



INTELLIGENT TRANSPORTATION SYSTEMS

**24/7 Detection and Monitoring
Solutions to enhance safety
and keep traffic flowing**



ENHANCING SAFETY AND EFFICIENCY FOR ROAD TRAFFIC AND PUBLIC TRANSPORTATION

Traffic managers all over the world use detection and monitoring solutions from FLIR to help manage safe, efficient traffic flow. With over 25 years of proven transportation experience, advanced FLIR hardware and software solutions help you monitor motorists and pedestrians in urban environments, detect incidents on highways and in tunnels, collect traffic data, and ensure safety along public railways.



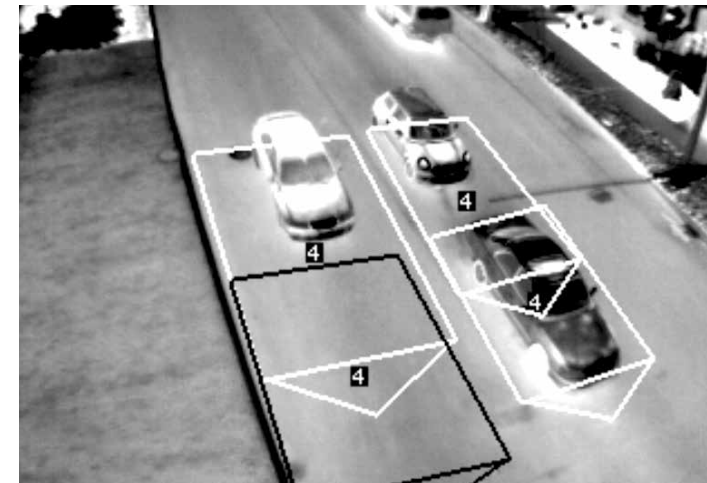
Urban Intersections

FLIR traffic sensors help you control intersections and optimize traffic flow for vehicles, pedestrians, bicyclists, and public transportation. Automating intersections and crosswalks can improve overall safety and reduce bottlenecks in dynamic urban environments. While improving traffic flow in real time, FLIR sensors also collect valuable traffic data for traffic engineers.



Highways, Tunnels, and Bridges

FLIR automatic incident detection solutions help save lives in tunnels and on highways and bridges by detecting smoke, fire, stopped vehicles, lost cargo, pedestrians, wrong-way driving vehicles and other traffic events. Early detection of road irregularities enables first responders to intervene quickly and avoid secondary accidents.



Trackside Monitoring and Level Crossing Safety

FLIR thermal imaging cameras can prevent collisions between trains, vehicles, and pedestrians at level crossings. Integrated systems detect when a vehicle stops on the tracks, a person falls from the platform, or an individual is deliberately walking on the railway to give train and tram operators advanced warning of upcoming obstructions.

Traditional video cameras, as well as thermal cameras, can be combined with FLIR traffic video analytics.



DETECTION & MONITORING SOLUTIONS FOR TRAFFIC AND PUBLIC TRANSPORTATION APPLICATIONS

Combining video and thermal cameras with artificial intelligence, video analytics, radar, and V2X with traffic management and data analytics software, FLIR has field-proven solutions to help cities run safely and smoothly.

Real-Time Analysis

Real-time analysis of video or thermal camera images allows for more efficient traffic management in tunnels, on highways, and in urban areas. Traffic lights can be adapted in real-time, according to current traffic flows. When incidents occur, early detection enables faster intervention by rescue teams, preventing secondary accidents.



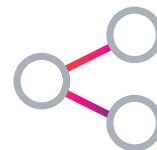
Cost Effective

Video detection systems for monitoring traffic streams are extremely cost effective. Cameras can be easily installed above ground on existing infrastructure—such as mast arms, luminaires, or existing poles—eliminating the need for road closures or other disturbances. Detection zones can also be easily moved or adapted when traffic situations change.



Connected

FLIR sensors securely connect to all varieties of management software solutions. From video recording, command and control, traffic event storage, cloud data analytics, and V2X communication, FLIR transportation solutions are capable of much more than detection.



Video Detection - Seeing is Believing

The combination of numerical data and visual images sets video detection apart from all other detection systems. The immediate visual feedback from a monitor is invaluable for traffic managers or operators to know exactly what is occurring and what appropriate actions to take.



Efficient and Reliable

Video detection and monitoring systems from FLIR are used around the world. Traffic managers appreciate their high detection rates and speed. This results in a low Mean Time to Detect (MTTD) and a low False Alarm Frequency (FAF).



Proven Technology

Over 300,000 FLIR traffic cameras are operational in over 80 countries worldwide. FLIR has Automatic Incident Detection (AID) installations in more than 1800 tunnels and traffic light management systems at more than 75,000 intersections worldwide.





