



# CHARTING THE PATH TO SAFE CITIES

Why video will play a vital role in the cities of the future

MAKE THE  
WORLD SEE

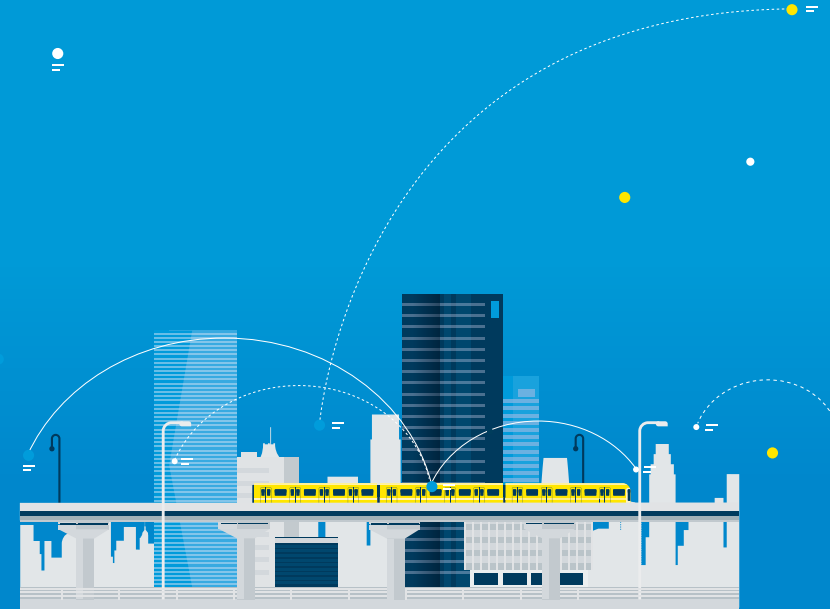


 milestone



# CITIES OF THE FUTURE

For the first time in history, there are more people living in cities than in rural areas. By 2050, 68% of people will live in urban areas. This global migration to urban residences has put unprecedented pressure on city leaders - but they also face opportunities to improve livelihoods, safety, and health. To achieve this, a city's infrastructure needs to be reconfigured. Particularly in the wake of emerging technology like the Internet of Things (IoT), automation, artificial intelligence (AI) and advanced video analytics.



Realising this, many governments including the European Union are championing safe city technology through encouraging innovation and cross-sector collaboration. For example, the European innovation partnership on smart cities and communities (EIP-SCC) brings together city authorities, private businesses, banks, academia and more, to improve urban life through sustainable technological solutions.

## The benefits of safe cities

Leveraging technology, safe city leaders can proactively protect people, secure premises, respond in real-time, and optimise their public services. Citizens can be protected from everything from terrorist attacks to epidemics and natural disasters. First responders in

healthcare, policing, and firefighting can be better informed and efficiencies can be found for traffic control, waste management, social care and more. Sustainability can also be improved through cost and resource efficiencies.

For example, in Helsinki, a safe city initiative has been designed to test smart and clean tech solutions within the metropolitan area, save one hour of every citizen's day through traffic efficiencies, and share City Council meetings via webcast. Meanwhile in Barcelona, investment in the city's Wi-Fi infrastructure and the IoT has saved an estimated \$58 million (€49.4 million) on water and created 47,000 new jobs.

## In short, safe cities will improve:

- **Safety** through predictive policing, preventative measures such as crowd dispersal, and deterring antisocial behaviour.
- **Cost-savings and financial benefits** through improving services and operations, reducing the impact of crime, promoting tourism to a safe city, new business opportunities, increased foreign investment and increased retail spending.
- **Public perception** as citizens experience their leaders improving their wellbeing and safety.

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# HOW TO START A SAFE CITY PROJECT

Research has found that leading safe cities prioritise getting the basics right in four areas: digital, health, infrastructure and personal security.

