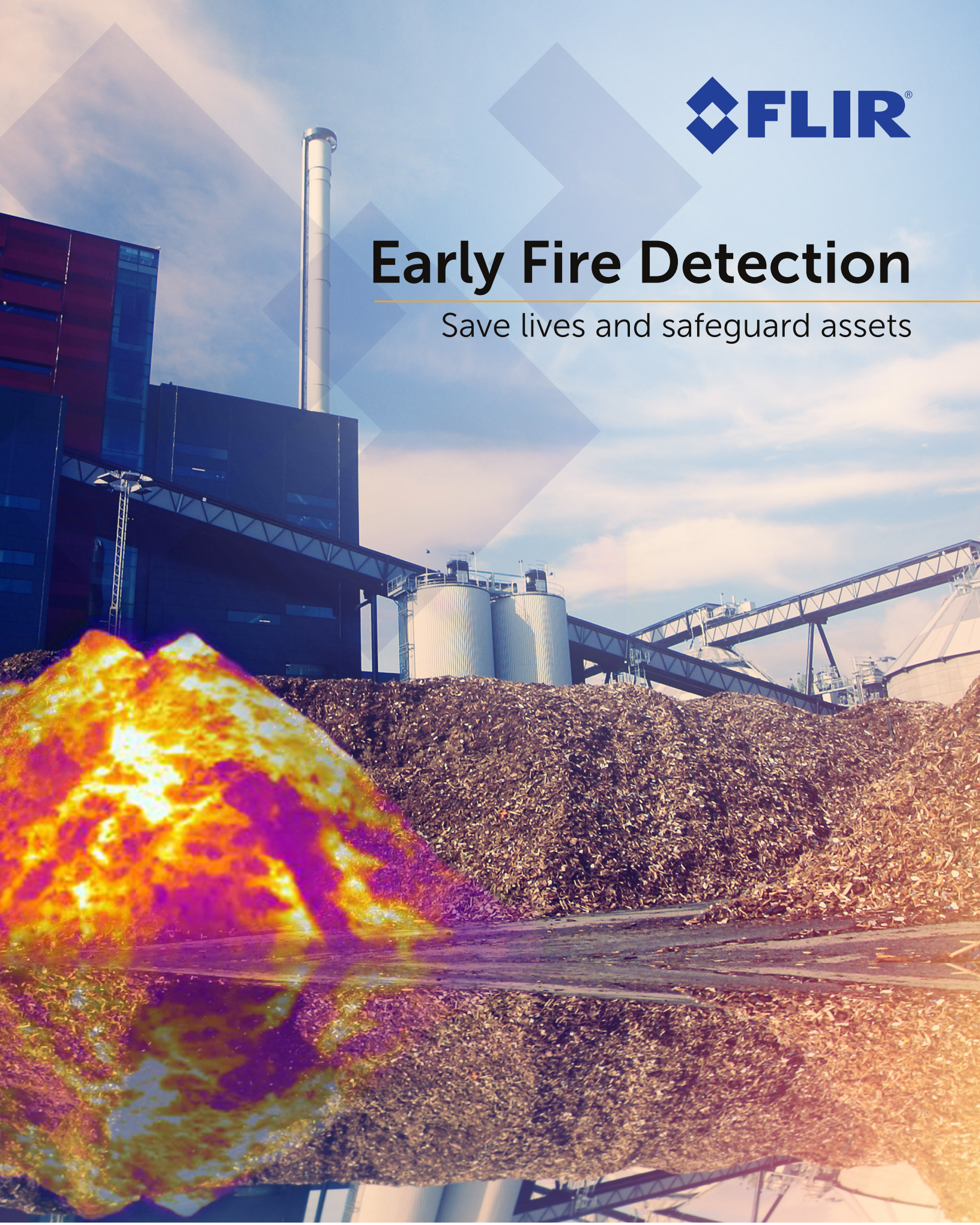


Early Fire Detection

Save lives and safeguard assets

1.888.610.7664 www.calcert.com sales@calcert.com

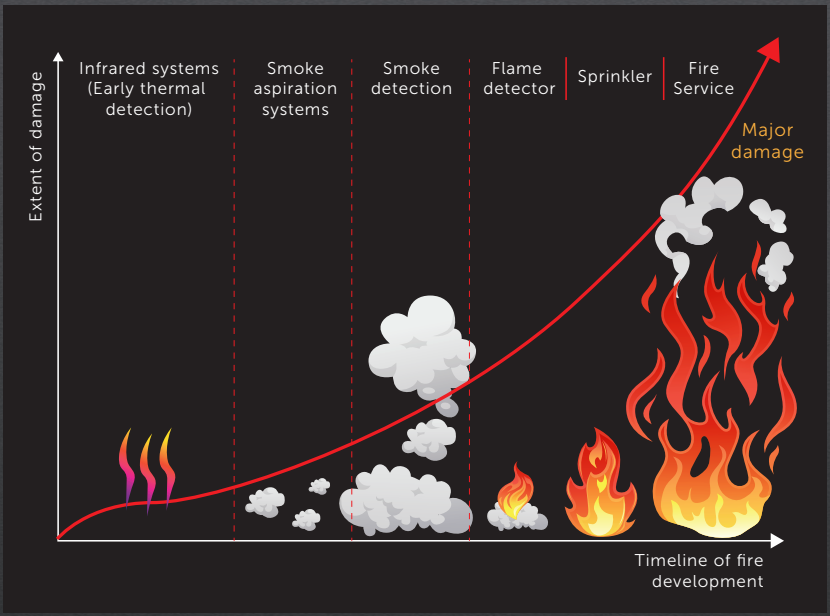
With any fire, an early response is absolutely essential. But what if you could act before the fire even ignites? With FLIR's active thermography, you can.

In 2022 alone,

- U.S. fire departments responded to an estimated **1,450 warehouse fires.**
- **7,534,403 acres** of U.S. land burned due to wildfires.
- Fires reportedly cost U.S. businesses more than **$300 billion.**

Many fires are preventable, and that's where FLIR early fire detection systems come in. The ability to identify and detect rising heat levels is crucial to being able to act early and protect people and vital assets. With their non-contact method of measuring temperatures, FLIR thermal imaging cameras can help prevent fires by detecting hot spots and proactively alerting safety personnel of trouble spots so they can act quickly before a fire ignites. FLIR cameras help speed up response times, preserve valuable assets from fire damage, and keep people out of harm's way.

FLIR has systems you can count on for Early Fire Detection



Although important, traditional fire detection equipment, such as smoke detectors and sprinkler systems, don't cover the entire fire development timeline from hot spot to ignition. The best way to minimize damage to materials and people is to take action against potential fires before they're visible to the naked eye (or nose).

FLIR cameras supplement traditional fire detection systems to find early signs of potential fires. Offering a full suite of thermal cameras and options for software, training, service, and world-class after-sales support, FLIR has a system you can count on.

"The FLIR cameras have taken away the uncertainty. Today, we are always one step ahead because we can detect hot spots before a fire breaks out."