THERMAL IMAGING FOR TRAFFIC APPLICATIONS

While video cameras are traditionally used for traffic video analysis, they need additional algorithms to overcome their inherent vulnerability to low light conditions (night time), too much light (sun glare), and shadows that can hide vehicles or pedestrians. Thermal sensors don't face any of these issues because they create a crisp image based on subtle differences in heat signatures within a scene. Thermal sensors need no light to work, are not blinded by direct sunlight, and provide uninterrupted 24-hour detection of vehicles, pedestrians, and cyclists, regardless of the amount of light available.

Sun Glare

Glare from the sun blinds conventional video cameras, effectively hiding vehicles, people, and animals. Thermal sensors cannot see this glare and only respond to the heat signatures they detect.



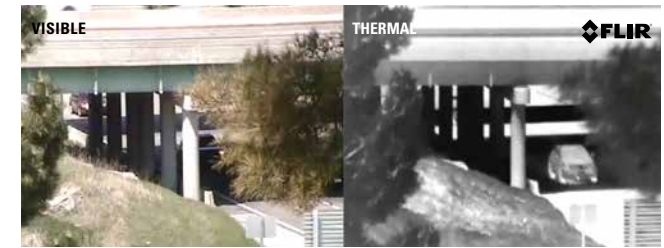
Headlights

Headlights are confusing to video cameras, making accurate observation of highway traffic at night challenging. Thermal sensors, however, are immune to headlight glare, so they see clearly.



See into Shadows

Video cameras can miss pedestrians, cyclists, animals, and cars obscured by shadows or at night. However, since thermal sensors see heat, not light, they can see into shadows or total darkness, providing a more reliable detection solution.



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 almost impossible. But thermal cameras see the heat signatures of vehicles clearly from miles away, while also providing clear views of the roadsides, revealing vehicles that are pulled over.



Measure Temperature

Thermal cameras display the temperature differences of any objects in their field of view. This unique capability allows detection of fires at their early stages over the full detection range.



See Through Smoke

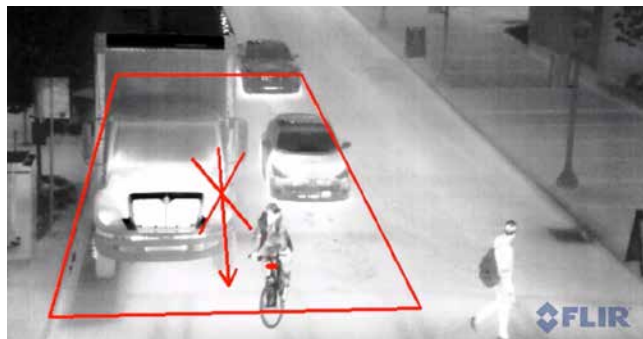
Thermal cameras see through smoke, offering better visibility than visual cameras in the event of a fire. This enhanced vision can help emergency personnel quickly locate and evacuate victims during a tunnel fires and other incidents.



How Video Analytics Works

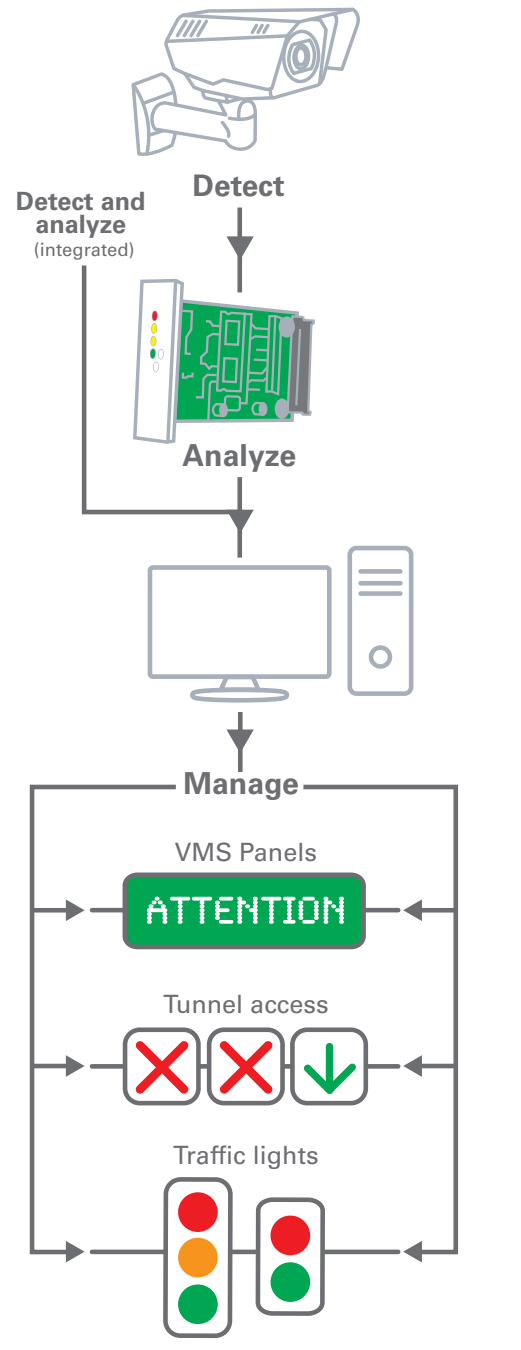
An installed video or thermal imaging camera sends an input signal to a detection unit, either onboard the camera or integrated into a standard 19-inch rack. Once the camera or the video image processing modules are set, detection zones are superimposed onto the video image.

