



The World's Sixth Sense®



*Traffic video detection  
and monitoring*

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Discover a wide variety of applications



↑ 4R

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The images displayed may not be representative of the actual resolution of the camera shown. Images for illustrative purposes only.

# 1

## *FLIR for Smart Traffic Management*

### **FLIR: The World's Sixth Sense**

FLIR Systems, Inc. designs, develops, manufactures, markets, and distributes technologies that enhance perception and awareness. We bring innovative sensing solutions into daily life through our thermal imaging systems, visible-light imaging systems, locator systems, measurement and diagnostic systems, and advanced threat detection systems. Our products improve the way people interact with the world around them, enhance public safety and well-being, increase energy efficiency, and enable healthy and entertained communities.



## FLIR Intelligent Transportation Systems

With roads getting more crowded and cities more congested, there is an increasing need to monitor traffic in a smart way. Traffic management operators want solutions that allow them to better manage intersections, make it safer for vulnerable road users to participate in traffic, to prevent secondary accidents on roads and in tunnels, or to gather insights from their traffic. FLIR Intelligent Transportation Systems, FLIR's dedicated business unit for ITS, focusses entirely on these needs.



FLIR Intelligent Transportation Systems has grown out of the acquired company Traficon International, a major player in the traffic market for more than 25 years. Today, FLIR ITS uses a combination of visual cameras, thermal imaging cameras, smart video analytics, and traffic management software to support traffic operators in making roads safer and traffic flows smoother.



# 2

## Safety and efficiency in any traffic environment

### Urban areas

FLIR's traffic sensors help you control traffic lights at intersections, so your urban traffic can flow smoothly. In addition, they help optimize traffic flows for pedestrians and bicyclists and improve their safety in busy traffic scenes.

### Highways

FLIR detection technology helps avoid incidents and traffic jams on highways. Early detection of road irregularities enables rescue teams to intervene fast and avoid secondary accidents.

### Tunnels

FLIR's incident detection solutions help save lives in tunnels and avoid secondary accidents, by detecting smoke, lost cargo, pedestrians and many other traffic events very fast.

### Railway tracks and platforms

FLIR's thermal imaging cameras prevent serious accidents and infrastructure damage by detecting vehicles that have stopped on railway tracks at level crossings. FLIR's thermal cameras also detect people on train/metro/tram tracks and platforms in an early stage, so accidents can be avoided.



### Intersection control

FLIR's video and thermal sensors are a reliable alternative to loops and other detection technologies. By detecting vehicles, bicyclists and pedestrians, FLIR's sensors enable smart intersection control to improve city traffic flows and enhance safety for all road users.



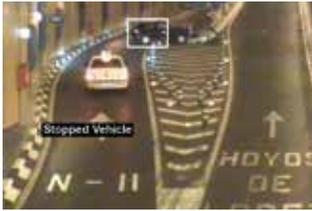
### Pedestrian safety and mobility

By detecting people on a crosswalk or on the sidewalk, FLIR's pedestrian sensors allow you to control your traffic lights in favor of pedestrians or make pedestrians more visible in traffic.



### Highway monitoring

FLIR's thermal imaging cameras help keep an eye on our highways. Because they don't have problems with darkness, shadows, or too much light, they offer a true 24/7 solution for highway operators.



### **Automatic Incident Detection (AID)**

FLIR's detection solutions allow you to detect stopped vehicles, wrong-way drivers, queues, slow-moving vehicles, fallen object or pedestrians in a matter of seconds, so you can prevent secondary accidents.

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### **Data collection & flow monitoring**

FLIR's cameras and sensors accurately monitor traffic flows and help you to keep highways safe. Other applications include queue monitoring during road works and travel time calculation based on flow information.

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### **Fire detection in tunnels**

FLIR thermal imaging cameras allow tunnel operators to monitor traffic flows and detect incidents or fires in an early stage. Firefighters also use thermal cameras to enhance their vision and to see through smoke or detect hot spots.

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### **Vehicle detection at railway crossings**

FLIR thermal cameras can detect stationary vehicles on the tracks at level crossings and as a result prevent heavy collisions. This way, train or tram operators can be warned for oncoming danger or warning lights can be activated.

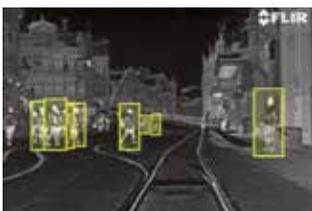
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### **Trackside monitoring**

FLIR thermal cameras can detect people on metro, tram or railway tracks. Whether a person just fell from the platform or is deliberately walking on the tracks, FLIR cameras ensure 24/7 detection on tracks or in tunnels.

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### **Driver vision enhancement**

FLIR's thermal imaging night vision systems installed onboard trams allow drivers to see clearly in total darkness or in bad weather conditions, offering increased detection of potential hazards, like pedestrians, cars, animals, on the tracks.

# 3 Proven technology, proven results

FLIR Intelligent Transportation Systems offers both the hardware and software for intelligent traffic detection and monitoring. The combination of a video camera or thermal imaging camera with intelligent video analytics provides traffic managers worldwide with a perfect solution for managing and monitoring traffic streams.

