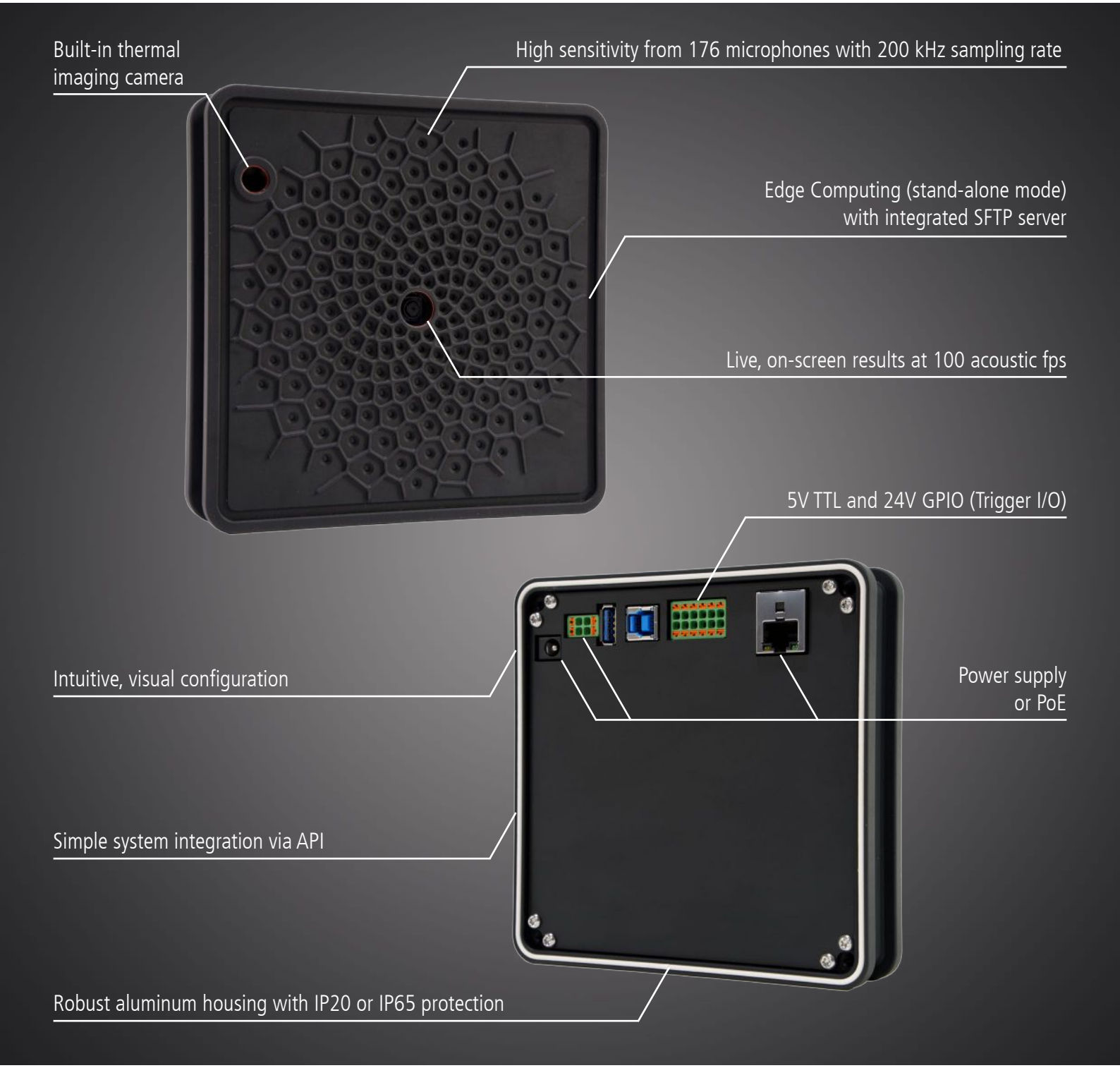
Product data

SOUNDCAM ULTRA 3 SENSOR

Ultrasonic camera sensor: powerful, intuitive, versatile



Typical applications

- Compressed air/gas/vacuum leak detection
- Detection of partial discharge
- Condition monitoring
- Wildlife studies
- Non-destructive testing
- Mechanical fault detection

Hardware High-performance

The **SoundCam Ultra 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 leak detection, partial discharge detection, and the monitoring of machines, animals, or traffic - even from greater distances and in noisy conditions.
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.