Olle Ankarling, Söderenergi's Plant Manager

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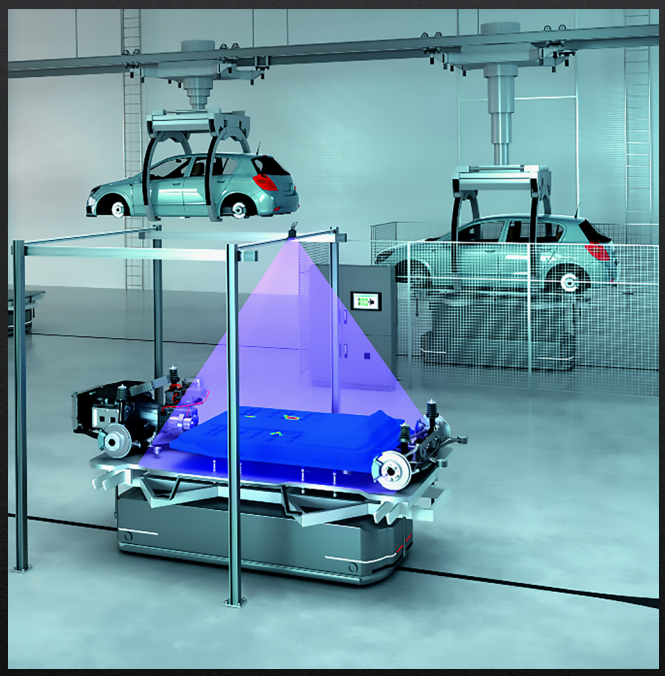
Li-ion Battery Production & Storage

Thermal Monitoring Application
Fires at electric vehicle battery storage facilities are becoming more prevalent since batteries still hold a small amount of charge during transportation to manufacturing plants. A faulty battery can cause catastrophic damage to critical infrastructures like ports, HGVs, roads and highways and more.

FLIR thermal cameras can provide real-time temperature monitoring of Li-ion batteries. Since temperature variations can indicate potential issues like thermal runaway, continuous monitoring allows for early detection of abnormal heat levels. This early warning system enables operators to take proactive measures to prevent battery overheating and potential fire hazards.

Learn More



Case Study
SICK AG, a market leader in the global sensor manufacturing industry, has developed a system for detecting at-risk batteries, helping businesses prevent battery fires before they can cause significant damage. The system required a customized interface that could accurately test each battery for thermal runaway and then export and transmit the data to a server for analysis when anomalies were detected. After carefully considering the scale of the hot spots to be detected by this state-of-the-art system, SICK AG chose to build its new Area Hot spot Detection System (AHD) around the FLIR A70.

The FLIR A70 ensures that the AHD has a clear view of every element of each battery through infrared imaging, unlike conventional inspections such as laser thermography, which can only isolate and measure the temperature of battery components one at a time. This allows AHD to view any areas with elevated heat readings as batteries pass beneath the FLIR A70 thermal imaging camera in real-time.

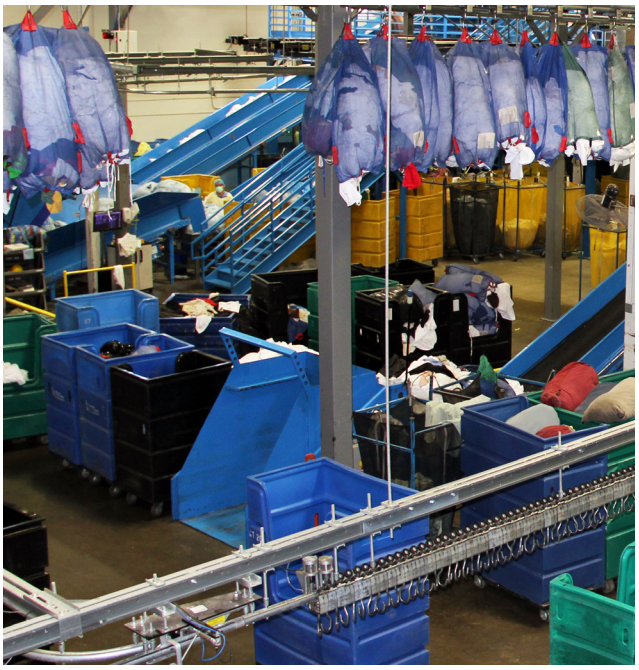
Read the case study

Manufacturing & Product Storage

Thermal Monitoring Application
Maintenance teams want to aggregate data to continually evaluate an asset's health and know if it is about to fail. Production managers are keen on catching process anomalies that result in faulty products or packaging before they leave the production line. Safety managers need to detect excessive heat buildup on fuel, hazardous material, and electrical components before combustion occurs.

