



**BOSCH**

Invented for life

# Automatic incident detection for bridges and tunnels

Improving mobility and safety with analytics-driven video solutions

## The challenge

Heavy traffic in tunnels, on bridges and along nearby roadways can make it difficult to identify and react to problems fast. Serious safety events include:

- ▶ Traffic congestion that can delay or prevent emergency response vehicles from access
- ▶ Stopped or disabled vehicles
- ▶ Wrong way driver
- ▶ Debris, objects, or animals in the road
- ▶ Fire or smoke in hard to see areas
- ▶ Bicyclists and pedestrians in low light and low visibility conditions
- ▶ Icicle formations hanging from tunnels

All of these situations can pose significant threats to motorists. Harsh weather conditions and uneven lighting further compromise visibility. At any given moment, traffic management center (TMC) operators need to know exactly what is happening – the number of vehicles and pedestrians and their location in real-time.

## The solution

Bosch Intelligent IP cameras deliver automatic incident detection enabling TMC operators to quickly react to events such as congestion, a stopped vehicle, or a wrong way driver. Automated incident alerts give operators an improved situational awareness to reduce disruption times, which is especially valuable for emergency response vehicles. At the same time, the cameras continuously record statistics to enable data-driven decision-making on safety improvements.

Bosch IP cameras can also trigger third-party systems such as dynamic message signs, flashing beacons, and dedicated short-range communication (DSRC) for smart vehicles to ensure drivers are alerted to safety issues, congestion, or delays, enabling them to take action earlier.

# Manage incidents quickly and prevent further escalation 24/7

Bosch cameras for ITS applications have built-in Video Analytics with a second processor dedicated to analytics. This enables the camera to analyze scenes and stream metadata around the clock so they can detect and alert automatically, reducing false alarms with higher detection accuracy. Each camera operates independently, creating a distributed and scalable network of intelligent video sensors with no single point of failure. This ensures your video infrastructure is more resilient, reliable, and meets the highest standards in end-to-end data security.

## Improve accuracy with machine learning technology

Standard camera analytics are extended with our built-in Camera Trainer based on machine learning technology. Camera Trainer allows for creation of 16 custom classifiers, enabling more accurate counting of vehicles on roadways, railway crossing safety and detection of icicles in colder climates. The camera retains information on new user-defined classifiers and uses these with predetermined alarm rules and object filters for even more accuracy and flexibility.

## Gain valuable insights from easy access to data

Beyond incident detection, camera analytics and metadata enable the ability to collect and aggregate data – helping you understand traffic patterns, congestion points, and more. Camera-generated analytics data facilitates solutions like historical data dashboards for making intelligent business decisions.

## Minimize maintenance costs

The MIC IP family of extremely rugged cameras can withstand severe weather and environmental conditions, such as vibration on bridges and high impacts from debris. An onboard wiper and optional washer system significantly reduces regular maintenance and cleaning costs. The cameras offer IP68- protection without pressurization housing to further decrease your total cost of ownership.



## Reduce false triggers and improve accuracy

All MIC IP cameras have an image stabilization feature to reduce any shaking or movement caused by high winds or road vibration on bridges and in tunnels, which could shift the field of view and render unstable images. The algorithm enables the cameras to detect continuous vibration and correct a shaky video in both the vertical and horizontal axis. A precision gear drive system ensures the camera always returns to its preset position with high accuracy.

## Ensure high-quality images in low light

Built-in starlight technology in our ITS cameras combined with 1080p resolution and frame rate of 60 frames per second ensures highly detailed color images in extreme low-light situations. Cameras with IR illuminators ensure the greatest level of detail, while thermal cameras ensure early detection of objects.

## Detect smoke and flames early

The AVIOTEC IP starlight 8000 is a video-based fire detection solution that enables reliable smoke and flame detection in tunnels before traditional sensors trigger an alarm. By continuously tracking movement curves, the cameras can automatically detect stationary vehicles, wrong way drivers or people on the road.

Bosch offers a complete camera portfolio for intelligent transportation systems. NEMA TS 2 certification confirms they meet environmental requirements for traffic applications, while NTCIP compliance ensures communication with traffic management systems.



MIC IP cameras



FLEXIDOME IP starlight 8000i



DINION IP thermal 8000



AVIOTEC IP starlight 8000



AUTODOME IP 7000i



Bosch Video Management System



PRAESIDEO Digital Paging and Mass Notification Systems

## Bosch Security and Safety Systems

Protecting lives, buildings and assets is our aim. Our product portfolio includes video security, intrusion detection, fire detection and voice evacuation systems as well as access control and management systems. Professional audio and conference systems for communications of voice, sound and music complete the range.

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