



Creating safer and smarter mobility

URBAN MOBILITY & TRAFFIC



For safe journeys in cities and beyond

No matter what destination, everyone deserves a safe and smooth journey. Whether it's by public transport, car, bike, or on foot, a long and bad travel experience can cause frustration. Traffic is increasing multifold due to an expansion in urban populations. With more and more road users, including e-scooters and city bikes, there's an increase in traffic challenges. Traffic management needs automation and digitalization to handle these macro trends. At the core of this will be traffic video surveillance coupled with advanced analytics.

Axis will take you there

Axis, together with a vast network of trusted partners, offers scalable, flexible, and cost-effective traffic management solutions for safer and smoother road transport. We enable traffic authorities, law enforcement, emergency services, and road infrastructure authorities to keep people and traffic moving safely on roads, sidewalks, highways, bridges, and tunnels, in and between cities, between urban and rural areas. Our easy-to-integrate solutions are focused on three areas:

- Improving traffic and mobility safety
- Ensuring an efficient traffic flow
- Data acquisition for planning and actionable insights

Tackling urban mobility trends

Today, city authorities are shifting their focus from traditional security surveillance to also include urban mobility to help people connect and thrive within the city. Standard transportation systems such as buses, trains, and taxis have faced competition in recent years with new mobility options and micro-mobility services in the form of bicycles and scooters. Despite their popularity, cities are learning that these are challenging inner-city infrastructure in a new way. Addressing the challenges of urban mobility is often the trigger for a smart city adoption and the direct route to a more liveable city.



Axis technology can:

- Increase traffic safety
- Improve mobility flow
- Support infrastructure planning
- Reduce environmental impact
- Facilitate accessibility
- Manage traffic fees
- Reduce congestions

How Axis keeps traffic flowing safely

Whether you are responsible for keeping traffic moving or involved when emergencies hit or road infrastructure planning, here are some examples of what Axis technology can do to make road transport safer and smoother in the city and beyond.



Parking management

Optimize parking with license plate recognition for frictionless access to parking lots and automated payment.



Emergency management

Respond quickly and remotely to ongoing incidents and emergencies thanks to real-time situational awareness.



High-speed tolling

Enable free-flowing traffic through toll plazas with license plate recognition automating payment and opening barriers.



Lane control

Control lanes when you see queues forming by opening lanes or the smart shoulder to ensure an efficient traffic flow.



Traffic data collection

Collect traffic statistics for actionable insights to plan road infrastructure projects in the city and beyond.



Incident management

Detect accidents, congestions, wrong-way driving, a stopped vehicle, pedestrians, or smoke and debris on roads, highways, bridges, and in tunnels.



Intersection control

Make intersections safe with adaptive control that adjusts traffic light cycles to the speed of the crossing pedestrian or cyclist.



Traffic management

Prevent gridlocked traffic with congestion control, lane control, and speed control to keep traffic flowing.



Violation detection

Catch traffic violations with automatic detection and issue fines automatically to deter future offenses.

Improving traffic safety

Feeling safe on the roads is a pillar of a happy and functioning society. Just as feeling assured that when a traffic incident occurs, it will be responded to accurately and timely. Axis improves traffic and mobility safety through real-time situational awareness for traffic operators and automatic incident detection, whether it's in the city or beyond.





URBAN MOBILITY

USE CASE



An efficient emergency response

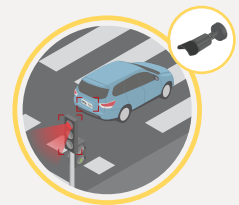
Challenge

Traffic incidents, big and small, are happening every day in cities, causing stress and congestion. Each second counts for traffic operators and emergency services to understand the situation and get the traffic moving again while securing the safety and care of the people involved in the incident.

Solution

Axis, together with partner analytics, delivers reliable incident detection to minimize false alarms. Using cameras as automatic incident detectors with deep learning capabilities, notifications are triggered based on abnormal data. Incident detection can be implemented on a range of Axis cameras, all offering excellent HDTV quality video footage that holds up as evidence in forensic investigations.

USE CASE



Deterring traffic offenders

Challenge

Managing traffic offenders can be hard with violations happening constantly on streets, sidewalks, and intersections across the city. With limited resources and traffic everywhere, it can be challenging and time-consuming for authorities to prevent and act on these violations which can be extremely dangerous. Even if an offense is reported, the quality of evidence is crucial to secure penalties and make sure offenders comply in the future.