Because temperature changes can be an early indicator of equipment deterioration, non-uniform temperature profiles on products, or a hot spot area, thermal automation cameras are a premier choice for plant managers.

Learn More



Case Study
Large-scale laundry facilities face many fire risks. Combustible fabrics, the possible presence of flammable or reactive contaminants, and unmonitored or uncontrolled heating of laundry piles all increase the potential for spontaneous combustion.

FLIR integration partner MoviTHERM was approached by an industry-leading linen and uniform supply company to design and deploy a thermal monitoring system. The intent of the monitoring system was to track the critical temperatures at key processing locations in their laundry facility, and generate warnings and alarms when temperatures exceeded expected limits.

To address the specific challenges, MoviTHERM adopted a distributed, multicamera network topology based on nine FLIR A310 cameras and three MIO-8 multichannel intelligent I/O controllers.

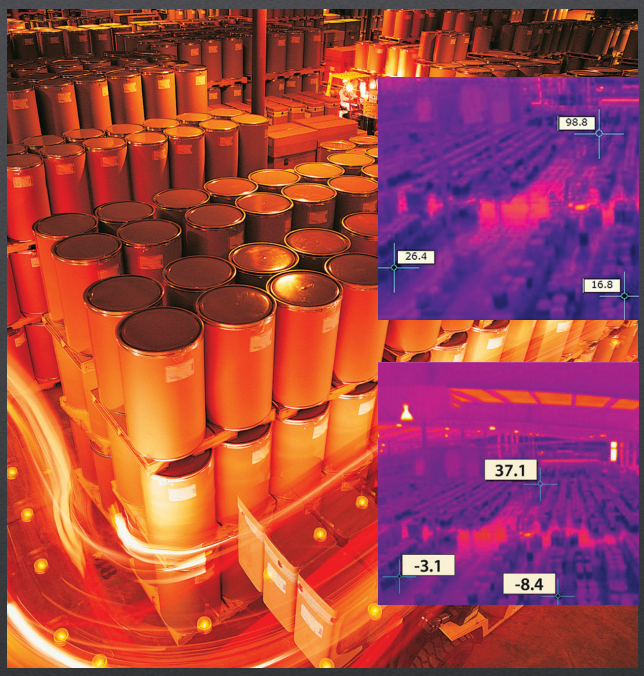
Read the case study

Warehousing

Thermal Monitoring Application
Even though warehouses are equipped with fire alarms and firefighting systems, asset damage is almost inevitable once a fire starts.

FLIR thermal imaging cameras provide an early warning response to hot spots in real- time, indicating the precise temperature and location of those spots. In addition, thermal imaging cameras do not require lighting to produce their images. Therefore, they support "lights-out" 24/7 warehouse monitoring. Furthermore, thermal imaging cameras have another advantage: they can also see through smoke. If a fire should break out, they can be used to guide firefighters to the source of the fire and to see if there are people still in the smoke-filled room.

Learn More



Case Study
Recently, a group of logistics engineers across Europe looked into how they could improve their maintenance and safety through a Condition Based Maintenance program based on infrared imaging.

The solution was formed around the FLIR T530 camera equipped with Inspection Route functionality. The T530's MSX®-enabled thermal images provided the engineers with the detail needed to locate and diagnose issues before they resulted in equipment failure.

Pre-uploading inspection routes onto cameras with live guidance reduced the need for additional equipment, streamlining the process for engineers and enhancing inspection efficiency. Improved data consolidation and reporting efforts lead to increased operational savings by lowering personnel costs for facilities.