When a vehicle or a pedestrian enters a detection zone, dedicated algorithms generate different types of traffic data. This includes presence and incident-related data, information for statistical processing, and data for pre-and post-incident analysis. Compressed images and alarms are transmitted to the technical control room. The system can be installed so that the video image processor triggers a third-party system, such as a traffic light, electronic traffic sign, or any other VMS panel. When an alarm is generated, the traffic manager in the control room will receive a visual image of the scene, allowing them to take action.

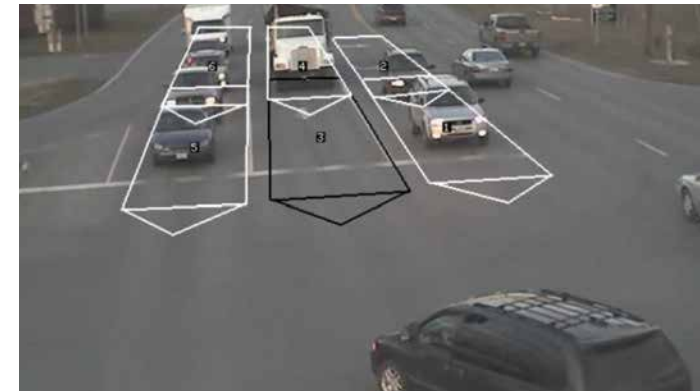


Precise detection zones can be set using analytics.

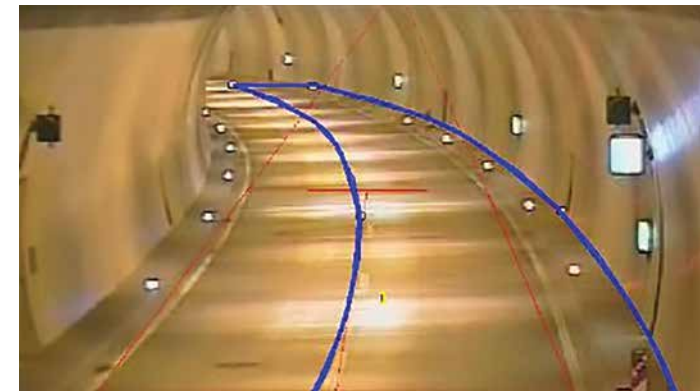
Video Analytics System Diagram



Pinpoint analytics for easy vehicle detection and recognition.



Monitor intersections with precise analytics that can transmit alarms when potential hazards enter controlled zones



Precise detection zones can be set using analytics.



High resolution data analytics

FLIR thermal and visual analytics provide real-time traffic signal control by detecting the presence of vehicles, bicyclists, and pedestrians at intersections. This generates valuable traffic data, including counts, occupancy, classification at the stopbar, and between intersections. By anonymously using Wi-Fi technology to track how people and vehicles move at intersections, FLIR sensors measure travel times, delays, points of origin, and destinations. FLIR integrates both presence data and traffic flow data into a single source in the cloud, resulting in high-resolution, high-quality intersection data.

- Capture, store, and fuse valuable traffic data
- Measure intersection performance
- Real-time congestion mapping
- Better insights, better decisions

