



Thermal imaging warning system helps ensure the safety at Transpole

Natural gas storage for use in autobuses monitored using FLIR thermal imaging cameras



The FLIR A310 thermal imaging camera detects rising heat, warning of impending fire.

Dwindling fossil fuel reserves and rising fuel prices give plenty of cause to look for other types of fuel. That is why the Lille Métropole Communauté Urbaine and transport company Transpole decided to start using natural gas as a fuel. To that end natural gas is stored at the Transpole bus depot in Wattrelos, near the French Belgian border. But natural gas storage can be dangerous, for if a fire breaks out there is a very small but definite risk it might cause a devastating gas explosion. An early warning system using thermal imaging cameras from FLIR Systems provides the solution. By detecting a fire in an extremely early stage, likely even before the fire actually starts, the system ensures the safety of both the Transpole employees and of the inhabitants of the surrounding area.

In the 1990's the Lille Métropole Communauté Urbaine and public transport services operator Transpole made the decision to start using methane gas from the fermentation of sludge processed in sewage treatment plants as a fuel for urban buses. The aim was to reduce fossil energy consumption and CO₂, NOx and CO emissions using local energy.

From 1994 to 1998 7 of the autobuses ran on natural gas as an experimental test, using natural gas from the sewage treatment plant in the nearby Marquette. These were the first natural gas powered buses in France. This test showed that using natural gas was price effective when compared to diesel and that

it is better for the environment as well. It led to a reduction in particle emissions of 95%, in nitrogen oxide by 71% and noise reduction by 50%. It also proved that the buses running on gas are reliable. Currently, about 80% of the Transpole buses are fueled by natural gas. These buses are employed in 93% of the bus rides conducted by Transpole in and around Lille, saving the equivalent of an estimated 4.48 million liters of diesel per year.

Averting disaster

But the use of natural gas is not without risk. If a fire breaks out the stored gas can theoretically have disastrous effects, explains Régis Messiaen, technical manager of the



The FLIR thermal imaging cameras, mounted in a rugged waterproof housing, continually monitor the entire premises.

Transpole bus depot in Wattrelos. "The natural gas is stored under high pressure and is highly flammable. If this gas would for some reason explode it would not only threaten the Transpole employees, but also the inhabitants of the surrounding area. We've taken all the necessary precautions, so the chance of anything going wrong is very slight indeed, but however slim the chances may be, you have to do everything within your power to prevent that from happening. That is why we decided to opt for an early fire warning system based on thermal imaging cameras."





The live thermal video produced by the FLIR thermal imaging is shown on two touch screens, one at the depot's entrance and another in the main office.

The company that produced the warning system and installed the FLIR thermal imaging cameras is the French FLIR Systems products integrator ALOATEC. Since 1998, ALOATEC specializes in providing turnkey solutions for the management and control of continuous industrial processes and services, including thermal imaging based fire warning systems such as the system that ensures the safety of natural gas storage at the Transpole bus depot.

Thermal imaging buys you valuable time

"Thermal imaging simply detects fires in a much earlier stage than other detection methods", explains Philippe Bourrier, director of ALOATEC. "Smoke detectors only detect a fire when it has already started to produce smoke. Visual light cameras only detect flames or smoke development and for smoke detection they depend on the presence of light to function. Not only do thermal imaging cameras function regardless of the



light conditions, they also help to spot a rise in temperature even before fire breaks out, which buys you valuable time, possibly even allowing you to fix the problem before the fire actually starts."

All objects emit thermal radiation in the infrared spectrum that cannot be seen with the human eye. Thermal imaging cameras convert that radiation to a radiometric thermal image, which means that every pixel in the image is actually a noncontact infrared temperature measurement. At the depot in Wattrelos Bourrier installed ten FLIR A310 thermal imaging cameras, which were mounted in rugged waterproof housing, continually monitoring the entire premises.

The cameras are continuously sending their temperature measurements through optic fiber cables to a central computer, which compares the thermal data with previously determined parameters. If any part of the monitored area rises beyond a certain temperature an alarm will go off. The live thermal video produced by the FLIR thermal imaging is shown on two touch screens, one at the depot's entrance and another in the main office, provides an intuitive and easy to understand visual image that will allow personnel and firefighters to immediately assess the situation and recognize the problem.

Accurate and reliable

"I've been installing these thermal imaging cameras in all sorts of industrial applications, including petrochemical installations, for eight years now and I've come to know the thermal imaging cameras of FLIR Systems as highly accurate and very reliable", says Bourrier. "Thermal imaging cameras might be slightly more expensive than CCTV cameras and smoke detectors at the initial purchase, but as they require no light whatsoever to function the maintenance costs and energy bills are kept low. This solution is also the only system that can help you to actually prevent the fire, making it the best fire warning system on the market today."



The touch screen interface shows the floor plan of the facility and live thermal video footage of all ten FLIR A310 thermal imaging cameras, including automatic alarms and accurate temperature readings.

According to Messiaen it was initially difficult to find the right setting for the system. "We had to learn the hard way which settings allow the best combination of early warning and few unwanted alarms. In the past the exhausts of the buses that still run on diesel could cause the alarm to go off, because they reached temperatures higher than the previously determined threshold. We therefore adjusted and tweaked the settings together with Aloatec and the technical support team of FLIR Systems to reduce the rate of unwanted alarms and regular tests ensure that the warning system continues to work perfectly. Now that we have enhanced the system with filters and tried and tested temperature alarm settings, we can honestly say that the system is working very well. It is fast, effective and reliable."

Take no risk, detect possible fires sooner

Fire can be dangerous in its own right, but due to the presence of a natural gas at the depot the advantage of having an early warning in case of fire is of utmost importance to Messiaen. "Now I know that the risk is in fact very small, but if it does go wrong the results might be catastrophic. Theoretically the nearby villages Wattrelos and Roubaix are also within the danger zone. When the safety of our employees and of the village inhabitants is at stake you want to take no risks. Thermal imaging cameras detect possible fires much sooner than any other detection tool, even before the fire starts."



Philippe Bourrier, director of ALOATEC (left) and Régis Messiaen, technical manager of the Transpole bus depot in Wattrelos (right).



Currently, about 80% of the Transpole buses are fueled by natural gas, saving the equivalent of an estimated 4.48 million liters of diesel per year.

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