Solution

Axis cameras together with partner analytics can increase your efficiency in detecting traffic violations and catching traffic offenders. Our solutions can capture red-light violations, wrong-way driving, speeding, or wrong parking in all weather, speed, and light conditions. Together with license plate recognition (LPR), the system can trigger fines or notifications automatically for more efficient safety measures, promoting future traffic compliance.



TRAFFIC

USE CASE



Incident detection outside the city

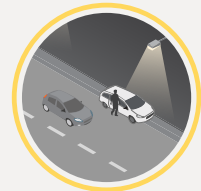
Challenge

The ability to manage traffic incidents depends on rapid and accurate information. Reliable detection can reduce the impact of an incident on a traveler's journey and sometimes save lives. Automatic incident detection and situational awareness on roads, highways, bridges, and tunnels can discover accidents, congestions, wrong-way driving, a stopped vehicle, pedestrians, or smoke and debris.

Solution

Axis, together with partner analytics, turns cameras into automatic incident detectors, identifying incidents in seconds to support operations with actionable real-time traffic data. Axis cameras with deep-learning capabilities can develop algorithms and trigger notifications based on abnormal data. Depending on your needs, the incident detection software can be implemented on a range of different Axis cameras.

USE CASE



Remote traffic violation enforcement

Challenge

Preventing traffic violations across your road network is hard as there is a huge area to cover, and resources are limited. Even if an offense is reported, the quality of evidence is crucial to secure penalties and make sure offenders comply in the future.

Solution

Axis cameras with partner analytics allow you to detect more traffic violations, such as lane violations, wrong-way driving, speeding, or illegal parking in all weather, speed, and light conditions. Our cameras capture high-quality video details like license plates, with vehicles moving at various speeds and angles. License plate recognition technology can be used for remote enforcement and to administer fines automatically.

Enhancing road safety in a metropolitan city

Milan, Italy | A collaboration between Axis and Safety21, a market leader in the field of technology services for Public Bodies and Police Forces, allowed the city of Milan to carry out an integrated project on road safety. Using Axis technology, complete with IP cameras with edge analytics and 360° cameras, operators can monitor the main roads in real-time and receive immediate notifications in case of criminal offenses, and, in case of an accident, they are able to check videos and to take suitable countermeasures.

"Axis solutions allow us not only to gather data and information in a wide range of situations – from detecting environmental crimes or determined events, such as rules violations or accidents in the proximity of pedestrian crossings – but also to interact with our Titan® ecosystem to make operators' lives easier."

Gianluca Longo
Safety21 Group CEO

Ensuring an efficient traffic flow

Efficient traffic management impacts all aspects of daily life, from happy commuters to on-time deliveries, from safer intersections to reduced pollution. Axis cameras with analytics can streamline city mobility through congestion control, intersection control, parking, and curbside management. Outside the city, traffic can be managed through lane control and speed control.





URBAN MOBILITY

USE CASE



Smooth city traffic

Challenge

It's a challenge to keep city traffic moving safely and efficiently, especially during rush hours. To optimize traffic flow, you need a good overview of the situation. Gridlocked traffic and long travel times cause a greater environmental impact on the air we breathe, as well as sound pollution, not to mention frustrated drivers.

Solution

Axis cameras together with cutting-edge partner analytics provide high-quality and reliable data to traffic operators for real-time traffic management. Video footage and insights processed on the edge can be used to improve efficiency at intersections and along major streets, control speeds, and open/close lanes. With pre-set rules, cameras can generate notifications and warnings to increase efficiency. Less congestion and less environmental impact create happier drivers and strengthen a city's reputation.

USE CASE



Safe and efficient intersections

Challenge

Intersections are designed to increase efficiency and safety at strategic locations in city traffic, but an inefficient traffic light can provide the opposite result with increased traffic congestion, overcrowding, and a rise in fatal accidents. It can be a challenge to get the timing right for traffic light cycles at intersections so they are safe for pedestrians and cyclists crossing.

Solution

Axis cameras with partner analytics are used as smart sensors that provide traffic statistics to operate and optimize intersections in real-time. With adaptive control, traffic light cycles can be adjusted to the speed of the pedestrian or cyclist crossing, for example, extending the traffic lights for an elderly pedestrian crossing the street.



TRAFFIC

USE CASE



Traffic control outside the city

Challenge

Keeping traffic flowing safely and efficiently across the entire road network including highways, bridges, and tunnels can be a challenge, especially during rush hours. Gridlocked traffic and long commute times cause a greater environmental impact and frustrated drivers.