Pedestrian safety and mobility

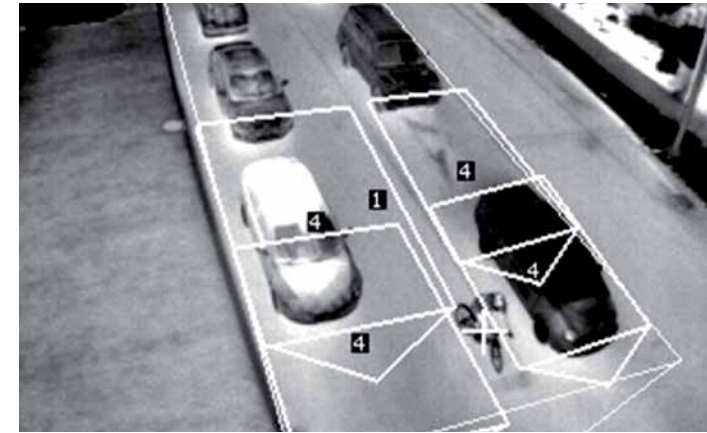
FLIR sensors allow you to include pedestrian movement into traffic control strategies and make them more visible to traffic. With dynamic traffic light control and warning sign activation, operators can make intersections and pedestrian crossings safer, while also preventing unnecessary delays to both pedestrians and motorists.

- Constant detection of pedestrian occupancy at crossings dynamically controls wait time
- Replace inefficient push buttons
- Enhance pedestrian safety

Vehicle Detection

FLIR video, thermal, and radar sensors are highly reliable, accurate and non-intrusive detection technologies specifically designed for signal control and traffic management. By detecting vehicles so efficiently, FLIR sensors enable smart intersection control for greater safety.

- Improve city traffic flows
- Reduce unnecessary delays
- Enhance safety for all road users

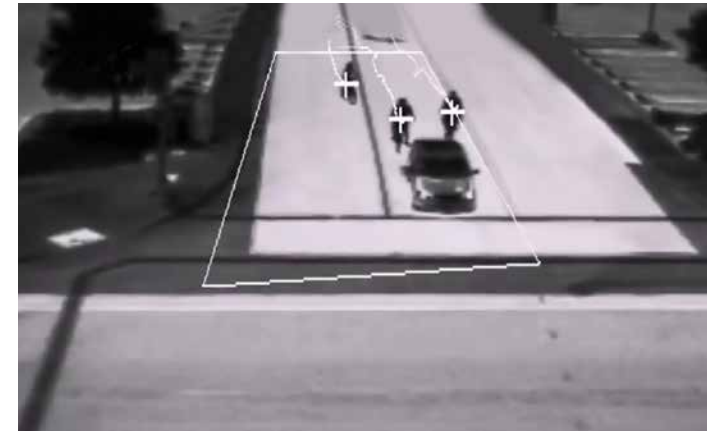




Bicycle Detection

By looking at heat signatures, thermal cameras can make a reliable distinction between bicyclists and vehicles. Traffic signals can be adapted to give bicyclists green time ahead of vehicle traffic for greater visibility. Bicycle detection will provide an extended clearance time for bicyclists, allowing them more time to cross an intersection without causing unnecessary delays.

- Above-ground thermal sensors reliably detect bicyclists in mixed traffic environments
- Trigger bicycle warning signals dynamically
- Adapt traffic signals to enhance bicycle safety

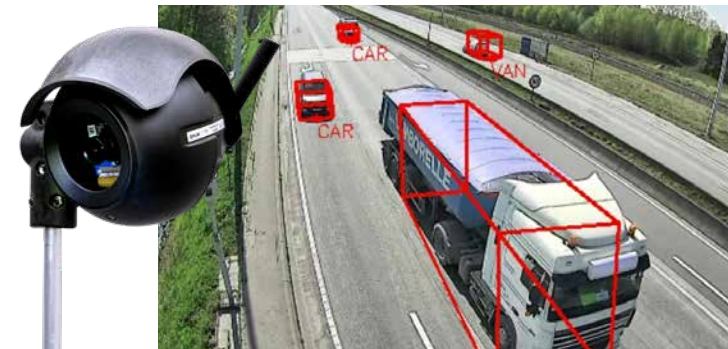


FLIR DETECTORS AND SENSORS FOR TRAFFIC SIGNAL CONTROL

TrafiCam™ AI

Vehicle Presence Sensor

Designed to reliably detect and classify road users, the TrafiCam AI is an intelligent HD visible sensor for traffic monitoring in complex urban environments. Featuring a low-light HD visible camera and AI algorithms built on 25+ years of traffic detection, TrafiCam AI offers detailed vision and data collection for safer, more efficient cities. Capable of tracking multiple objects, the advanced edge-based AI effectively controls intersections and gathers detailed traffic data for better city planning decisions.

