



Picture: IRIS GmbH

Infrared technology for fire protection - detect fires early

In fire protection speed is everything. And that doesn't only apply to firefighting. The faster a developing fire is detected, the greater the chance of keeping the damage to a minimum through timely intervention. Infrared measurement technology provides the possibility to detect fires very early. IRIS GmbH, who implements these types of systems, relies on infrared cameras from Optris.

All bodies with a temperature above absolute zero (-273.15 °C) emit so-called characteristic radiation at their surface, electromagnetic radiation which is proportional to its temperature. Part of this radiation is infrared radiation, which can be used for temperature measurement. Using modern sensor technology, cameras can be built which, due to their high thermal sensitivity of 40 mK, allow very small temperature differences to be detected. Instead of an image of the body, as the human eye would see it however, they produce a thermal image, where a temperature is determined for every point in the image. A false-color view of this kind of thermal image is useful in

„***Fires can be detected very early with this method, by applying a temperature threshold which is still below the ignition temperature***“

many applications - from industrial process control through to maintenance on electrical systems, where faults can be identified through high temperatures on contacts.

Early fire detection with infrared cameras

A special system for early fire detection has been developed by IRIS GmbH - which is being used very successfully. The company, with locations in Lüneburg and Wülfrath, has been active in industrial measurement technology for 28 years, and offers a comprehensive portfolio of technical measurement products from various manufacturers. Their focus area includes, for example, non-contact temperature measurement using infrared measurement technology. There has been a relationship with Optris GmbH for many years in this area, and IRIS has sold their products since 2003.

Infrared measurement technology has special advantages for fire protection, as Kirsten Köhn, Managing Director at IRIS explains: "Using this method, fires can be detected very early by using a temperature threshold which still lies below the ignition temperature." In this way, a potential fire can be detected even before it starts, due to the increasing temperature. The IRIScan FS system developed by the company, based on a proven industrial infrared camera from Optris, works exactly on this principle. The IRISvisual software which accompanies the system evaluates the thermal images and localizes a thermal hazard source in real-time.



The IRIScan FS system is able to detect fires at an early stage using infrared measurement technology.

Picture: IRIS GmbH

The highest temperature is determined within each section of the image. If this exceeds the preset threshold, the system triggers a warning or an alarm. "Our system works with multi-stage adjustable warning and alarm thresholds", says Köhn: "

Depending on the application, a first warning is triggered even at a temperature of 70 or 80 degrees Celsius."

The user can then identify the corresponding position on the infrared image very quickly. In many cases, this allows the initiation of a fire to be prevented in good time.

The first applications for this early fire detection implemented by IRIS were for waste bunkers. "You could say that was the start of our business in this area", remembers Kirsten Köhn. Other typical application areas of the system for example include storage areas in the paper, tire and textile industries, recycling plants or biomass plants. IRIS has also already installed an IRIScan FS for monitoring a tunnel system. In general, the system can be used in many sectors where traditional fire detection methods are not possible. High dust or smoke loads in the ambient air are no problem for this method, since by using air purge collars for rugged environments, the optical components of the infrared camera can be kept clean very effectively.

User-friendly system

The IRIScan FS early fire detection system has a modular design and is notable for its user-friendliness. Within the IRISvisual software, which controls all of the functions, various alarm levels can be adapted flexibly to the requirements for example. As well as the temperature threshold mentioned above to provide the initial warning, additional thresholds are also possible, which if exceeded can then allow the plant manager to send an alarm directly to the fire service.

As soon as the software detects that a critical temperature threshold has been exceeded, the user is provided with visual and acoustic signals on the PC. At the same time, the software records the current infrared images or videos. The system can be adapted flexibly to the customer's requirements: So for example alarm and status information can be displayed in-situ, in the control room, sent via a network or by e-Mail or SMS.

Depending on the level of installation, just one or also multiple infrared cameras can be used. If a larger area is to be monitored, these can be mounted on a pan-tilt head. This then looks systematically across the monitoring area. The software combines the images taken with the swivel head into a single composite image. Optionally, the system can also be equipped with an additional color CCD camera, which records a traditional video image.



The Optiris infrared cameras produce a thermal image, showing critical temperatures.

Picture: IRIS GmbH

In this way, the area within which the increased temperature has been measured, can be identified more easily in the case of an alarm. From the control computer, the user can also control the pan-tilt head manually, for example to look at certain areas in more detail.

Reliable infrared cameras as key components

As well as the intelligent and flexible software, the infrared cameras form the core of the IRIScan FS system. For this, infrared cameras from the German manufacturer Optris are generally used. The connection of the Optris camera to the supervisory hardware and the control computer is no problem via the USB interface. To bridge distances of much more than 20 meters between PC and a thermal imaging camera, a USB server with an Ethernet connection is used. Depending on the requirements of the particular system, IRIS will select the most suitable infrared cameras. "With Optris we have a very wide spectrum of different devices, so that we are always able to select the optimum resolution and the appropriate lens", says Kirsten Köhn, explaining a key advantage of the supplier. IRIS also sources the accessories directly from the manufacturer. Depending on the environmental conditions, the infrared cameras are equipped with a weather protection housing or also a cooling housing. Since the infrared cameras are very compact, they are simple to integrate within the application. One additional important criterium in the selection according to Köhn is the reliability: We are very confident with the quality from Optris - in the past we only experienced failures very rarely." This means that service calls for the installed IRIScan FS systems are also very infrequent. "Overall in the cooperation with Optris, who also offer an unbeatable price-performance ratio, has always brought positive experiences", summarizes Kirsten Köhn.