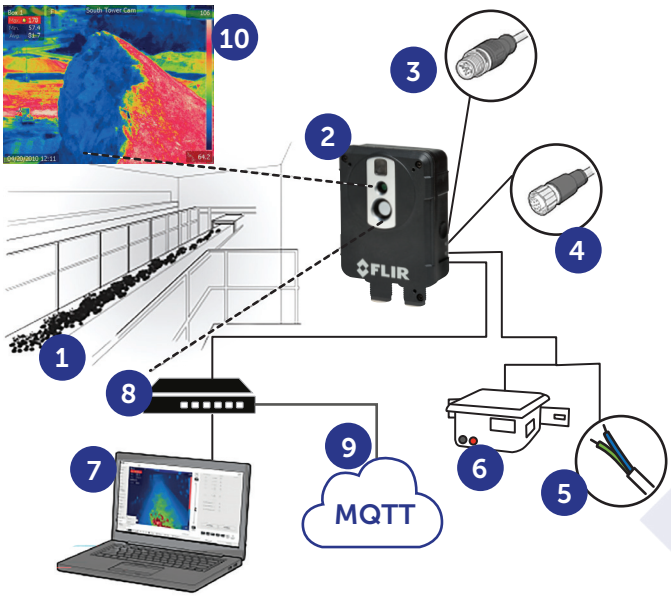
Read the case study

Waste, Recycling & Renewable Energy Production

THERMAL MONITORING APPLICATION
Waste and recycling carries a high risk of fire throughout the processing cycle, from sorting to storage. The most common causes of fires at waste and recycling facilities are spontaneous chemical combustion of waste and hot particles given off by the vehicles that collect the waste. A contributing factor to the risk of fire is the increased concentration of methane released from the waste during the natural decay process.

Thermal imaging cameras hold the potential to detect abnormal heat sources before a fire can start. This is important when every second matters, and a fast response can help to stop a critical incident. With early detection, rapid alerts, and actionable insights, you can protect your facility and staff, minimize fire hazards, and ensure uninterrupted operations.

Learn More



1. Waste storage
2. FLIR AX8 fixed-mount thermal camera
3. Ethernet connector, X-coded
4. Power I/O connector, A-coded
5. Digital output to a programmable logic controller (PLC)
6. Separate DIN rail power supply for galvanic isolation (18-56 V DC)
7. Laptop used for set up of the camera using the web interface
8. Ethernet switch
9. MQTT output connected to a third-party cloud service
10. Example thermal image

Case Study
Ecologica Tredi was founded in 1998 to recover oil filters coming from vehicle maintenance. Recently, Ecologica Tredi decided to improve facility safety by installing an effective fire control system based on radiometric thermal cameras.

The cameras Ecologica Tredi installed complement the facility's existing fire extinguishing system, including perimeter sprinklers, water, and foam cannons. The system continually monitors the relevant areas and sends the data in real-time to the management and processing software.

The company also installed a FLIR AX8 thermal imaging camera to monitor the material on a conveyor belt exiting a shredder. The company interfaced the thermal imaging camera to the conveyor belt's electrical panel for the fastest response to stop the belt if an abnormal temperature is detected immediately.

