

INFORMATION
PAPER

Shaping tomorrow's airports

Modern surveillance innovations enhancing
the aviation passenger and staff experience

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1. The airport experience of the future

In today's economic landscape, running an efficient and smooth airport presents inherent uncertainties. As the industry evolves, aviation security teams are seeking future-proof solutions that deliver long-term benefits. Airports must find innovative ways to strengthen security while maintaining passenger and staff convenience, safety, and operational efficiency.

The growing complexity of airport operations requires a strategic and integrated approach to safety, security, and operational efficiency. Beyond connecting passenger flows, security systems, and flight operations (both groundside and airside), airports must also address evolving passenger and key stakeholder needs.

Modern surveillance platforms can provide data-driven insights, aiding in improving efficiencies across the entire airport - ultimately enhancing the customer experience. Airport leaders who prioritize understanding the shifting needs of passengers and employees, and who actively develop capabilities to address these challenges, will unlock the full potential of their investments.

This whitepaper explores innovative solutions and strategies that prioritize passenger well-being while addressing key challenges faced by the industry in the current environment.

2. Passenger safety and experience in public areas

Passenger satisfaction, confidence, and trust are critical determinants of airports' service standards. To ensure world-class standards, airport operations are required to anticipate and minimize disruptions to passenger flow, mitigate the risk of contagion in crowded indoor environments and address health and hygiene considerations.

2.1 Key challenges

2.1.1 Accurately identify incidents in a highly dispersed area

From the thousands of passengers passing through the terminals each day to the numerous points of entry, an airport's expansive nature has always created challenges for security and surveillance.

In the event of an incident, security teams must immediately pinpoint its location to dispatch nearby personnel in a timely manner. Safety warnings have to be delivered clearly to specific affected zones to assist crowd management and facilitate a smooth and swift evacuation.

Much thought must go into finding a solution that seamlessly integrates into the existing infrastructure, provides high levels of accuracy and allows for timely incident alerts and response.

2.1.2 Improving passenger experience at high-stress touchpoints

Dealing with passport control and security efficiencies, assistance to lost items or children, and baggage reclaim and tracking, the airport environment has typically been associated with high-stress points, even for the most seasoned travelers. Airports must proactively streamline their workflow by gathering insights from visual data, empowering them with the information necessary to eliminate bottlenecks and inefficiencies from the end-to-end customer journey.

2.2 Axis solutions

From the moment passengers step into an airport to the moment they board their flights, Axis solutions are designed to deliver comprehensive surveillance capabilities for a seamless airport experience.

2.2.1 Situational awareness

Capable of achieving a clear situational overview with a single camera, Axis panoramic cameras offer extensive coverage to enhance monitoring activities, facilitating situational awareness and prompt detection of incidents and anomalies. Aside from delivering images in up to 4K resolution, pairing multidirectional cameras with additional PTZ cameras offer both the advantages of panoramic cameras with the ability to zoom in via a single click in the VMS (video management software). These cameras provide a high level of detail in the targeted object or area and a high-quality continuous 360° overview, enhancing real-time monitoring capabilities even in variable weather or light conditions.

2.2.2 Turning analytics into decisions and actions

Axis network cameras can combine visual data with artificial intelligence to improve object detection capabilities, providing actionable insights based on the object being monitored and filtering out familiar irrelevant sources of suspected events. AXIS Object Analytics leverages AI-based algorithms, camera deep learning power and behavioral conditions to analyze a scene and the spatial behavior of objects within. This significantly improves object detection accuracy and reduces the chances of false event, which cause much disruption to surveillance. For instance, cameras can be configured to alert operators only when it detects vehicles in pedestrian-only areas.

Object detection and classification capabilities can be used to manage public areas better. Insights derived from surveillance footage around visitor footfall and activity and area occupancy data can help operation teams identify areas displaying signs of overcrowding. This can allow them to begin redirecting visitors to less crowded areas to mitigate potential safety risks.

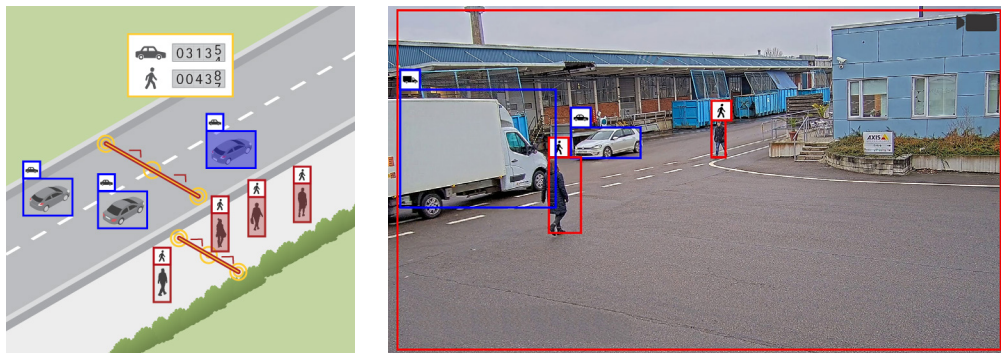


Figure 1. AXIS Object Analytics allows you to select which objects to detect – humans, vehicles, or types of vehicles, and then define behavioral conditions for that object to trigger an event.