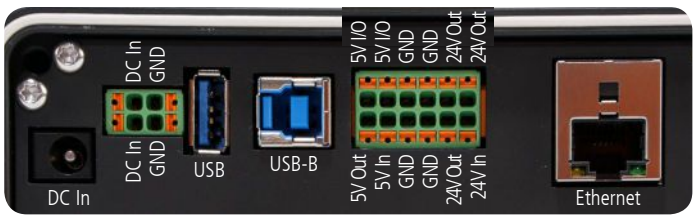
- Extremely high dynamic range and accuracy thanks to the optimized array with 176 microphones and a 200 kHz sampling rate at 24-bit resolution
- Wide frequency range for more sensitive detection and better noise suppression
- Suitable for harsh industrial environments thanks to IP65 protection
- Trigger 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 100 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 IP20 IP65	14 x 14 x 3,2 cm / 5,5 x 5,5 x 1,3 inch 14 x 14 x 5,5 cm / 5,5 x 5,5 x 2,2 inch
	Weight IP20 IP65	0,7 kg / 1,5 lb 1,1 kg / 2,4 lb
	Protection class	IP20 or IP65
	Usage	Robot/drone or fixed installation
	Mounting points	M5 threads all around
	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 or PoE, min. 20 W



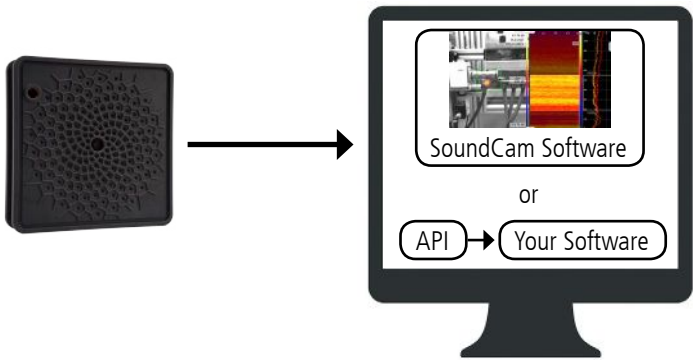
Software and API Comprehensive and intuitive

The **SoundCam Ultra 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 Ultra 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)