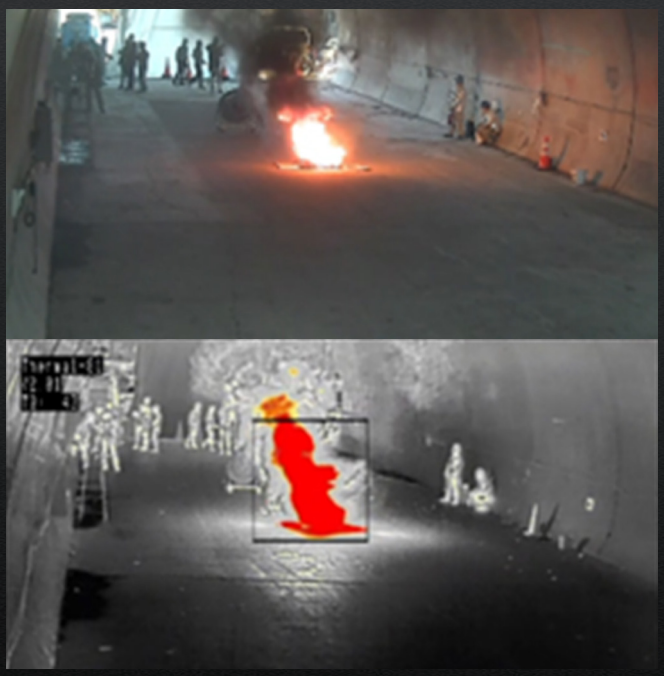
Read the case study

Highway & Tunnel Automatic Incident Detection

Thermal Monitoring Application
The ability to identify and respond quickly to incidents on roadways and in tunnels is an essential component of any effective traffic management system. FLIR traffic cameras and sensors can reliably detect incidents— including collisions, stopped vehicles, and wrong-way drivers—in challenging lighting and weather conditions.

FLIR thermal imaging cameras allow operators to detect fires in their early stages long before traditional sensors activate. In the event of a tunnel fire, the thermal cameras allow traffic operators to detect hot spots, see through smoke, and alert first responders before the fire can spread.

Learn More



Case Study
Japan has some of the most comprehensive regulations and requirements for detection equipment in the world, including road tunnels. In 2020, the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) called for a new fire detection technology that could also function as automatic emergency alert equipment. Sohatsu Systems Laboratory Inc. (SOHATSU, responded to the call with a fire detection system based on the FLIR ITS-Series Dual AID thermal imaging camera. The FLIR Dual AID combines best-in-class thermal and visual imaging technology with advanced video analytics to provide a complete solution for automatic incident detection, data collection, and early fire detection.

The ITS Dual camera system surpassed requirements by detecting the test fire within 10 seconds. It also passed the non-fire alert tests for a warm truck passing by the camera. This demonstration of the ITS Dual AID camera's ability to accurately detect potential fire hazards within seconds was a testament to its advantage over traditional flame detector technology.

Read the case study

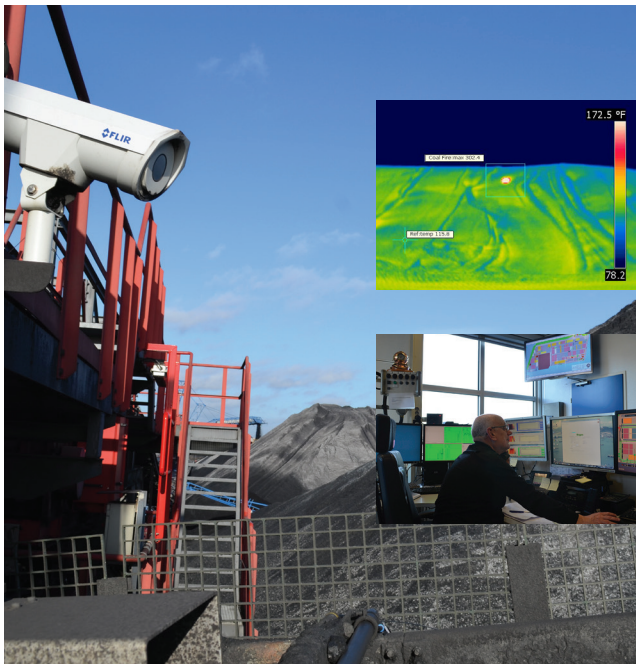
Pile Monitoring/Biomass Energy Production