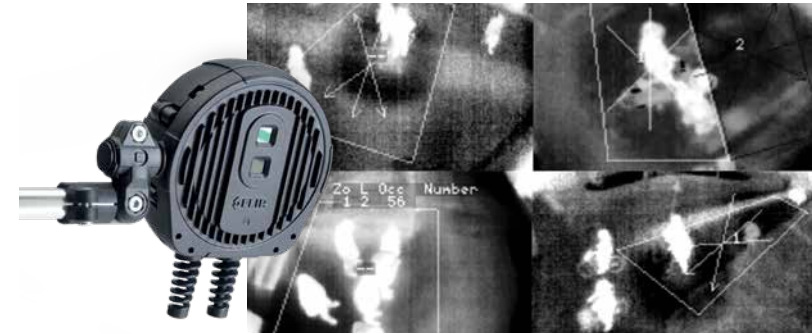




TrafiOne™

Smart City Sensor

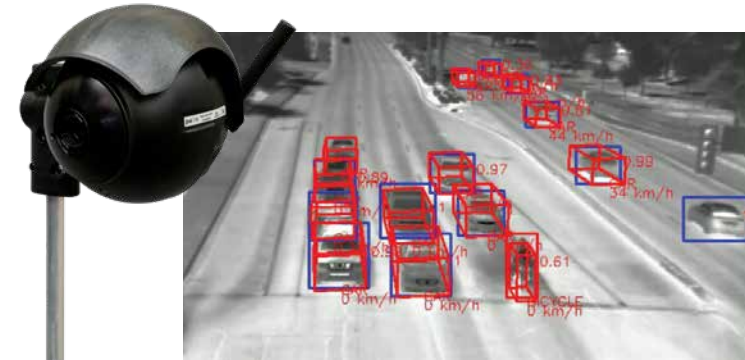
FLIR TrafiOne is an all-round sensor that tracks waiting and crossing pedestrians and bicyclists in urban environments. TrafiOne uses thermal imaging technology to reliably detect in all weather conditions and even in total darkness. The sensor includes an HD visual C-MOS camera for streaming video.



ThermiCam™ AI/TrafiSense™ AI

AI-Powered, Integrated Thermal Traffic Detector

Designed to reliably detect and classify road users, TrafiSense AI/ThermiCam AI is an intelligent thermal imaging sensor for traffic monitoring in complex urban environments. Featuring AI algorithms built on 25+ years of traffic detection and best-in-class thermal imaging, TrafiSense AI/ThermiCam AI delivers continuous vision and data collection for safer, more efficient cities. Capable of tracking multiple objects in any lighting condition, the advanced edge-based AI technology effectively controls intersections, helps protect vulnerable road users, and gathers detailed traffic data for better city planning decisions.



ThermiCam2™ /TrafiSense2™

Integrated Thermal Traffic Detector

ThermiCam2/TrafiSense2 is an intelligent thermal sensor capable of detecting vehicles, bicyclists, and pedestrians for dynamic traffic signal control and data collection. Integrated Wi-Fi technology allows simultaneous thermal detection, travel time, and delay time calculation. Since the ThermiCam2/TrafiSense2 relies on thermal energy rather than light, it offers 24/7 traffic monitoring and can detect road users at night, through glare, and in harsh weather conditions.

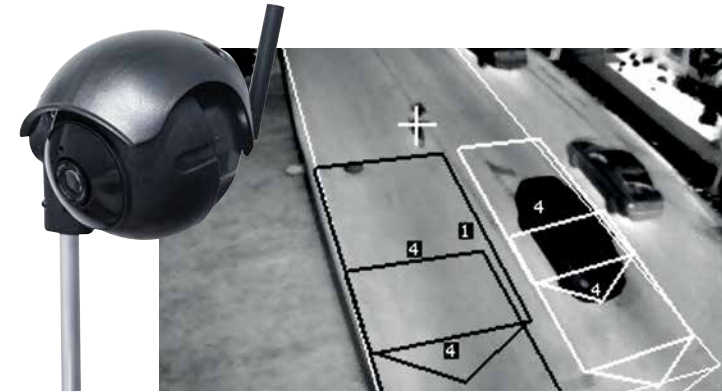




TrafiSense2™ V2X/ThermiCam2™ V2X

Intelligent Thermal Traffic Sensor with V2X

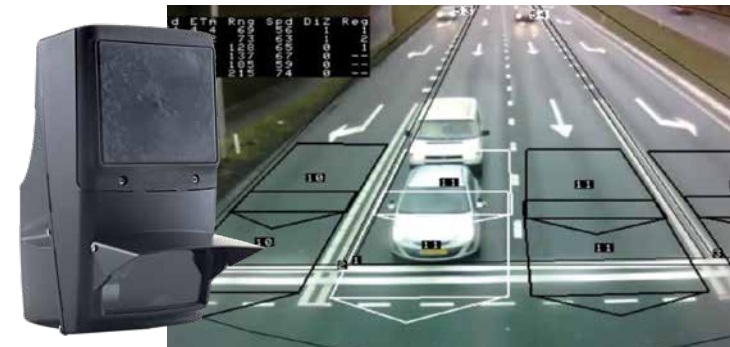
TrafiSense2 V2X/ThermiCam2 V2X is an intelligent thermal sensor for vehicle, pedestrian, and bike detection. Integrated V2X technology allows simultaneous thermal detection and V2X message processing. Since the TrafiSense2 V2X/ThermiCam2 V2X relies on thermal energy rather than light, it offers 24/7 traffic monitoring and can detect road users at night, through glare, and in harsh weather conditions.