Solution

Axis cameras with partner analytics provide high-quality and reliable data to traffic operators for real-time traffic management. Combining PTZ, thermal, and license plate capture cameras with powerful deep-learning analytics gives actionable, real-time insights that can be used to improve road safety and keep traffic flowing. Video footage and insights processed on the edge can be used to improve efficiency along highways, control speeds, and open/close lanes including the shoulder or smart emergency lane. Our solutions can also enforce the correct use of high occupancy vehicle lanes, where vehicles need a minimum of two passengers to legally use this lane.

Monitoring traffic in real time

Croatia | The Croatian Automobile Club (HAK) decided years ago to operate a system of traffic cameras to provide drivers with real-time images of key Croatian infrastructure areas, such as border crossings, toll stations, highway junctions, ferry ports, bridges, and tunnels. With a network of approximately 260 cameras, most of which are from Axis, drivers are provided with real-time images of the current traffic situation such as weather conditions and heavy traffic on the HAK website and mobile app, to increase road safety for everyone.

"In our project, images must be delivered swiftly to web servers/web cache, rather than to a central recording unit or a surveillance room video wall, as they primarily end up on our website and mobile apps that are available to the general public. This makes digitizing the image on an IP video server a must for us rather than an option."

Goran Baotic

Head of the Business Support Division, HAK

Data acquisition for actionable insights

Axis solutions can provide traffic and mobility statistics for more than just optimization, but also for planning urban mobility infrastructure, roads, highways, bridges, and tunnels. Our video intelligence software is powered by deep learning and artificial intelligence to uncover patterns buried in surveillance data to produce actionable insights and trends for urban planners and engineers.



Axis cameras with capabilities for deep-learning analytics on edge can be used as a sensor for efficient data collection



URBAN MOBILITY

USE CASE



Traffic data for city planning

Challenge

Fast-growing cities are creating challenges for city planners to meet new mobility demands and problems such as increased travel time, air and sound pollution, and incidents. Traffic and mobility infrastructure has thus become a fundamental and complex problem for every municipality. When planning future infrastructure, it is critical to understand the current situation in order to improve and prioritize.

Solution

Axis cameras with partner analytics and deep learning can be used to collect and process reliable data efficiently at the edge. This provides actionable statistics for urban planners, civil, and traffic engineers to optimize traffic flow and safety. It can give an understanding of how people and cargo move through a city, detect and classify vehicles and people, detect and understand unsafe areas with frequent near-misses, or discover areas with a high environmental impact.



TRAFFIC

USE CASE



Traffic data for road works

Challenge

It's hard to understand what is happening across your entire road network on an hourly, daily, or weekly basis. Having reliable traffic data can give traffic engineers and traffic planners actionable insights when planning road improvements or future projects.

Solution

Axis cameras, empowered with partner analytic software and deep learning, make it easy and economical to collect and manage large-scale traffic data for actionable insights. Traffic statistics can include, for example, traffic volume statistics, average speed, occupancy, vehicle counting, vehicle classification, and detection of unsafe areas with frequent near-misses or areas with a high environmental impact. Statistics can give insight into the movement of vehicles and cargo along a road network to understand how to optimize traffic flow and road safety.

Using people counting to promote a walkable city

Okazaki city, Japan | The city of Okazaki's urban planning incorporates the concept of a walkable city that allows pedestrians to wander through its historic district. To ensure that public investments for a walkable city are effective, they implemented outdoor people counting based on video footage. With 21 Axis cameras installed around the station, in the shopping district, along the pedestrian path, and on the footbridge, they provide a foundation for obtaining data on people counts for the major locations within the city center.

"By implementing people counting, we have been able to quantitatively measure the results of urban planning on public investment. We are utilizing this as part of a more advanced approach to urban planning, such as by presenting this data in our conversations with private-sector businesses to interest more people in investing in this district."

Masayuki Suzuki

*Policy Planning Division,
General Policy Department,
Okazaki City Hall*

Optimizing parking management



The parking problem

Car parking is a major obstacle for urban planners and citizens alike. Parking has always been an issue in our towns and cities, but even more so with mass urbanization, megacities, and population growth. Studies show that drivers spend anything from 17 hours to four days a year driving around searching for available lots. Today, an estimated 30% of all drivers currently on the road are looking for parking. The search for a parking space causes congestion, higher emissions, costs, and wasted time.