## Smart video analytics

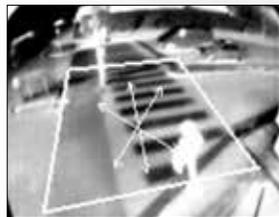
An installed video or thermal imaging camera sends an input signal to a detection unit. This unit can either be on board of the camera or integrated into a standard 19-inch rack. When the camera or the video image processing modules are set, detection zones are superimposed onto the video image. When a vehicle, bicycle or pedestrian enters a detection zone, detection is activated by the system. Dedicated algorithms generate various types of traffic information: presence and incident-related data, data for statistical processing, and data for pre- and post-incident analysis.



Stopped vehicle detection on visible-light video image

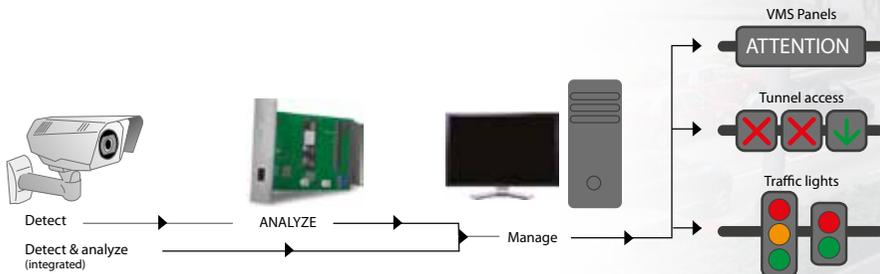


Bicycle detection on a thermal camera



Pedestrian detection on a thermal camera

Traffic data, compressed images and alarms are transmitted to the technical control room. The detection can trigger 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, so appropriate actions can be taken.



## Thermal imaging

Traditionally, CCTV cameras are being used for video monitoring. Although these are reliable tools for video analysis, they need additional algorithms to overcome the limitations of traditional video cameras, such as sun glare or darkness. Thermal imaging cameras do not have these issues. A thermal imaging camera creates a crisp image based on subtle temperature differences. They do not need any light whatsoever. They are also not blinded by direct sunlight. FLIR's high-performance thermal imaging cameras give you 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 cameras ignore this glare, and only respond to the heat signatures they detect.



### 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. But since thermal cameras see heat, not light, there are no shadows in a thermal world.



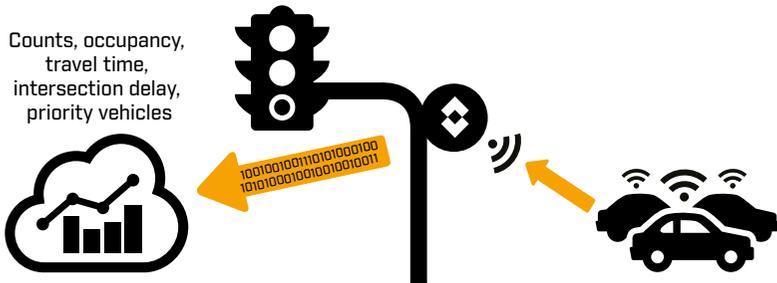
### Long-range night viewing

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.



## Wi-Fi tracking

FLIR's latest urban traffic sensors have optional Wi-Fi tracking technology that can be used to capture traffic flow data. By monitoring Wi-Fi Mac addresses of Wi-Fi enabled devices such as smartphones, these sensors can determine travel & route times along road segments. Via Wi-Fi signal strength information, they can also measure queue delay times at intersections. With Wi-Fi detection, vehicle movement is fully characterized as a vehicle approaches, stops and leaves an intersection. By matching MAC addresses across different intersections, travel times are calculated in real-time.



The information from different sensors can be collected, combined and accessed for further traffic analysis by FLIR's cloud-base analysis platform. Smart analytics transform the data into useful traffic insights, critical to understand the road network performance.

## Hybrid cameras

For specific traffic situations, a combination of different detection technologies delivers optimal results.

For example, FLIR uses a combination of visible-light video with radar in order to detect the presence of vehicles approaching or waiting at an intersection. FLIR's hybrid video/radar detector will warn the traffic light controller whenever a vehicle is present in the dilemma zone, either extending green time or by extending all red lights in order to improve overall safety at signalized intersections.

Another example is FLIR's pan-tilt camera, which combines a thermal and a visual camera in one unit in order to monitor traffic clearly in total darkness, in bad weather and over a long range. Combined with FLIR's video detection analytics, it offers an advanced incident detection and data collection system.



# 4

## *5 reasons to choose FLIR for your traffic project*

**Whether you are monitoring traffic in an urban area, on highways or in tunnels, FLIR Systems offers a solution to ensure and safe smooth traffic.**

### **1. Analyze traffic as it happens.**

The video or thermal images of FLIR cameras are analyzed in real time. This way, more efficient traffic management in tunnels, on highways and in urban areas becomes a reality. Traffic lights can be adapted in real time according to the current traffic flow. And in case of incidents, early detection enables fast intervention of rescue teams and prevents secondary accidents.

### **2. Get immediate visual feedback.**

The combination of numerical data and a visual image sets video detection apart from all other detection systems. The immediate visual feedback received from a video detection system allows the traffic manager to assess what is happening and to take appropriate action.

