**Identifying Air and Gas Leaks**

Interview with Darrell Taylor, Strategic Marketing Director Instruments, Teledyne FLIR.

**What does the classic search for air leaks look like?**

Take a vehicle with a slow puncture to a tyre fitting depot and the chances are they remove the wheel and spin it in water to determine the leak. Or it will be coated with soapy water to find the leak. It’s a simple time proven method for determining leaks from pressurised systems. But of course, not all equipment can be placed in soapy water. What if a system is known to be losing pressure and yet the lines carrying the compressed air from the source are located 10 metres above the ground, and dismantling the system is out of the question? Thankfully there is a fast and effective solution to hand.

**And what would that solution be?**

Acoustic cameras like the FLIR Si2 can help. Each time air or indeed any gas, leaks from a pressured system there is an associated sound. If the leak is significant, it can be audible to the human ear and therefore easily identified and rectified accordingly. However, most leaks in high pressure systems are extremely small and are out of the range of a human ear.

**And these small leaks are actually that serious?**

Indeed. Think about a pressured air system on a large factory delivering compressed air from a bank of compressors to various stages of production throughout the manufacturing process. The chances are there are hundreds if not thousands of connections in the form of joints, reducers, valves, elbows, condensers etc. Each of these has the potential to leak small amounts of air, reducing the pressure of the system.

One leak might make very little difference but multiply this by the number of potential leaking joints and efficiency can be significantly compromised. The compressor will seek to compensate for any pressure loss by simply working harder. However, as any engineer will know, compressors can be expensive to operate in terms of energy and therefore will certainly increase an operators energy consumption.

**And that makes such a big difference?**

Yes! With electricity costs being so much higher in Europe due to geopolitical factors in recent years, most companies are seeking to reduce the amount of energy used. Having a compressor work overtime to compensate for leaking joints is certainly not something senior management would smile about! These scenarios are certainly not uncommon, in fact one European compressor manufacturer has stated that in some industrial settings, up to 80% of air generated is lot in leaks. So clearly identifying these small leaks can make a real difference to a company’s energy bills.

**How do you actually detect these leaks?**

Although the sound produced by a small leak is inaudible to the human ear a high performance acoustic imaging camera such as the FLIR Teledyne Si2 – LD will have absolutely no problem identifying the source. Launched earlier this year the camera is capable of detecting leaks of 0.05 litres per minute at a distance of 10 metres, meaning those elevated air lines pose no problem for this latest instrument in the FLIR acoustic imaging camera line up.

**Is this the maximum sensitivity of the acoustic camera?**

For closer work the camera is even more sensitive and can detects minute leaks of 0.0032 litres per minute at a distance of 2.5 metres. Coupled with this improvement, the third-generation camera has improved microphones now capable of detecting sounds over an extremely wide frequency range, namely 2 – 130 kHz.

**What else is there to consider?**

Areas of plant are often dark or dimly lit. For this reason FLIR have fitted the FLIR Si2-series of cameras with two powerful LED lights to make component identification easy even in poorly lit conditions. Of course, it’s not just compressed air that the camera is capable of detecting; noise emitted by any escaping gas is identified by the powerful microphones.

**And the camera can also detect these gases?**

Yes, at least their escape from a closed system. The FLIR Si2-LD has built in software termed Industrial Gas Quantification. If the leaking gas is ammonia, hydrogen, helium, or carbon dioxide, very commonly used gases in a number of industries, the software is capable of quantifying the financial loss caused by the leak. By simply entering factors such as the cost per litre, the software identifies the amount each leak is causing over a given period of time. Such data is invaluable to financial analysts and senior management within an organisation.

**What potential savings are we talking about?**

It is not always easy to quantify the potential savings, but the estimates are now quite reliable. Let me give you an example: In an approximately 6,500 m2 American production facility, an inspection demonstration of the FLIR Si124 acoustic camera has already detected a whopping 155 leaks in the compressed air system, estimated to cause annual losses of around $11,000. With sums like this, investing in a high-performance acoustic camera makes perfect sense.

**Is it just about saving money, or are gas leaks also a health hazard?**

It goes without saying that the financial considerations are only one aspect of leaking gas. The gases mentioned above all carry significant health hazards and can present a variety of dangers to personnel if allowed to leak for any period of time. Ammonia and carbon dioxide can cause serious breathing problems and asphyxiation even in smaller concentrations, whereas hydrogen can explode in the presence of oxygen. Clearly the cost of such problems goes way beyond any financial considerations.

**So should more companies use acoustic cameras?**

Definitely yes. We’ve come a long way since the ‘soap and water’ approach. See how the latest technology from FLIR Teledyne can help in reducing downtime, lower energy bills and improve safety in your organisation. Visit [www.flir.com](http://www.flir.com) or contact you local FLIR Teledyne agent or distributor.