TrafiRadar™

Video Sensor & Radar Combination

FLIR TrafiRadar is a combination of a video sensor and radar, providing information on the location and speed of vehicles approaching or waiting at an intersection. The TrafiRadar warns the traffic light controller whenever a vehicle is present in the dilemma zone, either extending green time or extending all red lights in order to improve overall safety at signalized intersections. As a result, better decisions can be made to control the traffic lights in a more optimal way.



Acyclica™ by FLIR

Smart City Platform

The Acyclica smart city platform provides the information and insight necessary to understand the traffic situation. Acyclica transforms mountains of data into actionable information to help agencies understand travel times, traffic patterns, and congestion. From point-and-click origin-destination analysis to real-time congestion mapping, Acyclica helps agencies understand how people are moving. A range of automated reports, powerful user interface, and comprehensive APIs ensure that data is where you need it when you need it.





FASTER RESPONSE TIME, RELIABLE DETECTION

The ability to identify and respond quickly to incidents on roadways and in tunnels is an essential component of effective traffic management systems. FLIR traffic cameras and sensors can reliably detect incidents like collisions, stopped vehicles, tunnel fires, traffic-flow levels, and wrong-way drivers—in challenging lighting and weather conditions.

Highway Monitoring

FLIR thermal imaging cameras keep an eye on our highways. Because they aren't vulnerable to low light conditions, excessive sun glare, or shadows, they offer a truly 24/7 solution for highway operators.

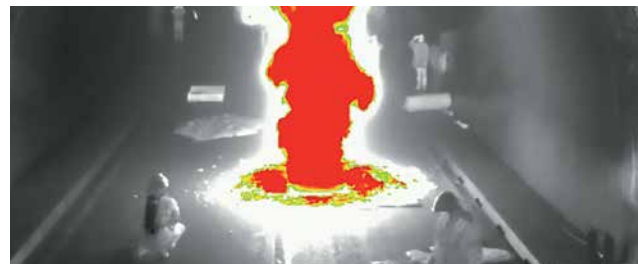
- Monitor traffic 24/7
- See your traffic accurately, day and night
- Enjoy a clear view in all weather conditions



Fire Detection in Tunnels

FLIR thermal imaging cameras allow operators to detect fires in their early stages. In case of a fire, the thermal cameras enhance the vision of the operators by seeing through smoke and detecting hot spots.

- Detect incidents and fires at an early stage
- Monitor tunnel traffic
- See through smoke



Automatic Incident Detection

Effective incident management depends on fast incident detection and verification. FLIR solutions allow you to detect stopped vehicles, wrong-way drivers, queues, slow-moving vehicles, fallen objects, or pedestrians in a matter of seconds, so you can prevent secondary accidents from happening.

- Detect in a matter of seconds
- Prevent secondary accidents
- See any traffic irregularity instantly



Data Collection and Flow Monitoring

FLIR cameras and sensors keep highways safe by accurately monitoring traffic flows. FLIR solutions can efficiently make a distinction between several levels of service: fluid, dense, congested, or stop and go. Other applications include queue monitoring during road work and travel time calculations based on traffic flow.

- Collect valuable traffic data
- Monitor queues
- Ensure safety during road works





FLIR DETECTORS AND SENSORS FOR ROADS AND TUNNELS

VIP-HD

Integrated Detection Boards

FLIR integrated detection boards provide 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. VIP boards can handle analog and HD network streams (VIP-HD), and can even be combined with video encoding.



TrafiBot2™

Automatic Incident Detection

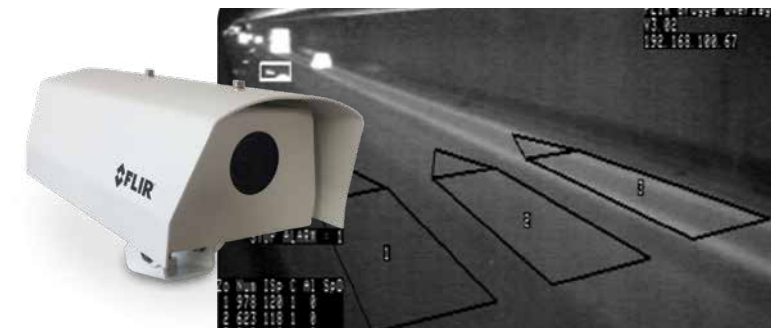
The FLIR TrafiBot2 is a compact, rugged camera solution for automatic incident detection. Combining full HD visual imaging with advanced video analytics, TrafiBot2's advanced processing generates traffic data and incident detection information for tunnels, bridges, and highways, including alerts on stopped vehicles, wrong-way drivers, and lost cargo.