### **3. Save on installation and maintenance.**

Video detection systems for monitoring traffic streams are very cost-efficient. Installation costs are low. All cameras can be easily installed on existing structures like traffic lights or on other existing poles.

### **4. Avoid missed and false calls.**

FLIR video detection and monitoring systems are used all over the globe. Traffic managers appreciate their high incident detection rate and high detection speed. Moreover, the incidents are detected very fast. This is translated into a low Mean Time to Detect (MTTD) and a low False Alarm Rate (FAR).

### **5. Work with the world leader.**

Traffic managers worldwide have embraced the technology from FLIR for managing traffic streams. More than 150,000 video detectors are operational worldwide in over 70 countries. FLIR ITS has Automatic Incident Detection (AID) installations in more than 1,000 tunnels. More than 750 kilometers of tunnels are continuously being monitored by our systems. FLIR ITS solutions are being used for traffic light management at more than 30,000 intersections worldwide.

# 5 *Don't take it from us...*

From large national traffic agencies to small city municipalities; all over the world traffic authorities are using traffic detection and monitoring solutions from FLIR Intelligent Transportation Systems to improve safety and reduce congestion.

On the following pages, we are presenting a selection of customer stories, where the use of visual and thermal imaging detection cameras has resulted in a significant improvement of traffic. Don't take from us; just read what our customers have to say.



# City of Liverpool relies on thermal imaging to boost cycling

The city of Liverpool wants to encourage people to leave the car at home more often and go cycling instead. In order to make that happen, the streets of Liverpool need to become a lot safer for cyclists. Thermal traffic sensors from FLIR already give cyclists a head start on two busy intersections.



*FLIR distinguishes cyclists from other vehicles. This makes smart intersection control possible.*

*Cllr Malcolm Kennedy, Liverpool City Council: Thanks to the FLIR sensors, cyclists have more space and time to cross the six lanes of Leeds Street, given their head start. This will give cyclists more confidence.*



*FLIR only activates the dedicated bike signal scheme when a cyclist is arriving at the intersection.*



*A traffic signal, powered by FLIR displays a green bike 'on' before the full green for other traffic, allowing cyclists a five second head start.*

# Smart traffic management in Darmstadt, Germany

In order to make intelligent traffic management possible and make traffic flows smoother, traffic authorities of the city of Darmstadt, Germany have installed more than 200 FLIR video detectors. The city also makes use of FLIR's video management system which visualizes the traffic streams coming from a wide variety of cameras.



Darmstadt uses various types of video sensors for vehicle, pedestrian and bike detection.

Marko Mitsch, e-netz Südhessen GmbH & Co: "FLIR has shown us the best approach over the years.

With its video management system and the integration of many elements that are specific to the city of Darmstadt, FLIR clearly differentiates itself from competitors."



Darmstadt monitors road junctions from the traffic control room without having to be present on location.



All video streams and data generated by the video detectors, are collected by FLIR's video management software platform.



With FLIR thermal sensors, the city of Darmstadt can detect bicyclists with high reliability.



FLIR's video management software manages and controls all traffic information and makes it meaningful to the control room operator.

# FLIR enables smooth intersection traffic in Utrecht, the Netherlands

Thermal sensors from FLIR have been deployed at a big signalized intersection leading from Utrecht to Amersfoort, the Netherlands. The sensors can distinguish between bicyclists and cars and thus enable a separate signal scheme for bicyclists and motorists, all the while both road users are sharing the same road space.



*FLIR thermal sensors are an ideal solution for a mixed traffic situation.*



*Vehicle-only detection: FLIR offers a very interesting alternative for detection loops.*

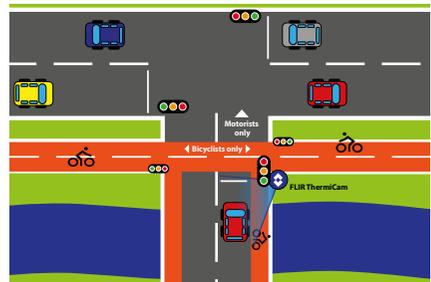


*FLIR sensors pick up heat energy coming from the cyclists and motorists and use this to make a distinction between the two.*

*Guus Sluijsmans, Imtech Traffic & Infra: "FLIR thermal sensors are the only solution I know that can efficiently make a distinction between bicyclists and motorists on the same traffic lane."*



*The FLIR sensor transmits its detection information to the traffic light controller and enables a more dynamic traffic light control.*



*For the specific situation at the Utrecht intersection, a separate regulation for bicyclists and motorists was the best solution.*

## *Lower Hutt, New Zealand, calls on FLIR to improve pedestrian safety*

Pedestrian user-friendly intelligent (PUFFIN) crossings are a safe and efficient solution for pedestrians and motorists. With intelligent FLIR sensors controlling the traffic lights, pedestrians get exactly the time they need to make it across. At the same time, PUFFIN crossings reduce unnecessary delays, so motorists benefit as well.