These cities also build resilience through using technology and having infrastructure that's equipped to integrate easily with future technologies, providing a degree of futureproofing. Transparency and governance are also essential and safe city leaders would do well to communicate their plans and the benefits of their strategy to stakeholders (including the public).

Underpinning every safe city implementation should be a central control function where leaders, security teams and other relevant stakeholders can access consolidated safe city data and receive real-time alerts. Data visuals and dashboards can help surface information to stakeholders in an at-a-glance format for faster decision making. The centralised repository of data enables

innovative solutions such as automation and artificial intelligence. It can also improve collaboration between different city functions to coordinate and manage response efforts. Live feeds from CCTV systems in a retail location, for example, can be fed back to city authorities to improve response times if an incident does occur.

A city's size doesn't impede its ability to become a safe city, however, different sizes will require different technology solutions and investment. It's worth noting that each city is unique, with various levels of legacy infrastructure, stakeholder buy-in, and citizen needs. Smart city solutions, therefore, are not one-size-fits-all.

## In action: Sofia

In [Sofia](#), the Bulgarian Ministry of Interior and Sofia Municipality used video analytics to upgrade public security during the 2018 Presidency of the Council of the European Union. Over 40,000 delegates attended the event that was held in the National Palace of Culture. The Ministry needed to secure this key location and consolidate various sources of city-wide information into a single system.

As Maksim Vladimirov, Sr. Expert Communications & Information Systems, Ministry of Interior, Bulgaria explained, "To achieve better results in crime investigation, safety preservation and crime prevention, centralisation of sources and coordination of forces was a necessity."

Video streams from thousands of cameras and nine different vendors were consolidated using Milestone XProtect and then integrated with internal systems such as access control and people/vehicle register. This enabled proactive monitoring and rapid detection of incident locations. For example, detection of a stolen vehicle's license plate would immediately issue an alert, as would unattended luggage, people running, trespassers or loiterers.

The technology is now being used as part of a wider programme called the "Smart City Automated Unified Security Platform for Situational Awareness and Predictive Analytics – CITYCURE".

# SAFETY OF PEOPLE

“What is the city but the people?” Shakespeare once asked, highlighting the main priority of all safe city leaders - protecting their citizens.

Without people, a city will cease to exist. If they don't feel safe, visitors won't come to a city and residents will leave. Public spaces play a vital role in reassuring people of their safety. High streets, street markets, shopping precincts, community centres, parks, playgrounds and neighbourhood spaces are where people connect with, and become part of, their cities. They are the social and economic life of communities, so city leaders must work to secure these areas.

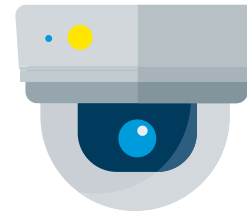
## IMPROVING CITIZEN SAFETY

Safe city leaders have a number of options to improve safety in public spaces.



### Object detection and classification

Object detection and classification analyses video to identify, track and classify ‘objects’ that appear. These can include people, different vehicles, or other items that may be left around a public space. It can help security and police forces to respond to a backpack left unattended or to understand more about the use of a space. Over time, this video data can uncover patterns and behaviour preferences which can inform future planning, services such as waste management, and maintenance.

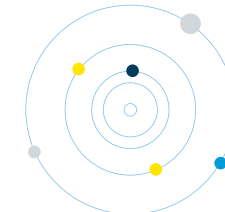


### Camera stitching

Camera stitching allows city leaders to track the movement of people or vehicles around a city as data from one camera is picked up by another camera, then another, and so forth. This can help improve pedestrian and road experiences, by closing lanes to traffic for an emergency vehicle to quickly pass through. Police investigations can be aided, with greater oversight of how a situation developed, where a perpetrator came from and where they escaped to. These insights will also help prevent future incidents.



Public spaces are the social and economic life of communities.