ThermiBot2™

Intelligent Thermal Imaging Camera

ThermiBot2 AID cameras combine best-in-class thermal imaging technology with advanced video analytics to provide a complete solution for automatic incident detection and data collection. Traffic video analytics from FLIR have proven their effectiveness worldwide along highways and in tunnels, and with the addition of thermal, allow traffic operators to see clearly in total darkness, bad weather, and over a long range.





ITS-Series Dual AID

Intelligent Dual Vision Automatic Incident Detection

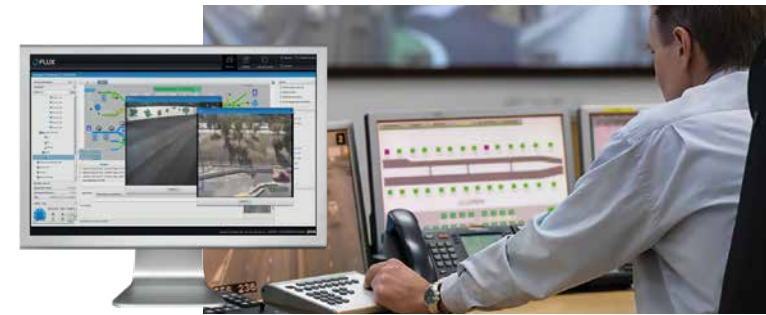
FLIR ITS-Series Dual AID cameras combine best-in-class thermal and visual imaging technology with advanced video analytics to provide a complete solution for automatic incident detection, data collection and early fire detection. FLIR traffic video analytics have proven their effectiveness worldwide along highways and in tunnels and are now combined with the power of thermal imaging, which allows traffic operators to see clearly in total darkness, in bad weather and over a long range.



FLUX™

Traffic Management System

FLUX is an intelligent software platform for use with a FLIR video detection system. FLUX collects traffic data, events, alarms and video images generated by the video detectors. FLUX also offers video management capacity and can control network video recorders, video walls, mobile and fixed cameras.



FLIR United VMS

Network Video Management System

FLIR United VMS is a reliable, enterprise-level software solution for video surveillance, supporting an unlimited number of cameras over IP networks. United VMS features enhanced cybersecurity, edge device integration, and global administration.



FLIR Cameleon ITS

Command & Control Software

Cameleon ITS is a central software platform for transportation monitoring and management that allows for the control of ITS-specific devices, including cameras, DMS signs, detector stations, gates, signal heads and incident detection.





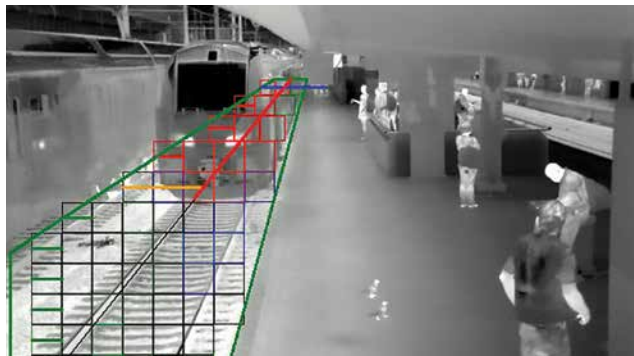
PUBLIC TRANSPORTATION SAFETY

FLIR technology helps public transportation systems operate safely. Thermal imaging cameras detect activity around platforms and tracks. Reliable detection and advanced analytics combine to reduce the risk of accidents and improve efficiency.

Trackside Monitoring

FLIR thermal imaging cameras detect people on metro, tram, or railway tracks. Whether a person falls from the platform or is deliberately walking on the tracks, FLIR cameras offer reliable, 24/7 detection on tracks and in tunnels in any lighting condition.

- Detect people on tracks and at the entrance of tunnels
- Prevent damage to infrastructure
- Enhance safety



Vehicle Detection at Railway Crossings

FLIR thermal imaging cameras can prevent collisions between trains and vehicles at level crossings by detecting when a vehicle stops on the tracks. In this way, train and tram operators can be warned in advance.

- Detect vehicles on level crossings
- Prevent damage to infrastructures
- Enhance railway safety





LEARNING ABOUT YOUR TRAFFIC SOLUTION

FLIR offers extensive training to help you get the most out of your transportation solution. Whether you need assistance with existing equipment or recommendations for a complete traffic management platform, FLIR experts are ready to help.