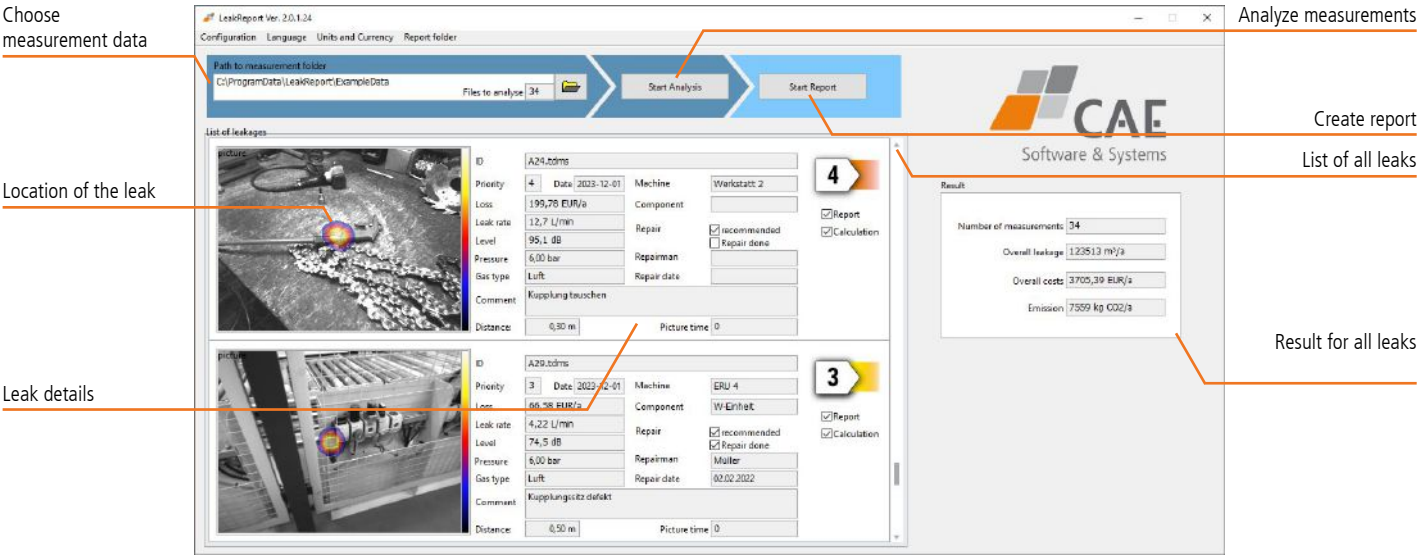
API

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

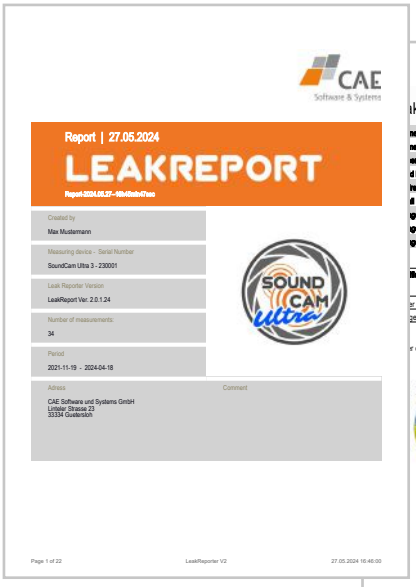
Application Pinpointing compressed air leaks

By simply transferring the measurement data from the device to the PC, the measurements can be quickly analyzed and evaluated. The evaluation and documentation software for compressed air leaks generates a meaningful report in the shortest possible time.
All relevant data is presented clearly and in an easy-to-understand way, using images, diagrams, and tables.

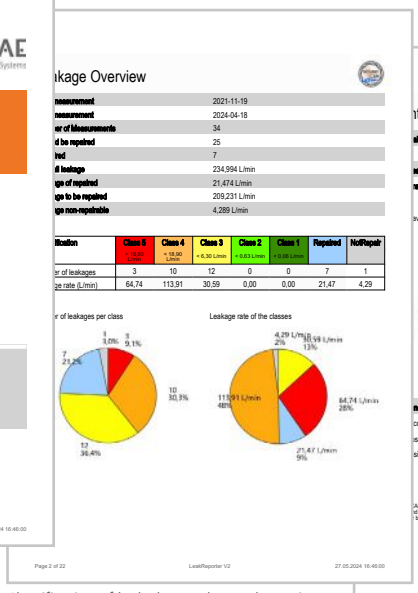
- » Leak detection from a great distance, even during ongoing, noisy production
- » Large-area scanning provides significant time savings compared to other leak detection methods
- » Real-time display of losses for immediate assessment
- » Easy to operate without prior knowledge thanks to the Leak Detection Mode
- » In combination with a mobile robot or drone, compressed air leak detection can be automated
- » The LeakReport Windows software displays all detected leaks, classifies them by size, and compiles them into a report



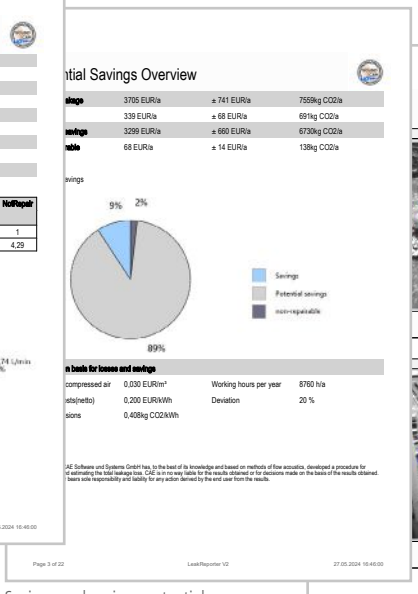
Get a detailed report quickly and easily in three steps: select measurement files, start analysis, generate report



Cover page



Classification of leaks by number and severity



Savings and savings potential

Detailed view of the leaks

The pie charts in the report provide a quick overview of the number of leaks found, the loss and possible savings.

Application Detection of partial discharges

By simply transferring the measurement data from the device to the PC, the measurements can be quickly analyzed and evaluated. The evaluation and documentation software for partial discharges generates a meaningful report in the shortest possible time.
All relevant data is presented clearly and in an easy-to-understand format, using images, diagrams, and tables.