Smart parking solutions

Together with partner analytics, Axis cameras can be used as sensors to monitor free parking lots or highway rest areas. Our solutions provide valuable data that can be integrated into navigation applications or digital signage to help drivers know where to go for a parking space.

A parking enforcement system

Using Axis license plate recognition, access to parking spaces can be frictionless and payment automated, which will improve traffic flow and efficiency in the area. With unauthorized parking detection, you avoid dangerous situations and keep citizens safe. For example, cameras can measure if you've parked far enough from the corner and send a real-time alert for illegal parking, double parking, and overtime.

Axis
network
strobe siren



Axis network strobe siren can be used to grant access to parking lots when coupled to license plate recognition. Using both strobe lighting and siren alarms, the device can signal, notify, or warn if an area is safe to be in or not and deter intruders. It's possible to choose various configurations, and only trigger strobe lighting or the alarm in different situations.

A smart parking solution to improve citizens' lives

Tržič, Slovenia | The city of Tržič in the Slovenian Alps scrapped their ground parking sensors and replaced them with Parquery's camera-based smart parking solution. Selecting Parquery as a partner with computer vision algorithms, you can monitor all parking areas in the project, detect available spots and deliver a guidance system to drivers. Using 180° multiple sensor cameras from Axis reduced the number of installation points needed and thus the total cost of deployment.

"We approached smart parking as we approach every solution that we integrate into our smart city platform. We looked for the best technology available according to multiple aspects: accuracy, flexibility, cost efficiency, integration openness, and that is what we delivered in Tržič Municipality."