Intelligent Transportation Training

The fast-changing nature of urban environments make it difficult to keep up with the latest innovations. The FLIR Traficon Academy offers a wide range of in-person and virtual training to help you leverage state-of-art technology to its fullest potential.

Comprehensive and targeted training options

Traficon Academy features a wide range of training topics and can provide either a complete overview of urban transportation solutions or pinpointed classes for a specific technology.

Smart City Sensors

Dedicated training for signal control, traffic management, vulnerable road user protection, and advanced data collection.

AID

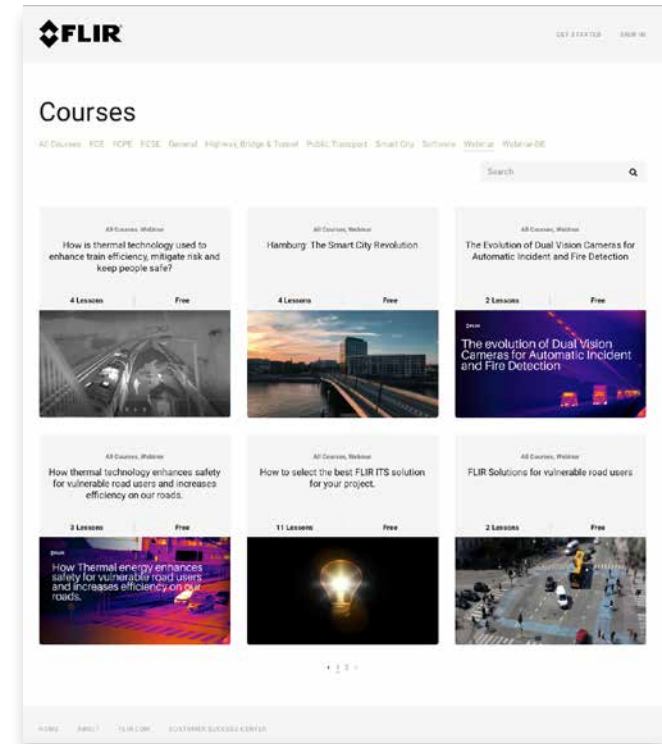
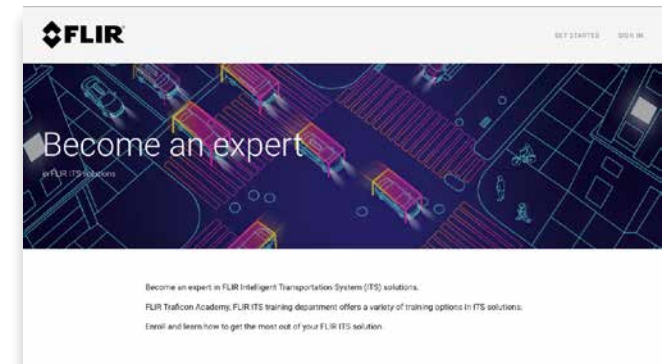
Automatic Incident Detection or (AID) courses focus on cameras and detectors used along highways, bridges, or tunnels to quickly report incidents and collect traffic data.

Management Software

Workshops dedicated to sensor installation, configuration, and operation on FLIR management software for transportation solutions.

Traficon Academy

With a host of tailored in-depth courses or free recorded webinars the Traficon Academy site is a great resource in your education, training, and certification.





THE SIX HALLMARKS OF FLIR TRANSPORTATION SOLUTIONS:

Traffic Solutions Now and in the Future

The six hallmarks of FLIR Transportation solutions are revolutionizing how traffic flows on roadways throughout the world. Our unique, field-proven solutions help keep vehicles, pedestrians, and bicycle traffic moving smoothly and safely. By combining video cameras, thermal sensors, intelligent video analytics, and command and control software, FLIR has the right solution for your specific situation. Traffic managers all over the world use technology from FLIR to keep roadways safe and running at peak efficiency. FLIR Intelligent Transportation Systems help protect citizens, as well as critical infrastructure. FLIR takes pride in making the places we live, work and travel to as safe as possible.

For the right solution for you and your transportation needs, visit our website at: www.flir.com/traffic or reach out and contact one of our trusted ITS Sales associates across the globe: Tel. **+32 (0) 56 37 22 00**

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Real-Time-Analysis



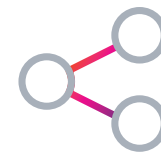
Video Detection
(Seeing is believing)



Cost Effective



Efficient & Reliable



Connected



Proven Technology

CORPORATE

HEADQUARTERS

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The World's **Sixth Sense**®