- » Identification from a great distance, even in noisy environments
- » Large-area scanning provides significant time savings compared to other partial discharge measurement methods
- » Minimal effort thanks to contactless measurement
- » Real-time display of the PRPD diagram for immediate assessment
- » Easy to operate without prior knowledge thanks to the Partial Discharge Mode
- » In combination with a mobile robot or drone, partial discharge detection can be automated
- » The PDReport Windows software displays all detected partial discharges, categorizes them by type, and compiles them into a report

Choose measurement data

Analyze measurements

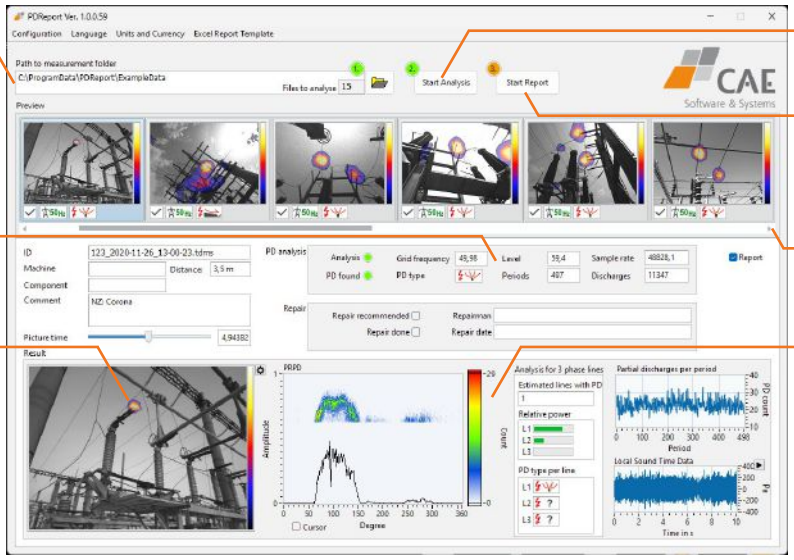
Create report

Overview of the partial discharge

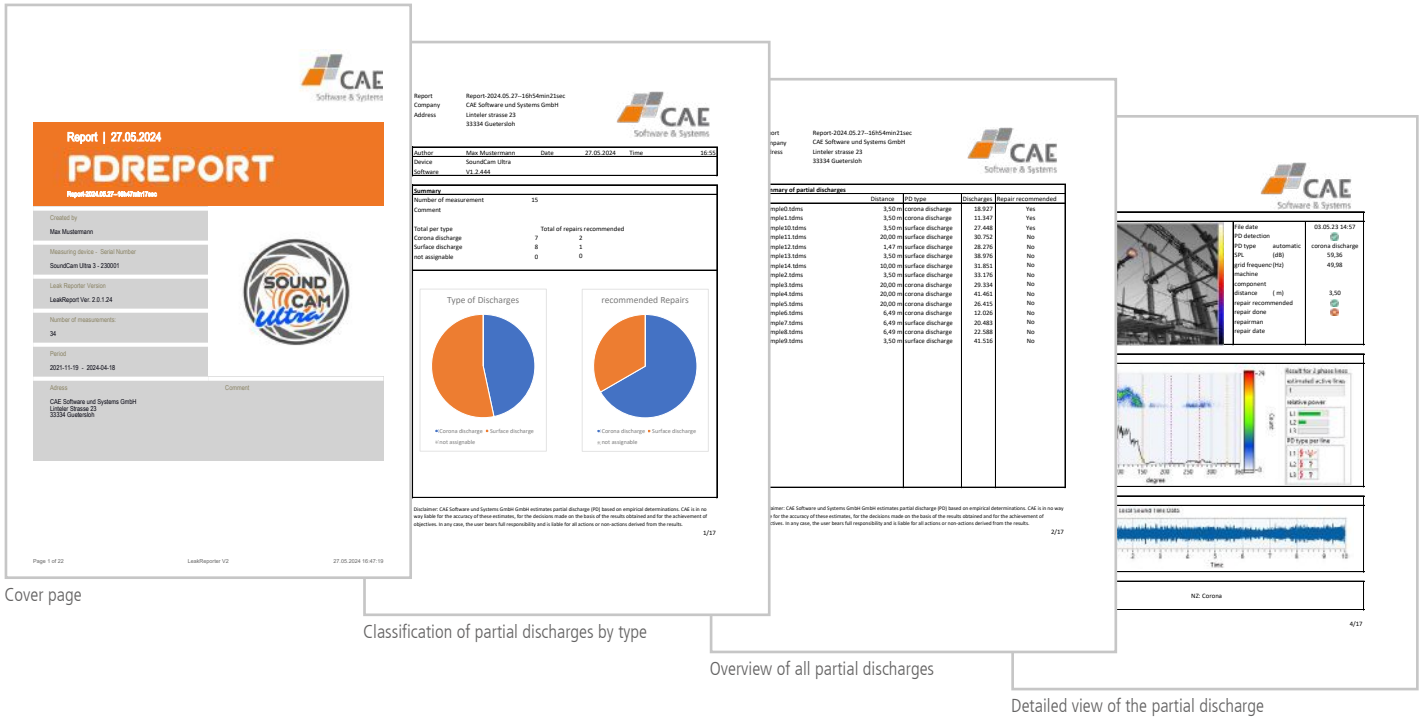
List of all partial discharges

Localization of the partial discharge

PRPD diagram and classification of the partial discharge



Get a detailed report quickly and easily in three steps: select measurement files, start analysis, generate report



Cover page

Classification of partial discharges by type

Overview of all partial discharges

Detailed view of the partial discharge

The pie charts in the report provide a quick overview of the number of partial discharges found and their classification.

Robots Inspection from the Ground

Whether it is an autonomously navigating robot or a precisely operating industrial robotic arm - combined with the SoundCam Ultra 3 Sensor, any robot becomes an intelligent inspection platform.
The acoustic camera enables automated detection of leaks, partial discharges, or mechanical irregularities - quickly, accurately, and without human influence.
Whether in large industrial facilities, hard-to-reach areas, or directly on the production line: this solution offers flexible deployment options, increased workplace safety, and seamless integration into digital maintenance processes. For reliable condition monitoring - around the clock.

Possible applications of the sensor integrated into a robot:

- Automated inspection of industrial facilities for the localization of compressed air leaks
- Detection of partial discharges in electrical systems