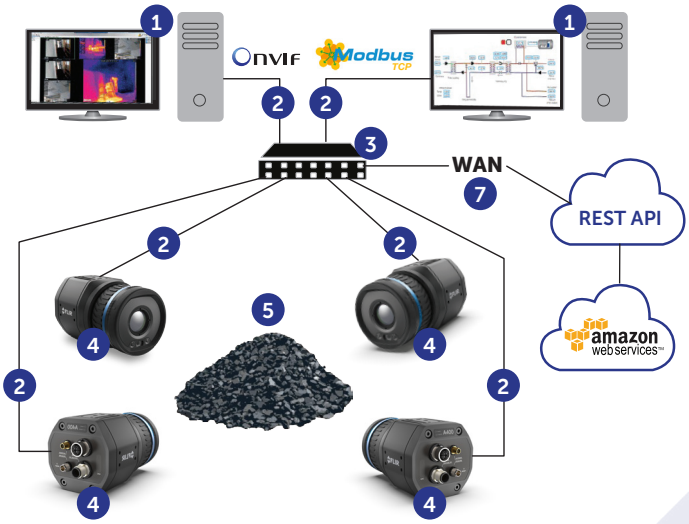
Thermal Monitoring Application
Similar to waste disposal applications, biomass is at risk for spontaneous combustion. Biomass piles are especially prone to self-heating as they naturally decompose.

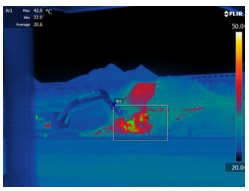
Early detection of a bulk pile fire is critical if a biomass fire is to be avoided. Spot measurements can be used but do not detect gradient effects. Monitoring the temperature trends over time is generally more helpful in detecting the early onset of heating where mitigation measures can be deployed before the situation becomes dangerous.

FLIR thermal imaging cameras can detect a warming-up of material early in the fire development process before forming smoke particles or flames, helping prevent fires by identifying hot spots before they flare up.

Learn More







1. Computer running VMS or HMI/SCADA software
2. CAT-6 Ethernet cable
3. Industrial Power over Ethernet (PoE) switch
4. FLIR A400/A500/A700 Smart Sensor cameras
5. Industrial process to be monitored, e.g. a coal pile
6. Example of thermal image
7. WAN connection to third party cloud service

Case Study
Biomass One is a leading biomass power plant in White City, Oregon. To supplement their fuel needs, Biomass One offers safe disposal of slash piles; loose wood debris left over from logging that can increase the risk of uncontrollable forest fires. This wood debris still carries the risk of combustion once it arrives at the Biomass One facility, leading Biomass One to rethink its fire management strategy.

Movitherm's early fire detection, or iEFD, system provided the fully automated IR monitoring that Biomass One was looking for. Movitherm's system includes FLIR fixed-mount thermal cameras that feed into their cloud-based platform for real-time monitoring of combustible targets. Movitherm installed a series of FLIR cameras at strategic points on Biomass One's facility, including right above their water cannons, giving them an immediate response in the event of a fire. Fire monitors can then examine the feed from the cameras and take corrective action, including activating the water cannons.

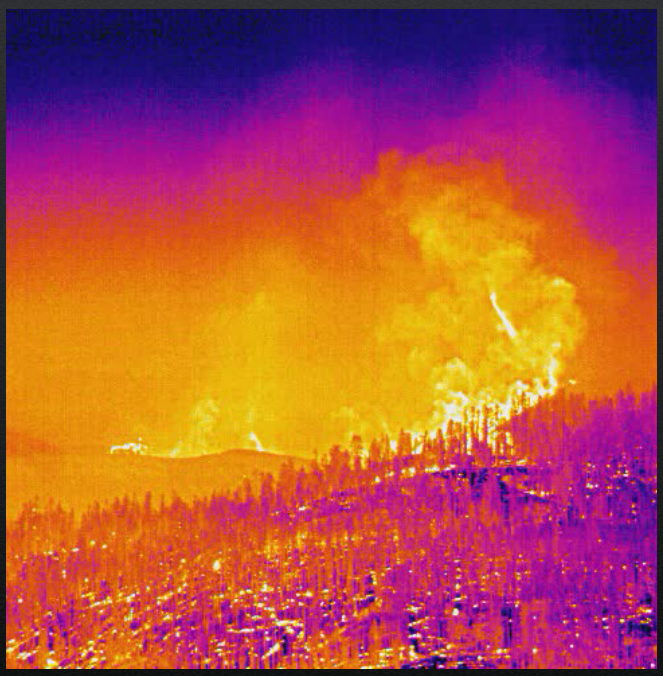
Read the case study

Wildfire Detection

Thermal Monitoring Application
Every year, wildfires present a huge threat to ecosystems, property, and human lives. Being able to see through smoke, thermal imaging is especially critical for firefighters. Without a way to see through the smoke, first responders were limited to the "waiting technique," i.e., waiting for the smoke to clear. Real-time detection of fire makes a huge difference when directing ground firefighters who need to get into the incident or for leadership who need data to make decisions.