Staš Kalan
*Senior IoT Project Manager
at Telekom Slovenije*

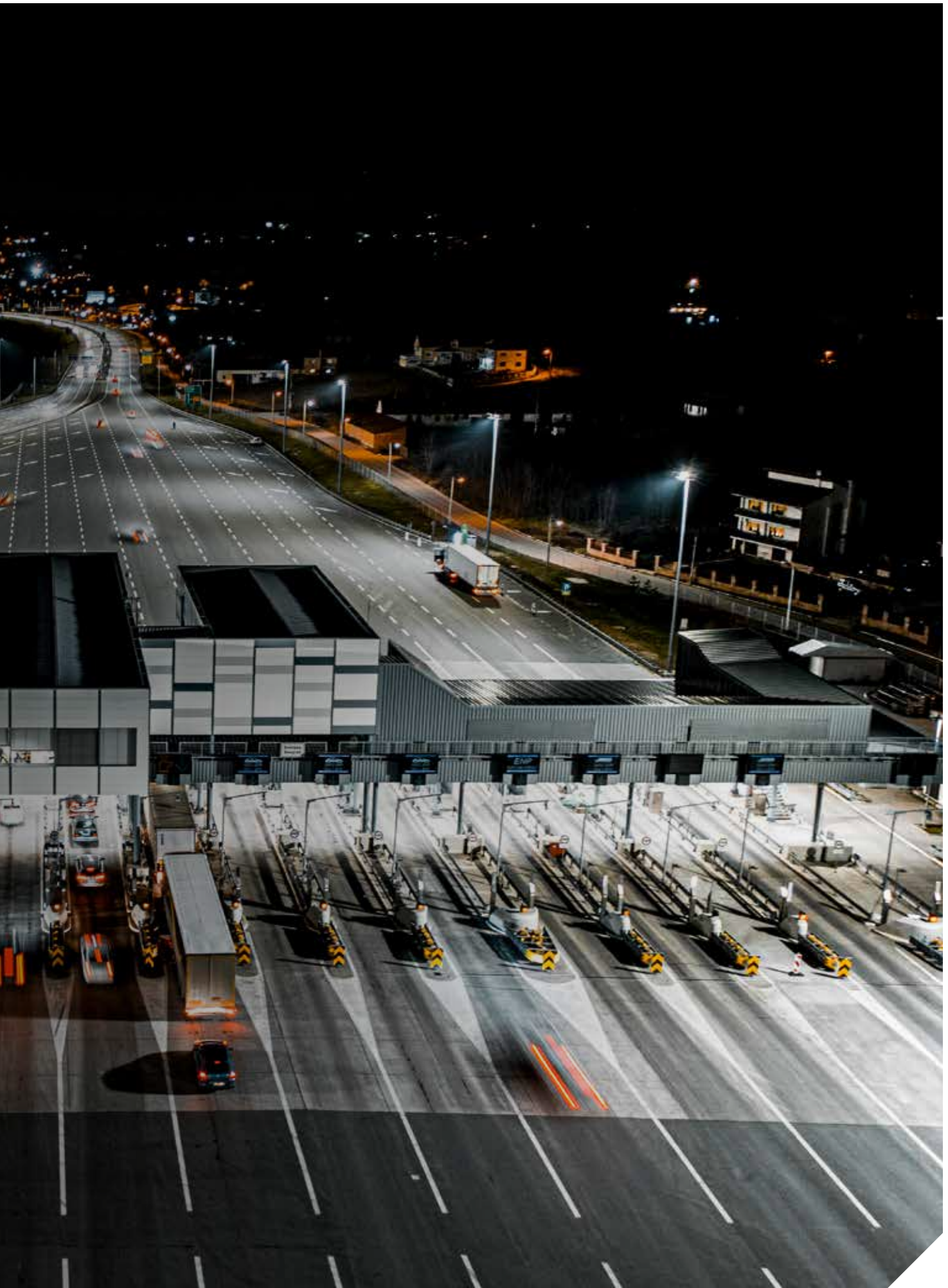


Enabling high-speed tolling

When it comes to tolling, the goal is minimal disruption in traffic flow and efficient payment collection. In all cases, you want to avoid congestions and payment problems that may extend travel times before drivers gain access to toll roads.

Axis license plate capture cameras combined with partner analytics software automatically detect and read license plates in real-time in free-flowing traffic in all weather conditions. On reading the license plate, the analytics then takes appropriate action, such as opening a barrier, automating a payment, or generating an alert. This makes high-speed tolling for highways, bridges, and tunnels frictionless and more efficient.

License plate recognition can classify different vehicle types and automatically generate appropriate toll fees. There is less congestion at the toll plazas, and if an incident should occur, automated or real-time incident detection enables a quick response.





LPR – A smart solution for many mobility challenges



License plate recognition

License plate recognition technology is an efficient and flexible technology that can be used for several use cases for traffic in the city and beyond. Depending on your needs, LPR can help to increase everyday efficiency, service levels, and security. Here are some applications where this technology can be used:



1

City and infrastructure planning

- Planners can use LPR technology to analyze traffic and vehicle statistics
- Count and classify vehicles that enter/exit the city
- Monitor traffic flow like journey times, congestions, and average speed
- Analyze the environmental impact of vehicles in different areas



2 Traffic management

- Traffic authorities can use LPR technology for real-time traffic management
- Detect and manage congestion with lane control
- Measure and manage average speed control
- Detect and monitor vehicles with dangerous goods



3 Traffic investigations

- Law enforcement can use LPR technology for real-time incidence detection and forensic search
- Search for missing/wanted vehicles
- Search for vehicle information – make, model, color



4 Traffic violations

- City authorities and law enforcement can use LPR technology to detect traffic violations and offenses
- Examples: Red-light violation, wrong-way direction, speed violation
- Uninsured or unlicensed vehicles



5 Access control

- City and traffic authorities can use LPR technology to manage a variety of access control uses
- Toll and border control
- Restricted access for law enforcement and emergency services
- Access control for parking, residential, and historic areas
- Emission control – deny access for high polluting vehicles and allow access for electric vehicles

Products for safer and smarter mobility

At Axis, we have a broad portfolio of innovative, scalable cameras and IoT solutions designed to keep traffic moving safely and efficiently. All our cameras offer excellent HDTV camera quality regardless of lighting and weather conditions, with innovative features like Lightfinder, forensic WDR, MQTT, and electronic image stabilization. Our products are built on open industry standards for flexible integration.

AXIS F Series
modular cameras



AXIS F Series modular cameras are flexible, rugged, and discreet cameras for almost any environment, for example, traffic light intersections, and crossings. Thanks to their discreet design, they are also suitable for in-vehicle applications, such as onboard emergency vehicles, buses, and trucks.

Axis
fixed box
cameras



Fixed box cameras send a powerful message of deterrence. They provide excellent image quality for a fixed angle of view and are great for covering vehicle lanes, bike lanes, pedestrian paths, junctions, and crossings. AXIS Q16 Series offers outstanding performance in demanding conditions with a wide variety of lens alternatives, including video quality with 4 MP resolution.

Axis
fixed bullet
cameras



Fixed bullet cameras have a small, slim design for surveillance around the clock. AXIS P14 Series is brilliant for multi-purpose surveillance, including high-quality license plate identification for slow-speed traffic. AXIS Q17 Series gives outstanding image quality and is ideal for securing vehicle lanes, bike lanes, pedestrian paths, junctions, etc. The series also includes a dedicated license plate camera for sharp images at high speeds.