2.2.3 Improved ability to support anomaly investigation and people identification

Axis forensic search offerings can help accelerate forensics investigations for objects, vehicles, people, or incidents and pinpoint evidence to solve a case, even in crowded situations. These deliver object classification and motion object tracking metadata from Axis cameras directly to the VMS, eliminating the need for analytics servers and reducing analysis times from hours to minutes.

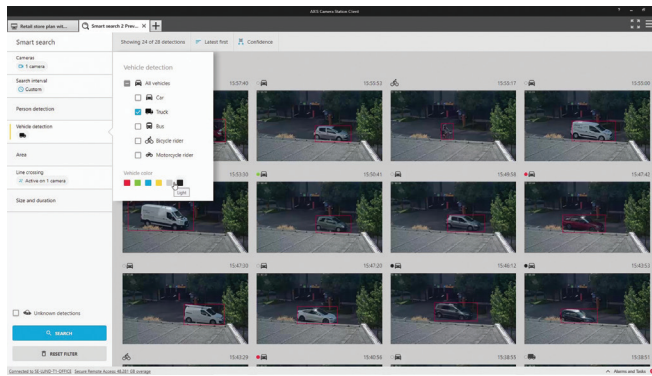


Figure 2. Axis forensic search offerings are designed to accelerate forensic investigations. This allows you to search using various metadata terms, search criteria, and attributes.

Facial recognition technology is another feature that can speed up identification and verification procedures at self-check-in gates or self-service bag drops. Partnering with leading-edge solutions providers, Axis cameras easily integrate with highly accurate facial recognition solutions to accelerate the process of verifying and authenticating travelers' identities, all while ensuring traceability on all passenger checks.

3. Staff and service provider's safety and operational efficiency in restricted areas

With comprehensive visibility from surveillance systems and data-backed analytics, airport employees can take proactive measures that mitigate internal and external risk factors from a single centralized location. Airports should adopt new innovations to bolster operational efficiency and safeguard the health and well-being of their employees amidst manpower constraints in the aviation sector.

3.1 Key challenges

3.1.1 Perimeter security and access control

Airports can occupy extensive land areas and housing facilities such as runways, hangars, terminals, offices, control towers, and cargo warehouses. This can create challenges for security teams that have to monitor the airport's perimeter for intruders or manage access for authorized vehicles and personnel, both fundamental aspects of any site protection. This is critical for airports due to the risk of terror threats. Without the help of technology, adequate security could require numerous manned guard stations and frequent guard patrols, which could significantly raise manpower requirements and operating costs.

3.1.2 Runway safety

Ensuring runways remain clear of obstruction or unwanted objects is essential to the safety of flight crews and ground staff, with any failure resulting in potentially devastating results. However, like perimeter security, manually monitoring such an ample space can be highly challenging regarding manpower resources. The effectiveness of physical teams could also decrease after nightfall or during adverse weather conditions when visibility is impacted.

3.1.3 Baggage tracking

The baggage process is critical at airports, vital for timely flights and passenger satisfaction. This process can be highly complex, going through various systems to be tagged, sorted, and transported. Disruptions at any stage can result in lost or delayed baggage, making the ability to track baggage essential. Such capabilities will also be important in the event of unattended objects, enabling security personnel to quickly and accurately differentiate between an item that has been genuinely misplaced or a potential security threat.

3.1.4 Unruly passenger behavior

Incidents involving unruly passenger behavior are rising, with examples of violence against crew and other passengers, harassment, verbal abuse, smoking, and failure to follow safety and public health instructions. Although a small percentage of passengers follow through to commit such acts, they often create a disproportionate impact. These incidents are highly disruptive and endanger other passengers' and crew's health and safety while incurring high operational costs for airlines.

3.2 Axis solutions

3.2.1 Intrusion protection and access control solutions

Axis empowers security units to prevent intruders from entering critical premises under challenging environmental constraints. Robust intrusion protection solutions by Axis offer intelligent monitoring of each site by utilizing surveillance systems with visual and thermal imaging, radar devices, network audio equipment, access control solutions, and video analytics. These components combine to form a security system that allows you to monitor multiple sites from a single control room, providing comprehensive, efficient, and cost-effective management to safeguard the airport's perimeter right to the critical core. Minimizing the disruption caused by unauthorized or wrong access will help improve both operational efficiency and worker safety. Axis offers a range of edge-based and streamlined access control and intercom solutions. For instance, vehicle access control solutions and automated license plate recognition help automate access to authorized personnel without manned guard stations. Any potential security incident will also immediately trigger alarms. Other access control solutions include video intercoms and touchless devices allowing mobile credentials to grant access. Touchless access control can provide additional protection for staff without compromising security.

