



COMPRESSED AIR LEAK MANAGEMENT

Compressed air leaks account for as much as 35-40% of total demand. That's 35-40% of your compressors output wasted for nothing.

The single highest cost in operating your compressed air system is electricity! NOT maintenance; NOT Capex; 75% of your compressor cost is the energy to run it.

SonaVu™ is a multi-frequency acoustic camera that takes airborne ultrasound inspection to a new level. Equipped with 112 highly sensitive sonic sensors and a precision optical camera, SonaVu™ brings the power of super-human hearing to focus on its vibrant, color touch screen. It unlocks limitless applications for asset reliability, energy conservation, and safety including compressed air leak management, electrical asset reliability, tightness control of large volumes, and much more.

A simple leak detection procedure consists of picking up the SonaVu™ and powering it on. Connect the high-quality noise attenuating headphones so you can hear what SonaVu™ is seeing. Then simply point the acoustic sensor array towards any compressed air lines. Listen for the characteristic hissing of the air leaks in the headphones and watch the color display light up with the precise location of the leak.

All controls are found on the SonaVu™ touch screen.

1. Set the distance:
 - Choose near range (<5m) or far range (>5m) or auto range to let SonaVu™ decide.
2. Set the frequency:
 - For compressed air leaks choose 25-40kHz
3. Set the gain:
 - Difference between min/ max sound pressure.



ELECTRICAL ASSET RELIABILITY

Electrical discharge is more common than we'd like to believe; even in new installations. Unreliable electric power systems not only cost millions of dollars in downtime and repairs, but also has the potential to maim and kill.

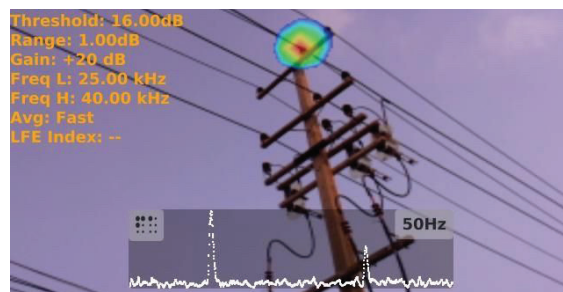
Any discussion about risk must include health and safety. But it should not ignore asset reliability. One certainty is that safety and reliability risks are both linked to unscheduled downtime, costly legal exercises, and ultimately, lost profit. A perfect solution identifies safety and reliability as one and the same and marginalizes their impact on the other three.

Ultrasound is the best technology for reducing the risk of electrical arc flash exposure while ensuring equipment reliability. It does this by detecting defects which, when left to deteriorate, could lead to an arc flash event. This doesn't suggest that ultrasound removes the need for personal protective equipment and other safety measures.

The long-distance acoustic capabilities of the SonaVu™ acoustic imaging camera make it an essential tool for inspecting electrical systems for partial discharge while maintaining electrical safety and reliability.

Sources of ultrasound created by the presence of partial discharge are superimposed on the SonaVu's screen, allowing inspectors to intuitively pinpoint their location.

You will find activity in all types of high voltage power assets. From switchgear... to transformers... to overhead lines... and underground cables. Partial discharge causes degradation and failures. Experience shows that Partial discharge activity is a contributory factor in over 80% of disruptive substation failures. It is the most reliable indicator of the true condition of insulation in live assets.



The procedure for scanning is straightforward:

- Position the sensor array towards your electrical assets to begin the survey.
- Common electrical defects such as arcing, tracking, corona, and partial discharge will produce an ultrasonic bloom which can be captured as either a video or image to put into an inspection report.



FUGITIVE EMISSION INSPECTION

One problem facing refineries and oil and gas (O&G) plants is how to identify and eliminate sources of leakage into the atmosphere.

There are many sources of fugitive emissions within the O&G industry segments. Sadly, many sources are intentional or, let us say, part of the process; whether that process be manufacturing, refining, transporting, venting, flaring, and storage.

However, accidental sources of fugitive emissions fall under the categories of “equipment leaks” and “accidents and equipment failures”. It is within these categories where we discover the highest risk because the leaks can be both long-term or sudden and impactful.

Five sources of fugitive emissions:

1. Equipment Leaks;
2. Process Venting;
3. Evaporation Losses;
4. Disposal of Waste Gas Streams (venting/flaring);
5. Accidents and Equipment Failures;

The SonaVu™ makes finding, documenting, and repairing fugitive emission and natural gas leaks easy. While most fugitive emissions remain inaudible and invisible to humans, the SonaVu™ is able to locate them at their source by visualizing the ultrasonic turbulence produced as they pass through a leak. Thanks to this, fugitive emission detection and management projects can be conducted at the height of production regardless of background noise.



DRY PIPE SPRINKLER SYSTEMS

SonaVu™ is the perfect companion for dry pipe sprinkler system inspections and fire safety service providers should consider offering this leak detection to their clients.

Fire sprinkler systems must be maintained and not classed as “run to failure”. They are the most important fire and safety element in any strategic asset management plan.

Proper maintenance of dry pipe sprinkler systems is critical to ensure their reliability. Leaks are a major concern as pressure drops can trigger false alarms that cause unnecessary water damage. In nitrogen charged systems, the loss of gas is expensive. In compressed air charged systems the constant cycling of the compressor to satisfy the false demand of leaks is wasteful and contributes to undesirable greenhouse gas emissions, as well as wear and tear on the compressor.

Fire safety companies turn to ultrasound as a popular inspection method for detecting pressure leaks in dry pipe sprinkler systems.

These instruments detect high frequency sound produced by the turbulence found at the leak source. As ultrasound is highly directional, identifying the location of a leak is easy. Detectors are not affected by other sounds. This allows for effective inspections even during noisy, peak production times.