*As soon as a pedestrian enters a predefined detection zone, the software lengthens the green time for the pedestrian and delays the green time for vehicles.*



*On both sides of the crossing, the system utilizes FLIR sensors, detecting pedestrians waiting on the curbside pedestrians on the actual crossing.*



*FLIR sensors make use of predefined detection zones, that are activated when entered.*

*Wayne King, Hutt City Council: "No other sensors perform as well as FLIR's pedestrian and vehicle sensors. I would not want to have it any other way."*

# *FLIR improves bicycle safety at Tamaki Drive, Auckland, New-Zealand*

The busy Tamaki Drive in Auckland, New Zealand, is a challenging mixed traffic environment that has already witnessed several cycle incidents over the past few years. To prevent incidents, Auckland Transport Authorities decided on the integration of a bicycle warning system, activated by FLIR thermal imaging cameras.



*FLIR gives traffic managers uninterrupted, 24-hour detection of cyclists regardless of the amount of light available and regardless of whether cyclists use the bike lane or main vehicle lane.*



*Continuously flashing warning signals have a reduced effect. Detection-based warning signals are much more effective.*

*Karen Hay, Auckland Transport: "The detection of bicycles is very fast and very accurate, regardless of whether we are looking at a carbon fiber bike or not."*



## *FLIR-powered intelligent crossing leads to more safety for pedestrians*

A pedestrian safety system has been installed at a busy retail park near Giltbrook, Nottingham, UK. The system uses flashing road studs and warning signs, activated by FLIR pedestrian sensors, to create a visual warning for motorists approaching an internal pedestrian crossing, which spans the main vehicle access to the park.



*Detection of crossing pedestrians activates the road studs and slowdown sign further up the road.*



*Configuration of the FLIR pedestrian sensor is done via portable PC with pre-installed user-friendly software.*



*The road studs only blink when pedestrians are using the crossing.*



*The system looks particularly good when it's dark.*



*The pole-mounted FLIR is the centerpiece of the installation.*

*“The FLIR sensors can simply be mounted on existing infrastructure and configuration of the sensor can be done in less than five minutes.”*

## *FLIR vehicle presence sensors for Lima city streets*

The city of Lima, Peru, is taking extensive measures to tackle its problem of heavy traffic congestion and pollution. As part of the solution, Lima city authorities recently called upon FLIR Intelligent Transportation Systems to help them improve urban traffic flows. FLIR vehicle presence sensors help streamline traffic at 218 road intersections and help monitor vehicle density, determine the peaks and troughs in the day's traffic, and regulate the traffic lights' green waves.

*"Lima's traffic light network,  
including 218 road  
intersections, now features  
FLIR video detection  
sensors."*



*Heavy traffic in the streets of Lima in Peru.*



*FLIR vehicle presence sensors monitor intersections and feed their video data back to the city's traffic control center.*

# *Video detection for intersection management in Salalah, Oman*

Together with Oman engineering company Hi-Tech Projects LLC, FLIR realized the country's first video detection project ever. Always looking into modern and innovative solutions for their clients, Hi-Tech Projects LLC were convinced that it was time to make use of video detection technology instead of inductive loops, which were the only detection equipment used in Oman so far.



*Integration of video detection systems in the city of Salalah, Oman.*



*FLIR vehicle presence sensor*

*“Our video detection solution had to be capable of operating in harsh weather conditions, to be cost-effective and provide all necessary features for modern and effective traffic management. FLIR’s vehicle presence sensor was up to the challenge.” Ivan Krusic, Traffic Engineering & ITS Manager, Hi-Tech Projects.*



*FLIR vehicle presence sensors proved to be an excellent alternative to inductive loops, as Oman's extremely hot weather conditions often lead to damaged asphalt, which in turn results in costly road works and re-installation of loops.*

# *Incident detection for the Yamuna Expressway, India*

The Yamuna Expressway, leading from New Delhi to Agra over a 165-kilometer stretch of concrete, features an all-inclusive traffic management system, commissioned by transportation specialist Efkon, and advanced automatic incident detection technology from FLIR Intelligent Transportation Systems.



*By informing motorists and road authorities about possible incidents in time, secondary accidents can be avoided.*



*The control room of the Yamuna Expressway.*



*The Yamuna Expressway in New Delhi stretches over 165 kilometer*

*“Thanks to FLIR ITS, the Yamuna Expressway will not only provide commuters with a smooth journey, but also a safe one. Traffic cameras equipped with the FLIR ITS incident detection system are monitoring the expressway for accidents or any irregularity that might occur,”*  
*Jeevit Vashishtha, Business Development Manager, FLIR Intelligent Transportation Systems, India.*

# *Kunshan City, China, relies on FLIR sensors to keep the traffic flowing.*

Kunshan city authorities are now relying on FLIR's vehicle presence sensor. In this project, 219 vehicle presence units have been installed to collect traffic data of incoming vehicles at intersections.



*Kunshan relies on FLIR vehicle presence sensors to keep the traffic flowing.*

*Covering three to four lanes, the FLIR sensors have been installed at existing road infrastructures, such as road signs, road lighting poles, and traffic light poles.*



*Thanks to FLIR ITS vehicle presence sensors, a smooth traffic flow is assured.*



*FLIR's vehicle presence sensors can be mounted easily on existing infrastructure.*

## *Watching over traffic streams in the Ekeberg tunnel in Oslo, Norway*

For more than 15 years now, FLIR ITS video detection technology has been watching over traffic streams in the Ekeberg tunnel in Oslo, Norway. When a bus coach caught fire inside the 1,500 m long tunnel in 1996, the Ekeberg tunnel video detection system generated an alarm and the tunnel operators and emergency services were warned in a matter of seconds.