Axis
thermal cameras



AXIS thermal cameras offer reliable detection and verification 24/7 in pitch black areas to sunlit parking lots. When combined with AXIS Perimeter Defender using AI-based functionality you can detect pedestrians, cyclists, or vehicles. The compact and robust camera is built on a powerful analytics platform so it's easy to add custom-made third-party analytics. For example, a thermal sensor unit can be integrated into a traffic light for adaptive traffic signal control provided by another party. This is a good option for a city traffic application with privacy concerns.

Axis
network horn speakers



AXIS network horn speakers allow you to discourage unwelcome activity and warn off bad actors detected by your cameras. For example, the speakers can be used to deter unwanted behavior in tunnels. The speakers can also be used to provide voice instructions during an emergency or inform about illegal parking.

Axis
PTZ cameras



PTZ cameras deliver real-time monitoring for wide areas thanks to pan, tilt, and zoom functionality. AXIS Q61 Series provides full scene fidelity and perfect image quality in all directions – above as well as below the horizon. This makes the series uniquely suitable when there is slightly uneven terrain. AXIS Q62 Series includes heavy-duty cameras that stand up to all weather conditions, making them ideal for highways and bridges. AXIS Q63 Series provides quick zoom and laser focus, even in the dark. With speed dry functionality, you get clear, crisp images even in rainy weather.

Axis
security radars



Axis security radar is a network-based device suited for area monitoring in low-speed areas (up to 55km/h~34 mph), or road monitoring in vehicle lanes with higher speeds (up to 105 km/h~65 mph). Using advanced radar technology featuring built-in analytics developed using machine learning and deep learning, it can accurately detect, classify and track objects of interest 24/7.

AXIS Speed Monitor seamlessly connects Axis security radar to your visual camera, making it possible to display vehicle speeds, collect statistics, and make informed decisions for improved road safety.

Why Axis?

Sustainability at every level

We all have a responsibility and role to play in building a more sustainable future. With our mobility solutions, we support authorities in adopting greener goals to reduce their footprint and environmental impact. Our solutions for increasing traffic efficiency also tackle congestion and, by extension, air, and sound pollution. Axis has 12 years of commitment to the UN Global Compact agreement. We innovate with respect to new regulations, policies, and legislation and work with "green-design" to use sustainable materials. For example, 80% of Axis cameras and encoders are PVC-free.

Driving cybersecurity

Cyberattacks on infrastructure or data theft can have catastrophic effects on a city. How vulnerable would we become if the cameras that govern traffic light signals were hacked? Mitigation of such threats is at the top of the agenda for authorities moving forward. Axis is a leader in security solutions with a superb track record in keeping smart city data safe, secure, and compliant. We have become experts at assessing risk and building processes for data protection into every level of our offering, always compliant with current and future policies, regulations, and legislation.

Quality in everything we do

At Axis, we always act and work with quality in mind. All our products are built to stand challenging conditions, being resistant to vandalism and harsh weather. Products have been extensively tested to last long and deliver sharp images in all conditions, such as capturing license plates at 160 km/h in bad weather or in dark tunnels. Our quality thinking is evident in the excellent HDTV images that our cameras deliver – quality so high it holds up as evidence in court.

The power of partnerships

Axis open platform is flexible, scalable, and easy to integrate, being compatible with many different partners, third-party hardware, and software solutions. This maximizes the uses and synergies to get the best, complete traffic solution. For example, Axis has one partner for seat belt control and one for license plate recognition. By working with many different partners, one camera can be used for several use cases to support safer urban mobility and traffic.

Innovative technology

We constantly strive to combine the best of technology and human imagination to make our products perform better. For traffic management, we apply video analytics and artificial intelligence to enable smarter mobility. For example, with deep learning we have improved our traffic statistics by identifying vehicles with better precision, instead of mistaken objects. The case for analyzing and utilizing data on the edge is rapidly catching on, and can give smart cities actionable insights on mobility, safety, and the environment.

Do you want to know more?

axis.com/solutions/smart-cities/urban-mobility
axis.com/solutions/traffic
axis.com/solutions/public-transport



About Axis Communications

Axis enables a smarter and safer world by creating solutions for improving security and business performance. As a network technology company and industry leader, Axis offers solutions in video surveillance, access control, intercom, and audio systems. They are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 4,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden.