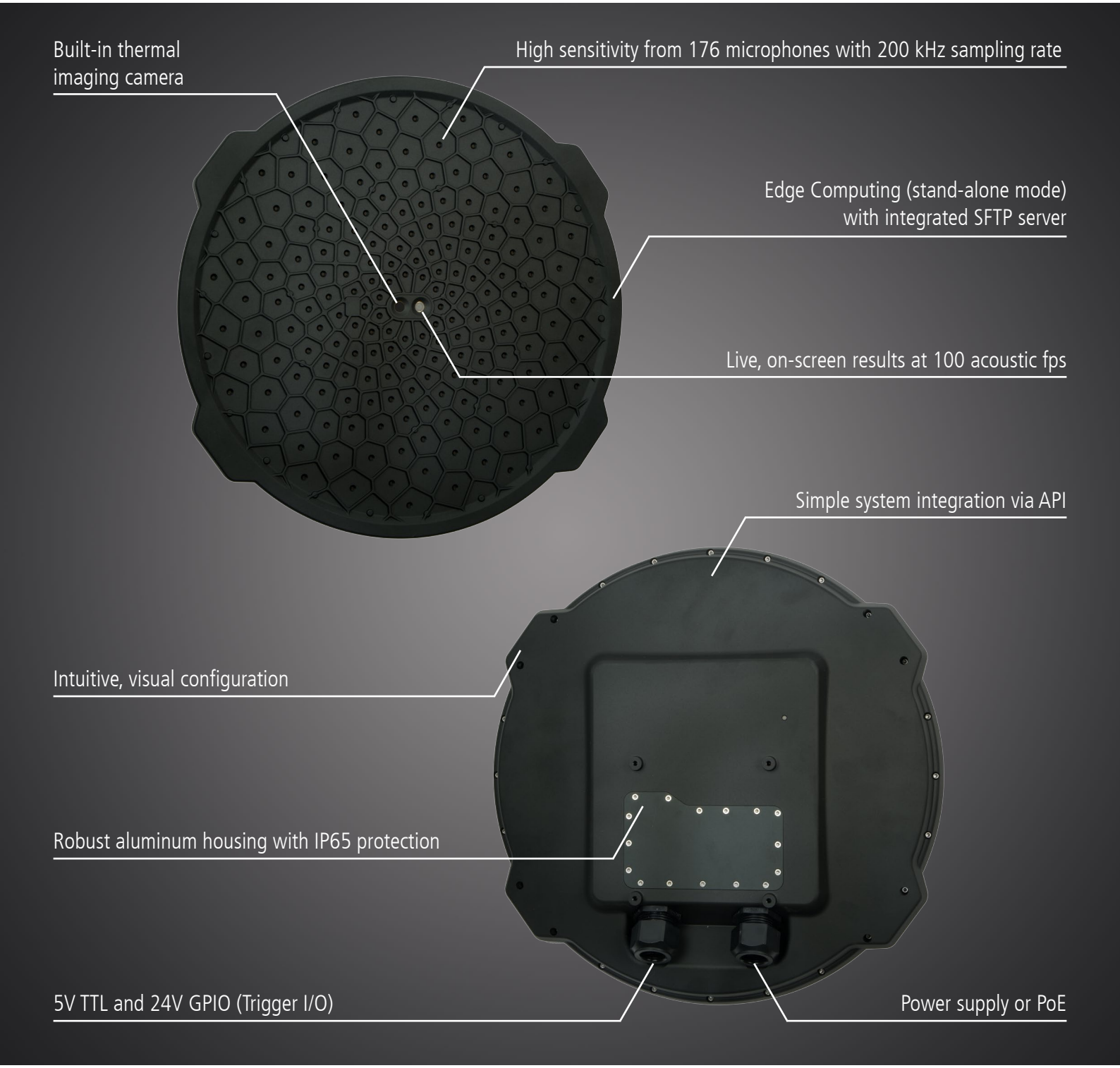
Product data

SOUNDCAM 3 SENSOR

Acoustic camera sensor: powerful, intuitive, versatile



Typical applications

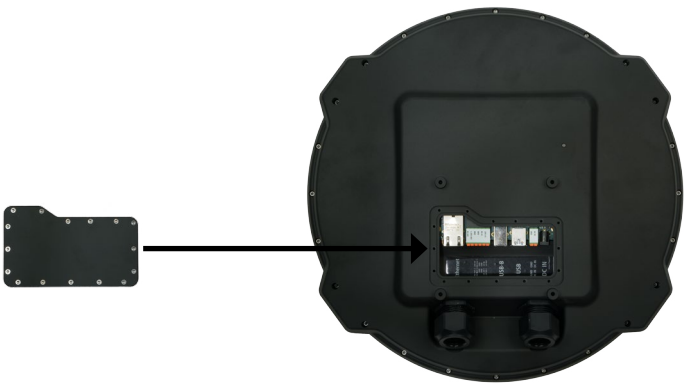
- Locating NVH and BSR
- Check soundproofing
- Localizing occupational noise
- Sound emission from devices and systems
- Diagnosis of electronic devices
- Pinpointing environmental noise

Hardware High-performance

The **SoundCam 3 Sensor** is a compact, high-performance acoustic camera with real-time analysis in both the audible and ultrasonic frequency ranges. The large number of microphones generates high-resolution acoustic images with a wide dynamic range - allowing even weak sources to become visible alongside louder ones. An optical camera and a thermal imaging camera provide additional data for evaluations.
Thanks to its lightweight design and optional IP65 protection, the sensor is suitable for both stationary and mobile applications in harsh environments, such as on robots or drones. Typical applications include EOL testing of devices for objective acoustic quality assurance and drone detection for area protection, even from greater distances and in noisy environments.
USB, Ethernet with PoE, and programmable trigger I/Os enable easy integration into automation systems. The sensor can operate autonomously: triggers initiate measurements, data is stored locally, and can be transferred as needed. After power outages, the system restarts automatically.
The device combines precise acoustic monitoring, robust construction, and versatile interfaces in a compact system - making it ideal for demanding monitoring and automation tasks.

- Extremely high dynamic range and accuracy thanks to the optimized array with 176 microphones and a 200 kHz sampling rate at 24-bit resolution
- Wide frequency range for more sensitive detection and better noise suppression
- Suitable for harsh industrial environments thanks to IP65 protection
- Trigger I/O: Programmable 5V-TTL and 24V-GPIO for PLC integration and automation
- High frame rate of the acoustic video for detecting transient sounds
- Synchronization between acoustic and optical video for high analysis accuracy
- Global shutter and high frame rate of the optical video for fast-moving objects or rapid movements
- Simultaneous capture and recording of acoustic, optical, and infrared images

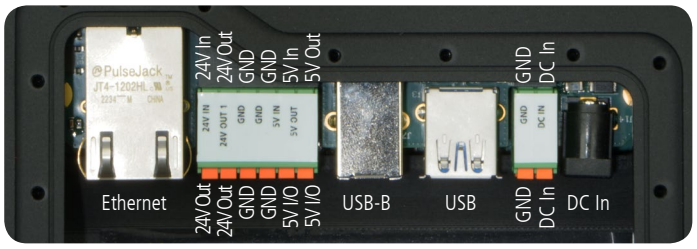
Available in black anodized and natural anodized



The back cover plate enables protection class IP65

Hardware

Microphones	Number	176 digital MEMS microphones
	Frequency range	Up to 90 kHz
	Sample rate	200 kHz
	Sound pressure	Max. 120 dB
	Resolution	24 bit
	Beamforming	100 fps
Optical Camera	Resolution	1280 x 800 px at 40 fps
	Aperture angle	74° x 51° (FoV horizontal x vertical)
	Shutter	Global shutter
	Night vision	Yes (external IR illumination recommended)
Thermal Imaging Camera	Sensor Technology	Uncooled microbolometer
	Spectral Range	Longwave infrared, 8 µm to 14 µm
	Resolution	160 x 120 progressive scan
	Frame Rate	8,7 fps
	Sensitivity	<50 mK (0,050°C)
	T.-Compensation	Automatic
	Measuring Range and Accuracy	-10° to +140°C with +/-5°C or 5% -10° to +400°C with +/-10°C or 10% Larger value is to be applied
	Aperture angle	57° x 44° (FoV horizontal x vertical)
	Temperature unit	Kelvin, Celsius, Fahrenheit
Embedded Controller	Internal memory	1TB M.2 SSD
	OS	Linux
Interfaces	USB-B 3.0	Data communication
	Ethernet	Data communication and PoE
GPIO (Trigger I/O)	5V TTL I/O	2x each selectable (specs as below)
	5V TTL Input	1x Wet-Contact Input 4,0V…5,5V
	5V TTL Output	1x Wet-Contact Output 5,0V
	24V Input	1x Dry-Contact Input 15V…24V
	24V Output	3x Wet-Contact Output 9V…24V (same as Power Input Voltage, PoE is 24V)
Physical Properties	Colour	Black anodized or natural anodized
	Dimensions	35 x 35 x 6 cm / 14 x 14 x 2,4 inch
	Weight	3 kg / 6,6 lb
	Protection class	IP65
	Usage	Robot/drone or fixed installation
	Mounting points	VESA 100 x 100 with M4 thread
	Operating temp	-15°C to 50°C / 5°F to 122°F
	Storage temp	-30°C to 60°C / -22°F to 140°F
Power	Input	9 to 24 V min. 20 W or PoE (PoE+ [802.3at] or PoE++ [802.3bt])



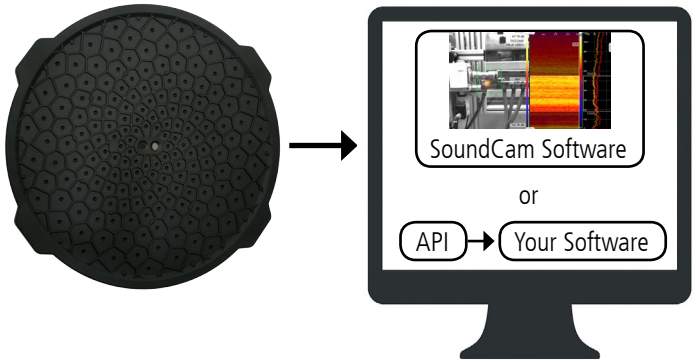
Software and API Comprehensive and intuitive

The **SoundCam 3 Sensor** can be operated both via the supplied SoundCam Software and integrated into a custom application using the available API.

The SoundCam Software is intuitive and very easy to use. In addition to manual control of the sensor, it can also operate in **stand-alone mode**. In this mode, all processing takes place directly on the sensor. After one-time configuration via a PC, the connection can be disconnected - the sensor then continues to operate completely autonomously. If a trigger is activated, the measurement data is automatically stored and can be retrieved either via the software or through the integrated SFTP server.

The powerful **API** allows not only full integration into custom systems but also individual configuration of data streams. Additionally, the stand-alone mode can also be controlled via the API, allowing data to be processed and stored directly on the sensor (Edge Computing). As a result, only the required results need to be accessed.

This gives the SoundCam 3 Sensor maximum flexibility - from easy operation using the supplied software to seamless integration into custom systems via API - enabling efficient, application-optimized sound source analysis both locally and remotely.



- Stand-alone mode for autonomous sensor operation
- Trigger function for automated recording when exceeding a threshold level or frequency curve
- Real-time results with 100 acoustic frames per second
- Three acoustic scaling modes:
  - Smart: Suppression of background noise
  - Auto: Dynamic scaling
  - Manual: Comparison to a reference level
- Creation of measurement profiles to perform recurring measurements with the same settings
- Data retrieval via software, API, or SFTP server
- Parallel live view of multiple devices on a single computer

Software

Modes	**Standard:** Simplified mode for a quick start
	Pro: Expert mode with extended range of functions
	Leak: Optimized mode for the detection of leaks including **real-time display of the loss rate**
	Partial Discharge: Optimized mode for PD detection including **real-time display of the PRPD diagram**
	Network: Remote control of the device via the Windows software
	Remote access: Set the sensor to stand-alone mode so that it continues to work independently
Functions	**Local and global spectrum** (narrowband, 1/3rd octaves and octaves), **spectrogram**, acoustic, optical and thermal image
	Setting the distance
	Frequency filter (narrow band, 1/3rd octaves and octaves)
	3 acoustic scaling modes: Smart, Auto, Manual
	Pinpoint listen-in (broadband or frequency-filtered) incl. making ultrasound audible
	Screenshot with comment option
	Playback in real time, slow motion or frame by frame
	Marking of events
	Adjustment of window sizes
	Project-based work via measurement series
	Creation and management of **measurement profiles/modes**
	File manager for copying, moving, deleting, exporting and viewing files
Recording	Ring buffer: 10 s, 30 s and additionally on Windows 60 s, 120 s, 180 s and 240 s
	Trigger recording: SPL- or spectrum-triggered up to 10 s with pre-run plus post-run time
	Long-term measurement: One image (average and peak hold) every 20 s to 900 s (adjustable)
Export	Photo(PDF), video, audio, measurement data
Units	Metric or imperial system
Languages	German, English, Spanish, Croatian, Italian, Japanese, Korean, Polish, Turkish, Chinese, Czech
OS	Linux (for the device), Windows (for laptop/PC)

API

Data Streams	Video camera
	Acoustic image
	Thermal image
	Frequency spectrum
	Audio signal of the monitoring point
	Sound pressure level of all microphones
	Time data of all microphones (raw signals)
Functions	Create and edit measurement mode/profile
	Set measurement distance
	Set minimum and maximum frequency
	Set acoustic scaling mode and dynamics
	Activate/deactivate trigger
	Set trigger settings (pre-trigger and post-trigger time, data to be stored, and trigger method)
	Download and upload files
	Restart device

EOL-Testing Objective Acoustic Quality Control

Whether leak testing, functional verification or the detection of hidden defects – in end-of-line testing, the SoundCam 3 Sensor becomes an objective acoustic quality control system. The acoustic camera automatically and reproducibly detects deviations in sound patterns – independent of the operator, environmental influences or subjective assessment.
Integrated directly at the end of the production line, the solution delivers clear pass/fail decisions, supports digital quality processes and enables seamless documentation.
For maximum product quality and reliable inline quality assurance – within every production cycle.

Possible Applications of the Sensor Integrated into End-of-Line Testing:

- **Automated leak testing**: Detection and localization of leaks in components and assemblies directly at the end of the production line.
- **Quality inspection of devices**: Identification of abnormal noises in products as a key quality indicator.
- **Process monitoring and classification using acoustic pattern recognition:** Comparison of reference sound profiles with series production units for automated pass/fail evaluation.
- **Partial discharge testing in electrical assemblies**: Early detection of insulation defects, cable faults or high-voltage component irregularities.

Advantages of Using the Sensor in End-of-Line Testing:

- **Contactless and non-destructive testing**: Acoustic analysis without interfering with or altering the product.
- **Fast real-time inline quality inspection:** Acoustic measurement and evaluation within cycle time – ideal for automated production lines.
- **High test reliability and repeatability:** Objective, reproducible measurement results independent of operator influence or subjective assessment.
- **Early detection of production and assembly defects:** Identification of leaks, mechanical faults or electrical anomalies immediately after manufacturing.
- **Reduction of scrap and rework:** Defects are detected at an early stage before faulty products are delivered or further processed.
- **Automated pass/fail classification**: Comparison with reference sound profiles enables automatic quality decisions (OK/NOK).
- **Seamless documentation and traceability**: Storage of acoustic test data per component for quality verification and full traceability.

The SoundCam 3 Sensor can be integrated into end-of-line testing systems.

Drone Detection Perimeter Protection

Whether industrial sites, critical infrastructure or sensitive security zones – with the SoundCam 3 Sensor, acoustic drone detection becomes a powerful security solution. The acoustic camera identifies drones based on their characteristic sound signatures and precisely localizes them – passively, automatically and independently of radio protocols.
Whether for perimeter monitoring, alerting or integration into existing security systems, the solution provides reliable early detection and continuous area protection.
For enhanced security, transparency and control – around the clock.