*The Ekeberg tunnel fire in 1996 put FLIR ITS video detection technology to the test.*

*"The FLIR ITS system has proved to be very stable over the past 15 years of operation. The great advantage of video detection over other technologies is that the operator has an immediate visual verification of the occurred incident." Åge Reiakvam, section manager at Siemens Intelligent Traffic Systems.*

## *Monitoring the Middle East's Longest Tunnel*

The overall goal of the Sheikh Zayed Tunnel (Abu Dhabi, UAE) is to reduce congestion. FLIR delivered 174 advanced network video encoders with integrated Automatic Incident Detection capabilities for the Video Incident Detection System (VIDS) component of the project. For the traffic management component, known as the Video Vehicle Detection System (VVDS), FLIR delivered 45 network video encoders.



*Spanning 3.6km in total, including a 2.4km covered section, the Sheikh Zayed Tunnel is the Middle East's longest road tunnel.*



*A view inside the Sheikh Zayed Tunnel in Abu Dhabi, UAE.*

*For the Sheikh Zayed Tunnel, FLIR was tasked with providing technology both for incident detection and traffic management.*

# Traffic light control in Jakarta, Indonesia

In order to tackle traffic congestion, Jakarta authorities laid out an ambitious and very comprehensive master plan. As part of this set of measures an Area Traffic Control System (ATCS) was implemented. As a result traffic flows are improved and risk of congestion reduced. Today, more than 160 vehicle presence sensors have been installed at some 37 intersections across the city of Jakarta.



*FLIR sensors help meet Indonesia's ambitious traffic management plans.*



*The Jakarta traffic control room.*

*When there is a traffic jam at a certain intersection, FLIR sensors can feed the ATCS system with vehicle presence information and allow it to directly alter the frequency and duration of red and green lights at that intersection.*



*FLIR ITS sensors installed in Jakarta.*

# *New Tyne Crossing (UK) engages latest video detection technology*

The New Tyne Crossing project is one of the biggest transport infrastructure projects currently active in Great Britain. The tunnel has been designed for a daily traffic throughput of 24,000 vehicles and is currently serving 38,000 customers a day during peak periods. Currently 83 video detection modules analyze the IP video streams to alert operators if something goes wrong inside the tunnel.



*A view inside the New Tyne Crossing tunnel, one of the most prestigious UK transportation projects.*



*The New Tyne Crossing is a prestigious UK project to develop a second vehicle tunnel under the River Tyne and to refurbish the existing vehicle tunnel.*



*The New Tyne Crossing control room is one of the most modern control rooms in the UK.*



*Entrance of the New Tyne Crossing tunnel.*

*The integration of FLIR ITS technology is a huge step forward in making the Tyne tunnels the safest in the UK.*

## *Smart intersection control in Mumbai and Chennai, India.*

The cities of Mumbai and Chennai are investing heavily in advanced technologies and intelligent solutions that optimize traffic management. Nearly 700 vehicle presence detectors have been installed in the city of Mumbai. In Chennai, 100 vehicle presence detectors are installed and operational.



*Installation of a FLIR vehicle presence sensor.*



*FLIR sensors are used as part of the Area Traffic Control (ATC) project to ensure that the traffic flows safer and smoother.*

*Based on the information coming from FLIR vehicle presence sensors, the city's traffic management system alters traffic signal cycles in real time to respond to changing traffic conditions.*

## *Vehicle presence detection on the Samuel Beckett Bridge (Dublin, Ireland)*

The Samuel Beckett Bridge in Dublin (Ireland) is a cable-stayed bridge, with a total length of 120 meters. The bridge has been designed on a massive pivot, which allows it to open through an angle of 90 degrees, allowing ships to pass through. To ensure that there are no vehicles on the bridge before opening it to ships, Dublin City Council installed multiple vehicle presence sensors from FLIR.



*FLIR vehicle presence sensors are a cost-effective and reliable alternative for traditional inductive loops.*

*Via detection zones (virtual loops) and detection outputs, vehicle presence information is transmitted to the controller. When FLIR is not detecting any vehicle on the bridge, the controller can instruct safely to open the bridge.*

# *Passive detection provides active pedestrian safety in Maryland, USA*

The Department of Public Works & Transportation (DPW&T) of Prince Georges County (Maryland, USA) is using FLIR pedestrian presence detectors to increase safety at a busy midblock crossing. The sensors were installed by Control Technologies (Florida, USA). The purpose of the FLIR sensors is to detect every person as they approach the crosswalk from either side, without requiring them to push a button.



*Video detection technology is passive – no action is required by the pedestrian – and this was desired because the pedestrians were simply not using the ‘push-button’.*



*FLIR sensor installed at the top of the traffic lights.*



*Pedestrians can cross safely thanks to the FLIR sensor.*

*“Set-up and operation are a snap with the the FLIR pedestrian detection system.” Jim Rhine, DPW&T*

# Smooth traffic between Denmark and Sweden

As a link between Copenhagen (Denmark) and Malmö (Sweden), the 16.4 km Öresund bridge-tunnel is one of the longest in Europe. FLIR technology provides Automatic Incident Detection with more than 180 cameras. Stopped vehicles, queues and wrong-way drivers are seamlessly detected.



Video detection is key in keeping traffic run smoothly.

*The Öresund bridge-tunnel features a fully redundant video detection system. The system will still be operational in the event of a component failure (such as power failure, network communication failure, and so on), by having back-up components that perform duplicate functions.*



The 16.4 km Öresund bridge-tunnel is one of the longest in Europe.

# Real-time traffic updates for Singapore roads

Singaporean transport authorities are increasingly coping with congestion and road safety issues. The country is a vast urban area and thus a perfect fit for FLIR's urban vehicle detection technologies, designed to enhance safety and alleviate congestion. 350 video image processing boards installed along Singapore's arterial roads help provide motorists with real-time information on traffic conditions.



*FLIR vehicle detection boards are feeding the Expressway Monitoring and Advisory System (EMAS) along Singaporean arterial roads.*

*"The FLIR detection technology has proven to be performing extremely well in the difficult Singaporean conditions. Canopy shadows and tropical weather conditions: our detectors handle it very well." Koen Soenens, International Business Development Manager, FLIR Intelligent Transportation Systems.*



*FLIR ITS processing boards help to ensure the smooth flow of traffic in Singapore.*

# *Enhanced pedestrian safety for Auckland, New Zealand*

FLIR's pedestrian presence sensors are the preferred solution to help enhance safety of vulnerable road users in Auckland, New Zealand. The detection of pedestrians by FLIR sensors activates in-road lighting, making crossing pedestrians extra visible for oncoming motorists.



*FLIR's video sensors activate on-road markers along a zebra crossing when a pedestrian is in range.*



*A FLIR sensor detects pedestrians in Auckland, New-Zealand.*

*Detection-based warning lights are very effective in enhancing driver awareness.*

# *FLIR's Automatic Incident Detection system monitors 22 tunnels in the Paris region*

FLIR Intelligent Transportation Systems delivered its Automatic Incident Detection (AID) solution to the Direction Inter-Départementale des Routes d'Île-de-France (DIRIF) for integration in 22 tunnels in the Paris Region. Currently 1,400 cameras linked to the FLIR AID system are monitoring the heavy traffic driving through the Paris tunnels.



*Thanks to FLIR's intelligent surveillance technology, the operator is instantly warned about any 'abnormal traffic behaviour' inside the tunnel, which allows him to quickly launch all necessary steps to prevent an accident from escalating.*



*Busy traffic in Paris, France.*

*The strength of this camera-based intelligent technology is its unique fast detection rate in combination with the direct visual feedback.*



*Automatic incident detection helps to avoid secondary accidents.*

# *Intersection management for Colorado Springs, USA*

The Colorado authorities have been on a mission to replace pavement loops with video detection technology for signal control. The plan has had the desired effect. Complaints, as well as costs, are down. After installing over 350 intersections, Colorado Springs is convinced it made the right choice to replace the in-ground loops with video detection.



*FLIR video detection modules are used for vehicle presence detection & traffic data collection in Colorado Springs.*

*“We have improved our abilities and installation procedures, improved service to our citizens, reduced delay caused by constant calls from broken loops, and reduced signal installation and maintenance costs.”*

## *Incident detection and data collection for ITIS Kuala Lumpur*

The Malaysian government has been making substantial investments in infrastructure projects to improve quality of life for its people and to make its Federal Capital, Kuala Lumpur, a world-class city. A major project, undertaken by City Hall KL, is the Integrated Transport Information System (ITIS).



*ITIS helps reduce traffic congestion, improves traffic management, and enhances public transportation.*



*The highway to Kuala Lumpur is monitored 24 hours a day, 7 days a week with FLIR ITS technology.*

*“FLIR Intelligent Transportation Systems delivered 932 video detection modules for data monitoring and incident detection and 126 communication modules sending data, images and “incident movies” to the Traffic Management Centre.”*

## *US Departments of Transport (DOT) adopt thermal imaging cameras for traffic monitoring*

US Departments of Transport are adopting thermal imaging cameras for traffic monitoring. Thermal cameras are immune to direct sunlight, night-time headlight glare, reflection from wet surfaces, shadows, fog and many other weather-related phenomena. Among many other installations in US DOTs, FLIR provided thermal imaging cameras for San Antonio, Texas, Lancaster, California, and the Arizona DOT.



*FLIR thermal technology is used by several hundred agencies and deployed in 45 of the 50 states.*



*Daylight image and thermal image of an intersection. Note that the thermal images show much more detail, even when the sun is shining on the wet road.*

*FLIR has offered its thermal cameras as a drop-in replacement for legacy video cameras. They are compatible with any detection technology.*

# Monitoring traffic at the Rion-Antirion Bridge, day and night

The Rion-Antirion Bridge in Greece is the world's longest cable-stayed bridge with a suspended deck. To ensure safety on the bridge and make quick interventions possible in case an accident happens, the bridge makes use of smart Automatic Incident Detection technology and thermal imaging cameras from FLIR Systems.



When 10,000 vehicles cross the Gulf of Corinth on a daily basis, you can safely say that the Rion-Antirion Bridge is an important thoroughfare for the region.