- Inspection of machines for bearing damage or unusual noises
- Condition monitoring in hard-to-reach or hazardous areas
- Facility management in large buildings: inspection of HVAC systems (heating, ventilation, air conditioning), e.g., leak detection in air ducts
- Quality control in production lines (e.g., detection of leaks)

Advantages of using a robot with the sensor:

- **Automated, precise leak detection:** The robot can independently follow predefined routes and accurately locate leaks.
- **Continuous monitoring without personnel:** Ideal for continuous operation (e.g., night shifts, weekends) without breaks, fatigue, or staffing requirements.
- **Integration into existing maintenance processes (Industry 4.0):** Data can be directly fed into maintenance systems (e.g., CMMS) and analyzed.
- **Objective, reproducible data capture:** No influence from human factors—the acoustic camera delivers objective measurement data.
- **Increased workplace safety:** No need for personnel to enter dangerous, confined, or contaminated areas.
- **Flexible adaptation to various deployment locations:** The robot can be used in different areas as needed.
- **Documentation & trend analysis:** Repeatable inspection runs enable condition comparisons and long-term trend monitoring.

LOAS Tfoi robot with the SoundCam Ultra 3 sensor

6-axis industrial robot arm with the SoundCam Ultra 3 sensor

Drones Inspection from the Air

The combination of modern drone technology and the SoundCam Ultra 3 Sensor opens up new possibilities for contactless, automated inspection of industrial facilities from the air. Whether it's high-voltage power lines, rooftop installations, pipelines, or hard-to-reach building structures - the flying platform enables precise acoustic analysis without the need for scaffolding, lifting equipment, or personnel in hazardous areas.
Thanks to objective and reproducible data collection, acoustic anomalies such as partial discharges, leaks, or mechanical irregularities can be detected at an early stage - allowing for targeted maintenance and increased operational safety.
Thus, acoustic drone inspection becomes a powerful tool for predictive, safe, and cost-efficient facility monitoring.