3.2.2 Tracking the flow of people and processes

For more effective monitoring that can do more with less, Axis outdoor-ready heavy-duty Q62 camera series, is ideal for helping staff enhance runways, airfield operations and highway monitoring. Axis multisensor cameras deliver a seamless 180° panoramic overview of extensive areas for quick and intuitive situational awareness – making it well-suited for monitoring aircraft parking. Panoramic cameras equipped with artificial intelligence features are also beneficial for monitoring luggage flow. Staff will be instantly alerted and can promptly deploy relevant personnel for unauthorized entries around conveyor belts or if luggage becomes jammed.



Figure 3. AXIS Q62 Series is ideal for wide and long-distance surveillance with high precision PTZ and long-range OptimizedIR. They are packed with built-in analytics to alert you when needed.

3.2.3 Creating safer workplaces with audio and AI technologies

Beyond video surveillance capabilities, audio and sound emerge as powerful technologies for threat detection. Axis cameras also enable audio analytics to be embedded directly inside the device. The device's video feed stream will only be activated when a particular audio event, such as verbal aggression, is detected. This will reduce bandwidth consumption and storage needs, and the immediacy of alerts enables security personnel to be more proactive in identifying and responding to threats, such as potential conflicts.

The AI-powered capabilities provided by AXIS Object Analytics enable the spatial behavior of objects within a scene to be analyzed. This vastly improves the ability of operators to identify work safety violations. Surveillance systems can be configured to automatically detect unsafe work practices, such as personnel standing around potentially dangerous objects.

4. Manage operations with cybersecurity and system management

4.1 The cybersecurity imperative

Surveillance is essential to security, safety, efficiency, and data support planning. Having the requisite measures to protect and secure these systems, and the data they collect and analyze will be central to long-term success. However, the large quantities of devices installed throughout airports will mean that operators must also be equipped with the right tools to efficiently manage all central installation, security, and maintenance tasks.

Confidentiality. Data availability. Lost business. There's plenty at risk if your system is compromised. Any IP networked device or service is a potential pathway to your network. Threats include unauthorized access, accidental misuse, sabotage, exploitation of vulnerabilities, and tampered software. A partner that can put safeguards in place to address these threats and make it harder for cyber incidents to occur will add value to the stability of your operations.

4.2 Axis approach to securing devices

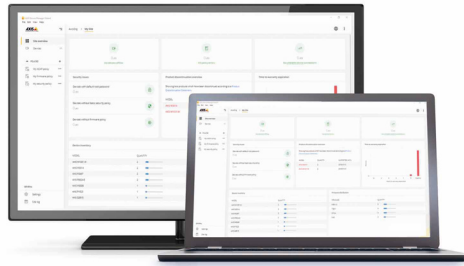
Effective cybersecurity is a question of managing risk and requires more than cutting-edge products and technology. This means a continuous assessment of risks and potential impact, supported by security teams able to proactively mitigate identified risks. Devices should also be developed with built-in cybersecurity by design, decreasing the risks of compromise and enabling secure behavior.

Axis network products have a variety of built-in cybersecurity features that help customers use them as securely as possible - from detecting firmware tampering to streamlining device replacement, assisting organizations to safeguard their digital devices and reduce the risk of cyber attacks.

4.3 Efficient device management and proactive cybersecurity controls

Axis offers a suite of solutions that make securing, managing, and optimizing Axis devices easy and cost-effective.

AXIS Device Manager and AXIS Device Manager Extend represent a platform to manage all major installation, security and maintenance tasks. Capable of configuring individual devices or in batches, it can support up to two thousand Axis devices on a single site. This is scalable to several thousand devices across multiple locations, enabling security operations of multiple airport facilities to be managed from a centralized control center. Besides empowering security installers and system administrators with a unified source of information, AXIS Device Manager also allows remote configuration of operational parameters and mass deployment of digital certifications or firmware upgrades, which could manage as high as five thousand for a typical airport.



4.4 Ease of system features access

Whether you are a system administrator, operator, or investigator, Axis offers a suite of integrations that ensures optimal experiences when working with Axis devices with third-party Video Management Systems. AXIS Optimizer for Milestone XProtect offers seamless integration across Axis devices, enabling all users to derive maximum value from their Axis devices in Milestone. Provided free of charge, the AXIS Optimizer only needs to be installed once, and it will automatically find, manage, and update all integrated Axis features and capabilities in Milestone XProtect VMS. This reduces the need for operators to search for, download, install, or manage separate plugins – saving considerable time, effort, and money.

5. Conclusion

In the near future, trends set to shape the airport experience and lend momentum to the use of surveillance systems include:

- > Advances in artificial intelligence giving rise to more innovative use cases for video analytics, supporting efforts by airport operators to manage increased passenger capacity and thus better capitalise on recovering travel volumes.
- > More efficient object and human recognition technology will likely lead to higher adoption of surveillance systems to boost operational efficiencies in areas such as access control or intrusion detection.
- > The rise of open platforms that can support new technology trends such as 5G, which can provide increased bandwidth to support the collection and analysis of data in real-time to power better airport experiences that adapt to evolving real-time situations, all while improving the safety of stakeholders.

Moving ahead, technology-first measures such as advanced surveillance systems may provide the competitive edge needed to enhance operational efficiencies in airports, enhancing the airport experience for visitors and laying the foundation for a smarter, safer world.

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.