*Stopped vehicle detection*

*“The use of thermal cameras dramatically reduced the number of false alarms and thus improved the performance of the overall AID system.”*



*Pedestrian detection*

# *A total traffic monitoring solution for Marseille*

FLIR Intelligent Transportation Systems has equipped both the Prado Carénage Tunnel and the Prado Sud Tunnel in Marseille with Automatic Incident Detection (AID) technology. Thanks to FLIR technology, it will be safer and more efficient to cross the city of Marseille by road.



*57 cameras in the Prado Sud tunnel and 95 cameras in the Prado Carénage tunnel are monitoring traffic for all types of incidents.*



*FLIR's video management system collects and visualizes a wide range of traffic data, events and alarms from FLIR or other detection modules.*



*FLIR technology is now monitoring all current tunnels in the city of Marseille.*

*"FLIR Systems offers a complete detection and monitoring solution, including automatic incident detection, surveillance cameras, mobile cameras, recording capabilities and visualization."*

## *Smart traffic sensors help alleviate city congestion in Moscow, Russia*

In order to tackle its heavy traffic congestion problem, the city of Moscow recently started with the development of an Intelligent Transportation System. To smoothen the traffic flows along signalized intersections, Moscow called upon the expertise of FLIR Systems. Over 3,000 vehicle presence sensors will make sure traffic signal cycles are adapted to the actual traffic.



*More than 3,000 vehicle presence sensors will be installed at various busy road junctions controlled by traffic signals.*



*FLIR manages to provide good detection results, even in the heavily polluted conditions of Moscow.*



*FLIR provides MPEG-4 or H.264 color streaming video at full frame rate.*

*“Based on the information coming from the FLIR sensors, this state-of-the-art ITS system can alter traffic signal cycles in real time to respond to changing traffic conditions.”*

## *Reliable incident detection for the Northbridge tunnel, Perth, Australia*

The Northbridge Tunnel, located along the 6.4 km Graham Farmer Freeway in Perth, Australia still uses the original video detection equipment that was installed more than 12 years ago. FLIR video detection units are monitoring the daily traffic movements through the tunnel, which currently include up to 100,000 vehicles per day.



*The FLIR ITS detection system has performed very well ever since the Northbridge tunnel was opened in April 2000.*

*"After more than 12 years of operation, the FLIR ITS detection system is still the most reliable tool we have." Phil Martina, Control Room Manager, the Northbridge Tunnel.*



*A rack with integrated video detection cards.*

# *Failure-free operation for the Huguenot Tunnel, Capetown, South-Africa*

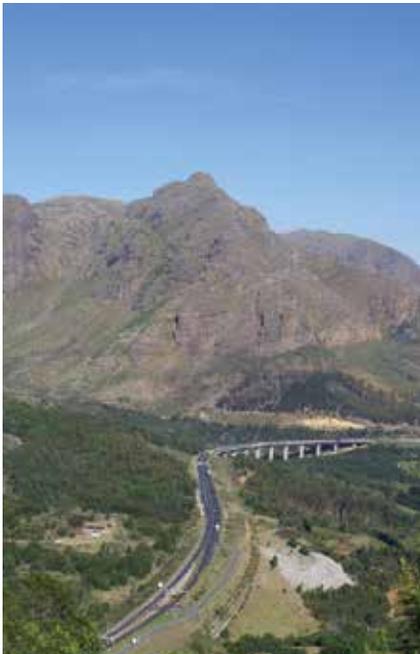
At the start of the new millennium the existing inductive loop detection system in the Huguenot toll tunnel (Capetown, South-Africa) was replaced by a video-based Automatic Incident Detection (AID) system with video detection modules from FLIR ITS. The system has been working faultlessly ever since.



*View inside the Huguenot tunnel in South-Africa.*



*Entrance of the Huguenot tunnel.*



*The system does an excellent job for incident detection, stopped or slowly moving vehicle detection, wrong-way driver detection and vehicle counting.*

*“Among the 12,000 vehicles we monitor daily, we frequently detect broken down or stopped vehicles. Thanks to the FLIR ITS system, we can quickly take the appropriate measures.”*  
*Christo Van der Linde, technical manager, Huguenot tunnel.*



# 6 A FLIR solution for every traffic and transportation need



## FC, PT, D and ITS-Series

Thermal sensors detect heat, rather than light, and aren't confused by extreme lighting conditions, such as bright sun glare or headlights reflected off wet pavement. As a result, thermal sensors have fewer false and missed calls, enable better signal timing, and lead to more efficient traffic monitoring. Plus, thermal cameras also detect cyclists, pedestrians, and animals faster and more reliably. FLIR's thermal traffic cameras come in the compact and flexible FC-Series T, the high-performance, multi-sensor PT-Series T pan/tilt cameras or the D-Series T outdoor dome cameras and the ITS-Series with traffic analytics inside.





### ThermiCam

ThermiCam is an integrated thermal camera and traffic detection sensor that gives you the power to detect vehicles and cyclists around the clock with industry-leading reliability. ThermiCam is an above-ground system that spares you the enormous installation and maintenance costs that traditional inductive loops typically require.