Possible Applications of the Sensor for Drone Detection:

- **Perimeter protection of industrial facilities and critical infrastructure:** Early detection of unauthorized drones above plant sites, power plants, refineries or logistics centers.
- **Security monitoring of sensitive areas**: Protection of research centers, military and government facilities, correctional institutions or data centers.
- **Monitoring of airports and no-fly zones**: Acoustic detection of illegal drone activity in the vicinity of runways and restricted airspace.
- **Protection of large events and public areas**: Detection of potential security threats at events, stadiums or public gatherings.
- **Border and coastal protection**: Identification of drones used for smuggling, espionage or unauthorized surveillance.
- **Monitoring of critical production and energy facilities**: Detection of drones operating near high-voltage lines, pipelines or manufacturing sites.

Advantages of Using the Sensor for Drone Detection:

- **Passive and non-visible detection without signal emission**: No radar or radio transmission required – discreet and regulation-compliant monitoring.
- **Early detection without visual contact**: Acoustic detection operates reliably in darkness, fog or visually obstructed environments.
- **High directional and localization accuracy**: Beamforming enables precise direction finding of detected drones.
- **Independent of radio protocols and manufacturers**: Identifies drones based on acoustic signatures – even when GPS or radio transmission is disabled.
- **Automated classification capability**: Differentiation between drones, vehicles, machinery or ambient noise through acoustic signal analysis.
- **Scalable for large areas and 24/7 operation**: Suitable for continuous monitoring using multiple networked sensors.
- **Integration into security and control systems**: Interfaces allow seamless integration into existing monitoring and command systems.
- **Low installation and maintenance effort**: Robust sensor technology designed for outdoor applications with minimal service requirements.

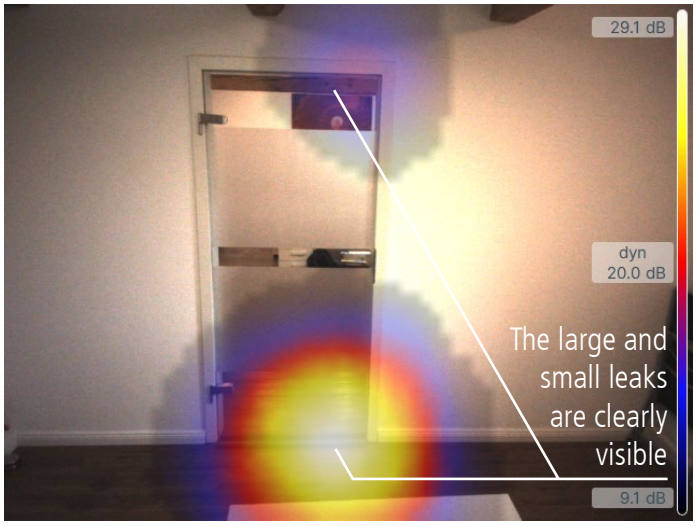
Drone Detection with the SoundCam 3 Sensor

Performance Well thought out to the last detail

- Very high sensitivity and dynamic range thanks to 176 microphones with 200 kHz sampling rate at 24 bit resolution
- Live, on-screen results at 100 acoustic fps
- Precise synchronization between acoustic and optical video for high analysis accuracy
- Simultaneous capture and recording of acoustic, optical, and infrared images
- Pinpoint listen-in, including making ultrasound audible, provides additional information
- Can be used in harsh industrial environments thanks to IP65 protection
- Control via Windows software or integration with the API
- Edge computing (stand-alone mode) for autonomous working
- Trigger function for automated recording when a level or frequency curve is exceeded
- Trigger I/O: Programmable 5V TTL and 24V GPIO for PLC connection and automation
- Data retrieval via software, API or SFTP server

Sensors Extremely sensitive

Result of the SoundCam 2.0 Sensor, the predecessor model of the SoundCam 3 Sensor. This is a very good acoustic camera with 64 microphones. The large leakage is detected very well. The small leakage is not detected as it disappears in the image noise.



The 176 microphones and the optimized microphone array design of the SoundCam 3 Sensor increase the sensitivity and dynamic range immensely. As a result, the large and small leaks are clearly visible. Even at 20 dB dynamic range, no image noise is visiable.

More microphones, a higher sampling rate and high 24-bit resolution ensure better, more detailed and more reliable results.

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