TECHNICAL NOTE

THERMAL IMAGING CAMERAS HELP GUARANTEE FIRE SAFETY IN TUNNELS

Combined with smart video detection analytics, the FLIR FC-Series offers a complete solution for automatic incident detection, data collection and fire detection.

Tunnel fires can have devastating effects on people and infrastructure. The consequences of fires in tunnels can in the worst cases result in severe fatalities, material damage and disruption of important infrastructure lines. Effective fire prevention, detection and control can therefore save lives and prevent high costs. Tunnel operators and emergency response teams have always relied on intelligent technology to support them in these tasks. Thermal imaging is one of these technologies.

Although traditional CCTV cameras are still an option for tunnel monitoring, thermal imaging cameras have a number of advantages. In tunnels, thermal imaging cameras are used to monitor traffic flows or detect incidents in an early stage. In other applications, like firefighting, thermal imaging cameras are a reliable addition to human vision, because they can help firefighters see through smoke or detect hot spots.

Thermal imaging technology makes use of temperature information coming off the environment. It does not need any light to operate and therefore, it has some distinct advantages over visual cameras and even human vision.

See through smoke:
One of the biggest advantages of thermal imaging cameras in the field of tunnel safety is that they can effectively see through many types of smoke. This makes it the ideal technology for emergency response teams to find their way through a smoke-filled tunnel or for incident detection systems to spot incidents in time.

Not affected by sun glare:
Sun glare blinds conventional video cameras, effectively hiding vehicles, people, and animals. Thermal cameras ignore this glare, and only respond to heat signatures they detect.

Not affected by headlights:
Headlights are confusing to CCTV cameras. This causes false and missed calls and makes accurate observation of highway traffic at night impossible. Thermal cameras are immune to headlight glare, so they see clearly.

See through shadows:
Video cameras can miss pedestrians, cyclists, animals, and even cars if they're in the shadows. This is especially the case at the entry or exit of a tunnel, where it can be very dark inside because of shadows and very bright outside because of sunlight. But since thermal cameras see heat, not light, there are no shadows in a thermal world, so this will not affect visualization.

Long-range night viewing:
At night, a highway looks like an indistinct row of lights to a video camera, making meaningful data collection and incident assessment impossible. But thermal cameras see the heat signatures of vehicles clearly from miles away. They also provide clear video of the roadsides for awareness of parked vehicles or other hazards.

THERMAL IMAGING APPLICATIONS

Automatic Incident Detection (AID)
Traffic incidents in tunnels can result in

severe fires. That is why it is extremely important for emergency services to be responsive and avoid further escalation of an incident, for example by avoiding secondary accidents. Effective incident management depends entirely on fast incident detection and verification. Tunnel operators can use thermal imaging cameras to detect stopped vehicles, wrong-way drivers, queues, slow-moving vehicles, fallen object or pedestrians in a matter of seconds, so they can prevent secondary accidents from happening.

Thermal imaging cameras are especially effective when installed at the entry and exit of a tunnel, because that's where traditional CCTV can experience difficulties in dealing with direct sunlight or precipitation. FLIR's high-performance thermal imaging cameras give you uninterrupted 24-hour detection of vehicles, pedestrians and cyclist regardless of the amount of light available.

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Early fire detection

Fire can cause severe damage to tunnel structures, resulting in high costs. Thermal imaging can help prevent fires, by detecting hot-spots, or detect fires in an early stage so they don't have a chance to spread. Thermal cameras can be configured to generate a direct alarm output to a control room operator when user-defined maximum temperature thresholds are exceeded. Thermal imaging cameras like the FLIR FC-Series are widely used to monitor continuously for hot spots, so that an early fire alarm can be triggered and fires can be avoided.

Firefighting

When moving into a tunnel fire scene, a thermal imaging camera is an indispensable tool for firefighters to help them quickly visualize their plan of attack, locate hot spots, and save lives. Today's Thermal Imaging Cameras (TICs) offer easier ways to see more clearly in the darkest, smokiest environments by showing big, bright thermal images that help them maneuver more strategically, stay better oriented, and find victims faster. With greater situational awareness, they can improve safety and the likelihood of successful outcomes.

Thermal Imaging Cameras (TICs) help firefighters see more clearly in the darkest and smokiest environments.

Thermal imaging can help prevent fires or detect them in an early stage so they don't have a chance to spread.

Driver vision enhancement

FLIR's thermal imaging night vision systems installed onboard emergency vehicles allow drivers to see clearly in total darkness or in bad weather conditions. Compared to traditional headlights, they offer increased vision through smoke, dust or precipitation, and therefore better situational awareness.

PRODUCT HIGHLIGHTS

FLIR FC-Series ITS – Thermal imaging cameras

FLIR thermal imaging cameras are commonly integrated in traffic video detection and monitoring solutions. Needing no light at all to produce an image, they can be used for a wide variety of traffic applications. Just like all thermal imaging cameras, the FLIR FC Series ITS works perfectly in combination with video analytics.

VIP-Series - Multi-functional video detection boards

The VIP series offers multi-functional Video Image Processing modules for traffic control. VIP boards integrate automatic incident detection, data collection, recording of pre and post incident image sequences and streaming video in one board. VIP modules have been installed for road and tunnel projects all over the world.

PathFindIR - Driver Vision Enhancement System

Unique in the industry, PathFindIR is an automotive-qualified system designed primarily for driving vision enhancement applications. PathFindIR is a hermetically sealed system, rated IP-67, with an integrated, automatic window heater. Using a 12VDC input power source, standard NTSC or PAL video is output for compatibility with most monitors or displays.

For more information please visit: www.flir.com/traffic

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