### TrafOne

FLIR TrafOne is an all-round detection sensor for traffic monitoring and dynamic traffic signal control. Offered in a compact and easy-to-install package, the FLIR TrafOne uses thermal imaging and Wi-Fi tracking technology to provide traffic engineers with high-resolution data on vehicles, bicycles and pedestrians at intersections and in urban environments.



### TrafCam Series

The TrafCam series of vehicle presence sensors combines a CMOS camera and video detector in one. TrafCam allows you to control traffic lights dynamically, based on vehicle presence information. The series includes the TrafCam vehicle presence sensor for standalone use and the TrafCam x-stream vehicle presence sensor and data collector with video streaming.



### VIP Series

FLIR's 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 (VIP-T) and network streams (VIP-IP), and can even be combined with video encoding (VIP-TX).



### TrafiBot HD

FLIR's TrafiBot HD combines field-proven video detection algorithms with advanced camera optics and powerful processing technology in a single housing. TrafiBot HD (with 1920 x 1080 resolution) is a network box camera that provides superior image quality, embedded AID analytics as well as multi-stream encoding. As such, the TrafiBot HD offers a cost-effective combination of technologies and top-level performance.



### Flux

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.

### Cameleon ITS

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.



# 7 Thermal imaging: a wide variety of applications

*As more and more people are discovering the benefits that thermal imaging cameras have to offer, volumes have gone up and prices are coming down. This means that thermal imaging cameras are finding their way to more and more markets. FLIR Systems has the correct camera for every application.*



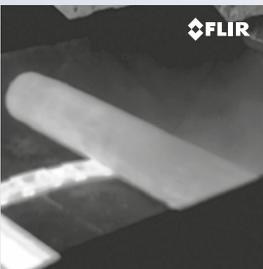
## Security

Our security customers benefit from thermal imaging cameras because they help them to secure facilities like ports, airports, nuclear facilities, warehouses, estates and many more against intruders.

## Electrical / Mechanical

In industrial environments thermal imaging is used to find hot-spots that can lead to failures in electrical and mechanical installations.

By detecting anomalies at an early stage production breakdowns can be avoided and money can be saved.

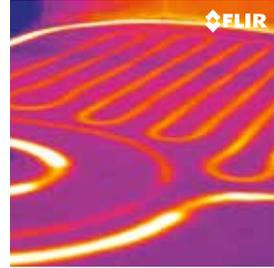


## Cores & components

FLIR Systems also markets a wide variety of thermal imaging cores that other manufacturers integrate in their own products.

## Building diagnostics

Building professionals look for insulation losses and other building related defects with a thermal imaging camera. Finding insulation losses and repairing them can mean huge energy savings.

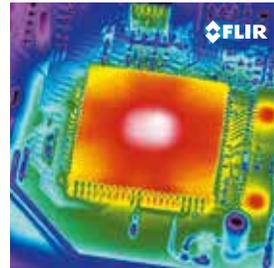


## Border security

Border security specialists protect their country's border against smugglers and other intruders. With a thermal imaging camera they are able to see a man at a distance of 20 kilometers away in total darkness.

## Science / R&D

Thermal imaging also plays a pivotal role in both applied and fundamental R&D. It can speed up the design cycle so that products can go to market faster. For these demanding applications FLIR Systems markets extremely high performance thermal imaging cameras.



## Maritime

On both yachts and commercial vessels, FLIR thermal imaging cameras are being used for night time navigation, shipboard security, man-overboard situations and anti-piracy.

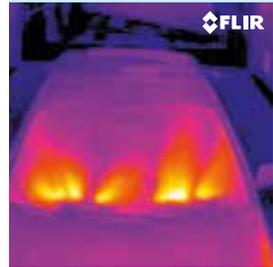


## Firefighting

Firefighters are able to see through smoke. It helps them to find victims in a smoke filled room and also to see if fires are well extinguished. It helps them to save lives.

## Automation / process control

Thermal imaging cameras are also installed to continuously monitor production processes and to avoid fires.

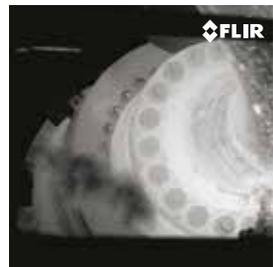


## Law enforcement

Police officers use the power of thermal imaging to see without being seen. They can easily find suspects in total darkness without giving away their position.

## Optical gas imaging

Gas leaks can also be detected seamlessly with a thermal imaging camera.





## Personal vision systems

Outdoor enthusiasts can see clearly at night with the help of a thermal imaging camera.

## Test & Measurement

FLIR's test & measurement offering for electrical and mechanical applications includes spot thermal cameras, digital multimeters, power clamp meters, flex clamp meters, voltage detectors, and videoscopes.



# 9 *Send us your application*

On the previous pages you could read how some of our customers are using technology from FLIR Intelligent Transportation Systems.

**We are always looking for new application stories and new customer testimonials. If you have an interesting application please contact us. We will be happy to include you in the next edition of this booklet.**

**Please fill out the following form, scan it and send it to [flir@flir.com](mailto:flir@flir.com) or fax this form to +32 3 303 56 24**

Company : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Postal Code : \_\_\_\_\_

City : \_\_\_\_\_

Country : \_\_\_\_\_

Tel : \_\_\_\_\_

Application : \_\_\_\_\_

Short Description : \_\_\_\_\_

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