Beyond seeing through smoke, thermal imaging is also ideal for catching what ground crews or visible light cameras might not be able to detect: spot fires. If conditions like wind push embers across the fuel break, a hot spot may ignite that's invisible to the naked eye. By identifying spot fires quickly, ground firefighters can extinguish the hot spot before the fire spreads.

Learn More



Case Study
Wildfires are an omnipresent threat along the West Coast, and FLIR thermal imaging gives firefighters an advantage when battling a blaze. During the 2021 California wildfire season, a FLIR Triton PT-606Z HD and a FLIR Elara DX- Series thermal camera monitored the Caldor Fire in northern California, allowing firefighters to get a better picture of the active fire even through dense smoke, while two FLIR Elara DX-Series cameras tracked the nearby Dixie Fire.

The thermal cameras augmented the network of visible-light PTZ (Pan-Tilt-Zoom) cameras that ALERTWildfire—a consortium of three universities providing cameras and other tools to detect and monitor wildfires—had previously installed in the area. The camera installed at Angel's Roost was intended to provide imagery if the Caldor Fire spilled into Lake Tahoe Basin, allowing firefighters to take proactive measures to protect nearby communities.

Read the case study

Frequently Asked Questions

How far away can a FLIR thermal camera detect a hot spot?
Detection range depends on camera resolution and lens FOV. There must be enough pixels covering a hot spot to register an accurate temperature reading. With the right FLIR camera, at 100 feet [30 m] you can detect a hot spot the size of inches, not feet.

How can I receive alarms?
FLIR Smart Sensor works with industry-standard protocols, such as Ethernet IP, Modbus, and Rest API, for integration into your PLC, SCADA, or custom application. The built-in Digital I/Os provide a dry contact for alarming into a control panel or closing a relay. Stream the video feed to your VMS via ONVIF-S or set up email server notifications through the Smart Sensor web interface.

How fast can the camera react to a change in temperature?
FLIR cameras actively read the scene for temperature changes and can alarm in real-time.

Is there any way to remove all false positives?
FLIR technology will accurately measure the temperature of what it sees. Smart Sensor features built-in measurement tools, such as boxes or polygons, configured through the camera's web interface, allowing users to only measure areas of interest and mitigate false alarms. Alarms are user- defined by temperature limit & time duration (ex.: 120°F [49°C] for 10 seconds).

Can we see a hot spot inside a pile? What about through walls?
Infrared technology is line-of-sight. If you can see it the camera will measure it. In some cases FLIR may detect the heat venting rather than the exact hot spot.

Can FLIR cameras detect thermal runaway in Li-ion batteries?
Thermal runaway is a chemical reaction that produces heat. FLIR cameras can accurately detect a hot battery experiencing thermal runaway or measure the heat escaping from a cell within a battery pack.

Will a FLIR camera work in my dusty, dirty, or hot environment?
FLIR cameras can see through smoke, steam, and dust, and are compatible with enclosures to protect them from hard environments.

Will FLIR install or integrate cameras on site?
FLIR cameras are simple to integrate and install. We rely on a network of expert integration and installation partners to support our customers worldwide.

Take the next step

FLIR has an experienced team ready to help build an early fire detection system tailored to your needs. With our dedication to innovation and industry-leading thermal imagery systems, we're ready to collaborate on the perfect answer to meet your challenges. Contact us today to turn your vision into reality.

For technical or sales support, please visit.

Specifications are subject to change without notice

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