### Real-time unusual behaviour detection

Capturing and analysing data in real-time is essential for every safe city project especially if the data is highlighting a security threat. Unusual behaviour can be automatically flagged by a system if, for example, an individual walks into a restricted area, is following another person, or loitering. Authorities can then respond quickly to understand more about the nature of the threat and take appropriate action. This can help to reduce crime, prevent terrorist attacks, or other violence.



### Artificial Intelligence to detect aggressive behaviour

Aggressive behaviour can be automatically flagged by a video system so security teams and police can quickly attend and de-escalate. Held weapons can be detected (using object detection) and aggressive arm signals or movements can be picked up by video feeds.



### Audio intelligence

Video feeds can act as an 'eye' on the ground for city leaders - but for a complete picture, sound is also needed. Audio intelligence can pick up the sounds around a city to provide more information on what city leaders are seeing. Threatening sounds like shouting or loud banging will alert authorities to possible violence, for instance.



### Crowd counting and control

People and occupancy counters can tell city leaders if a public space is becoming overcrowded or if crowds are gathering in a specific area, which could indicate possible antisocial behaviour or a travel bottleneck. People can be directed to other routes or spaces based on these insights. It can also inform policing efforts for specific events such as football matches or protests.

Longer-term, counting the number of people regularly using a space will inform planning and maintenance. Pavements may need greater care in busy areas, bins will have to be emptied more regularly, surfaces sanitised, and wayfinding may be needed to prevent regular bottlenecks.



### Traffic analysis

There is a vast range of data available on traffic movements in a city. Traffic data can be analysed to improve efficiency, the road/pedestrian experience, first response times, security, city planning, and more.

Real-time traffic information on road usage can tell leaders how best to divert traffic from congested roads into quieter (but equally functional) areas. In the event of an accident, authorities can be rapidly deployed to the area and traffic diverted. Lanes can even be closed dynamically for emergency vehicles to drive through. During peak periods such as commuting times or holiday periods, street closings and diversions can be proactively implemented based on past insights from the same time period.

Alerts can also notify police of any traffic violations, dangerous driving, stolen vehicles (via license plate recognition) or parking/driving in unauthorised areas. Video analytics can detect when parked cars have exceeded a designated length of stay and automatically issue a penalty notice charge.



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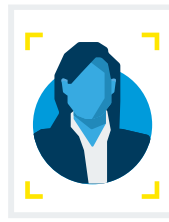
### Digital signage

Digital signage can be integrated with video systems to improve a city's communication with its citizens and increase public awareness of important campaigns. Automatic messages can be displayed if an area is closed, an accident has occurred or when people need to be aware of dangers in the area (such as increased pickpocket activity or a suspicious package being dealt with). When not in use, digital signage can also provide an additional revenue stream through advertising local businesses.



### Body-worn cameras

Many people have become used to seeing body-worn cameras on police and other first responders. These cameras help to deter violence against staff and can also monitor their behaviour to ensure best practice is being followed. Body-worn cameras are also becoming popular for security and retail personnel to prevent attacks on staff and provide evidence to authorities if violence occurs.



### Face recognition

Face recognition technology is becoming a critical tool in protecting people in large crowds or busy events. Authorities can create watchlists with digital images from video that will automatically alert them to individuals who are missing, suspected of a crime, or a public danger. Vulnerable people with dementia or special needs, and children, can be tracked by the system so authorities can quickly respond and protect them. Persons-of-interest can be detected and monitored to reduce danger to the public and determine an appropriate response.



Video arms  
our people  
with immediate  
intelligence.

## In action: The city of Hartford

The City of Hartford, Connecticut, first began expanding and upgrading its video systems in 2013 to improve public safety and help its frontline police officers. It implemented a new IP video system called BriefCam that uses hundreds of cameras to cover public parks, city streets and the City Hall.

The Hartford Police Department established a Real-Time Crime Centre and Data Intelligence Centre to better assist officers on the street. This facility includes the XProtect

Smart Wall with 30, 55-inch, 4K video monitors so city events can be seen at-a-glance. This centre is staffed almost round-the-clock by three civilian crime analysts who monitor video and data feeds across the city.