Leaking dry pipe sprinkler systems can cause damage to property and assets even if there is no fire. System pressure drops may trip the supply valve. All measures possible to maintain a leak-free dry pipe sprinkler system are paramount as a poorly maintained dry pipe sprinkler system could be the cause of catastrophic fire damage, physical injury, and death.

Ultrasound works by hearing the turbulent flow prevalent at the leak site. As compressed air or nitrogen escapes through tiny orifices the air molecules are excited. You may be familiar with the hissing sound of air escaping through a compressed air line. This turbulence has peaks at 40kHz (ultrasonic) making ultrasound detectors the ideal instrument for finding leaks fast, in any environment.



TECHNICAL DATA

SONAVU™ ULTRASONIC ACOUSTIC IMAGING CAMERA

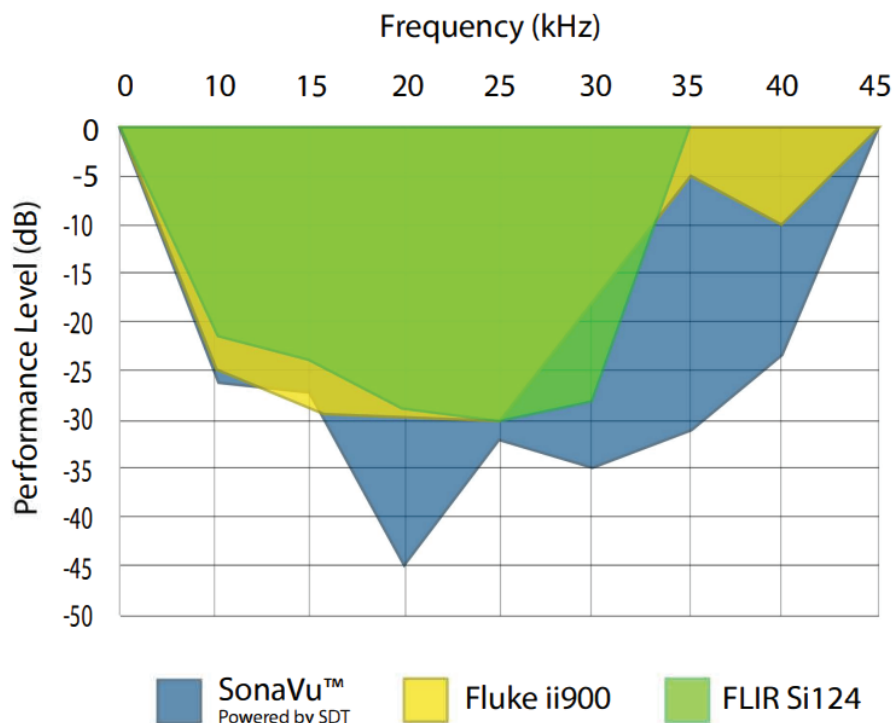
Hardware
112 Digital MEMS Microphones
Including Distance Range Sensor
Sample Rate 96,000 Sample per Second
Adjustable Lighting
5-inch Touch Screen

Firmware
Real-Time Visualization of Sound
Video and Image Storage
Desired Frequency Range Filtering
Improved Accuracy according to the Distance
Image Averaging Function

Performance	
Sensor (Microphone)	112 Channel Digital MEMS
Effective Frequency Range	2 kHz to 48 kHz
Microphone Sensitivity	-41dBFS
Signal-to-Noise Ratio	66dB(A)
Camera Frame Speed	25 FPS
Detection Distance	0.3m to 50m (11.8 inches to 164 feet)
Display Type	5" Color LCD + Touch Control
Battery Life	4Hours
Product Dimensions	237mm x 146mm x 56mm (9.3in x 5.7in x 2.2in)
Product Weight	1.2kg (2.64 lb)
Operating Temperature	-20°C to 50°C (-4°F to 122°F)

PERFORMANCE LEVEL COMPARISON

Minimum detectable sound pressure level and measurement range



TECHNICAL DATA

SONAVU™ ULTRASONIC ACOUSTIC IMAGING CAMERA

Specification	SonaVu™	Fluke ii900	Flir Si124
Sensor (Microphone)	Digital MEMS 112	MEMS 64	MEMS 124
Effective Frequency Range	2 kHz~ 48 kHz	2 kHz~ 52 kHz	2kHz~ 31 kHz
Sensitivity *	0.83 cc/sec at 1m with 0.25 bar pressure 1.83 cc/sec at 10m with 1.2 bar pressure 0.17 scfm at 1.09 yds with 3.62 psi pressure 0.0038 cfm at 10.9 yds with 17.4 psi pressure	2.5 cc/sec (150 cc/min) at 10 m	--
Frame Rate	25 FPS	12.5 FPS	--
Display Type	5" Color LCD + Touch Control	7" Color LCD + Touch Control	5" Color LCD + Touch Control
Acoustic Image	Acoustic Beampower Map	SoundMap™ Image	--
Battery Life	4Hours (+4 hrs with external battery)	6 Hours (+6 hrs with additional battery)	7 Hours with External Battery
Operating Temperature	-20 °C ~ 50 °C (-4 °F ~ 122 °F)	0 °C ~ 35 °C (32 °F ~ 95 °F)	--
Product Dimensions	237 mm x 146 mm x 56 mm	322 mm x 186 mm x 68 mm	270 mm x 162 mm x 90 mm
Product Weight	1.2 kg (2.6 lb)	1.7 kg (3.75 lb)	2.1 kg (4.6 lb) including external battery and cable

All product, product specifications, and data are subject to change without notice to improve reliability, function, design, and customer experience.

* Results are dependent on ambient conditions, operator's technique, and are subject to variability.