Possible applications of the sensor integrated into a drone:

- Detection of partial discharges from the air - to prevent failures and fires
- Leak detection in elevated compressed air systems - no scaffolding or lifting equipment required
- Inspection of industrial facilities, power plants, or refineries - rapid detection of acoustic anomalies and leaks
- Inspection of conveyor systems and pipelines for acoustic anomalies - longer sections can be systematically flown over to identify deviations
- Localization of disturbing noises in hard-to-reach areas on facades and roofs
- Leak detection in tank farms or chemical plants - safe and contactless

Advantages of using a drone with the sensor:

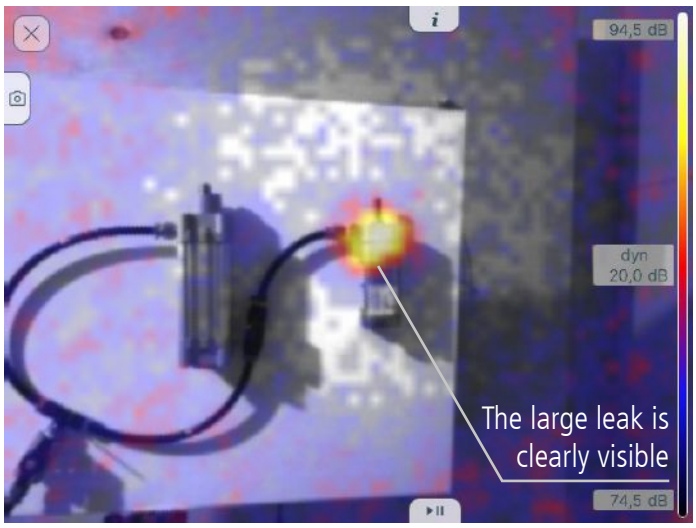
- **Automated inspection of extensive high-voltage lines, industrial plants, conveyor belts, or pipelines:** Enables time-saving, seamless, and safe inspection without the need for labor-intensive manual walkthroughs.
- **Access to hard-to-reach areas:** Easily reaches elevated, hazardous, or inaccessible locations (e.g., hall ceilings, masts, rooftop installations, silos).
- **Contactless and safe inspection:** No need for scaffolding, lifts, or climbing—reduces accident risks and operational downtime.
- **Time and cost efficiency for large-scale inspections:** Large areas (e.g., industrial plants, conveyor belts, pipelines, high-voltage lines) can be quickly flown over and inspected.
- **Flexible, mobile relocation:** The drone can be deployed at different sites on short notice.
- **Objective, reproducible data collection:** No influence from human factors—the acoustic camera provides objective measurement data.
- **Integration into existing maintenance processes (Industry 4.0):** Data can be fed directly into maintenance systems (e.g., CMMS) and analyzed.
- **Documentation & trend analysis:** Repeatable inspection flights enable condition comparisons and long-term trend monitoring.

LOAS Tfos Drone with the SoundCam Ultra 3 Sensor

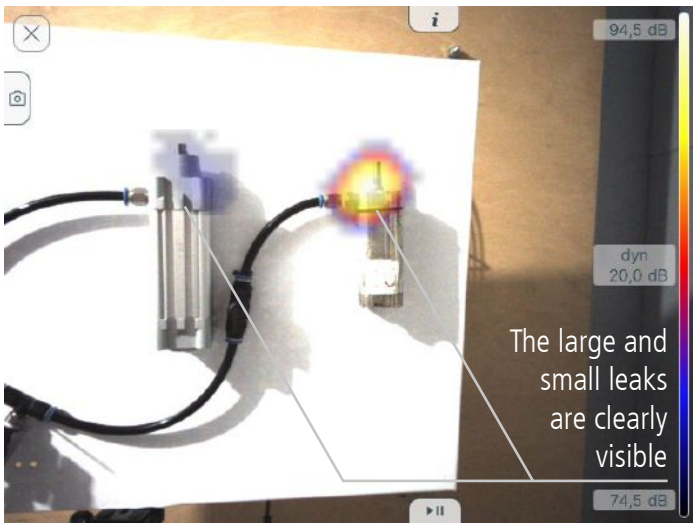
Performance Well thought out to the last detail

- 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 Ultra Sensor, the predecessor model of the SoundCam Ultra 3 Sensor. This is a very good acoustic camera with 72 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 Ultra 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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