IRIS GmbH

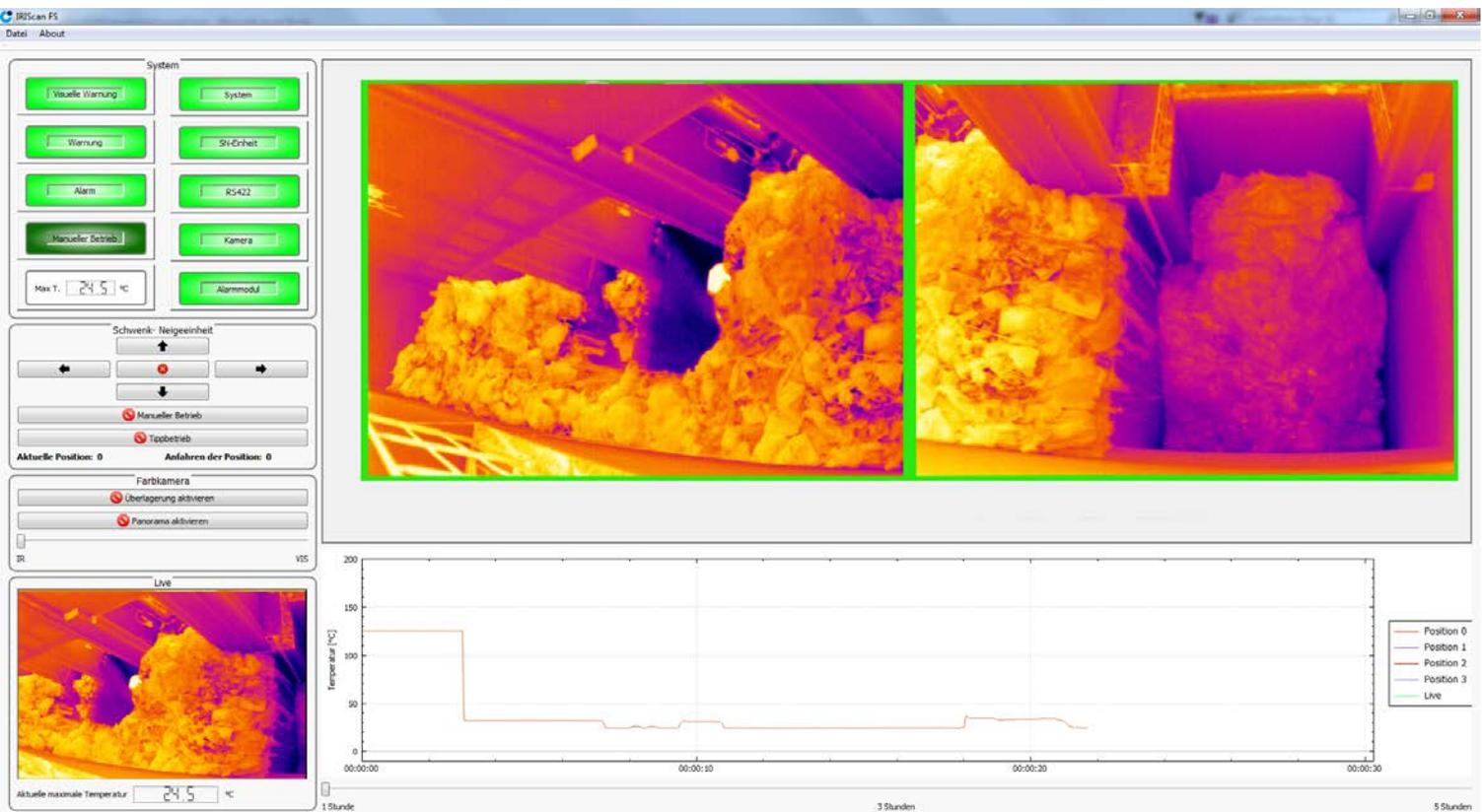
For 28 years IRIS GmbH has been a recognized contact partner in the field of applications in industrial measurement technology. As well as the key area of infrared measurement technology, the medium-sized business also sells systems involving applications for flow sensors, displacement-, distance- and position-measurement technology or vibration measurement. Projects are developed and implemented in close cooperation with customers. When doing so, IRIS delivers turnkey projects to customers, and also takes care of commissioning. The portfolio of services also includes expert technical consultancy as well as training. The medium-sized company sees itself as an independent service provider, who is able to fill the gap between the standard products from renowned medium-sized manufacturers and the individual requirements of customers.



Dipl.-Bw. Kirsten Köhn
CEO IRIS GmbH

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Using the flexible IRISvisual software, the parameters, for example such as the temperature thresholds, can be adjusted very simply. If the multi-stage temperature thresholds are exceeded, the system automatically triggers the corresponding alarm.

Picture: IRIS GmbH

Further developments of the system

IRIS is not content to stop with the current existing functionality of the fire early detection system. So for example the software is being continuously developed. Since the last development, object detection has been integrated. This is because the most frequent false alarms result from the hot parts of a vehicle - for example the exhaust of a forklift truck. In the latest version, the object detection can identify the forklift truck and ensures that the alarm is not triggered. With these and other functions, IRIS is looking to make the use of the system even easier and to extend it to other applications.

Authors:

Dipl.-Bw. Kirsten Köhn, CEO IRIS GmbH

Dipl.-Ing. Torsten Czech, Optris Head of Product Management