When potentially violent or hostile events are detected, the analysts can alert officers and use live information to assist with crime in progress. Perpetrators running down a street can be tracked or vehicle number plates can be relayed to officers. Recordings also help with

investigations after an event. Milestone Mobile is used by officers and detectives can record evidence or capture real-time video, which is then relayed back to the Crime Centre.

Additional cameras are being rolled out in phases until the entire city is covered. Further integrations with vehicle-level surveillance and body-cameras is also planned.

# SMART IOT SOLUTIONS

A significant development for safe cities is the emergence of the IoT. This market is expected to grow from [USD \\$113.1 billion](#) in 2020 to \$260 billion by 2025. A growth rate of 18.1% that's largely driven by safe city adoption. improve livelihoods, safety, and health. To achieve this, a city's infrastructure needs to be reconfigured. Particularly in the wake of emerging technology like the Internet of Things (IoT), automation, artificial intelligence (AI) and advanced video analytics.

IoT solutions have a wide range of uses in a city, from tracking the air quality around areas of interest such as parks and schools, to monitoring for water leaks and high usage (a priority for many cities given the [looming water shortage](#)) and providing deterrents for antisocial behaviour.

Sensors can complement video feeds by understanding more about how people use and move around a city, relax in public spaces and on benches, or access public services. For vulnerable citizens, SOS buttons can quickly tell caregivers or authorities if an individual needs help in their home or on the street.

In the [Netherlands](#), IoT street lamps are connected to the wider safe city system. They are automatically switched on when the system detects a crowd forming in areas with many nightclubs and pubs. They will also switch on when a bike or car is approaching.

The development of the IoT highlights the need for a futureproofed safe city system that can integrate with future technologies as well as today's ones. An open system won't lock a safe city project into one vendor, making it easier to experiment with IoT devices as soon as they launch and to implement innovative IoT-driven plans well into the future.





## In action: Calgary

With a population of nearly 1.2 million, Calgary is Canada's third-largest municipality. It is consistently recognised for its high quality of life and this can primarily be attributed to the role of technology in the city's management. Calgary uses a range of solutions including cameras, recorders, access control systems, alarm and detection systems, video analytics, GPS, laser scanners and emergency call boxes.

Milestone's open platform is the core of its new citywide video monitoring system, consolidating data from more than 8,000 devices from over 150 manufacturers. The city has installed the system to cover public utility facilities, parks and playgrounds, electrical substations, operational work centres and storage lots. The 24/7 system ensures public safety as well as preventing theft of equipment, supplies, and copper.

The city is now looking at integrating other IoT devices with the system and overlaying it with data and sensors from Live Earth business intelligence and visuals.

"Selecting the video management system was a big decision that impacts the current and future performance of the system. Having a truly open platform with the ability to deeply integrate third-party systems was a critical requirement. Calgary needed an open platform where any camera or device could be installed, and where we can integrate with other data systems. Milestone was certainly the right choice."

Mark Sheahan, Convergent Account Manager for The City of Calgary project



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# PRIVACY AND CYBERSECURITY CONCERNS

Given the wide connectivity and potential of safe cities, it comes as little surprise that there are privacy concerns surrounding the collection and use of data, and the risk from cyber-attackers.

With their complex, interdependent networks of devices, and wealth of data, cities are prime targets, with [70 per cent](#) of all reported ransomware in the U.S. targeting state and local governments. When implementing safe city solutions, therefore, city leaders

must prioritise the security of all of their systems and data. As [Dimitrios Pavlakis](#), industry analyst at ABI Research states, “In this increasingly connected technological landscape, every smart city service is as secure as its weakest link.”

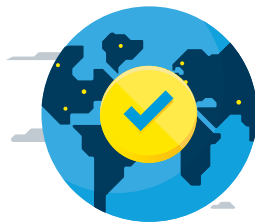
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### Address privacy concerns

The public has, understandably, many concerns around safe cities and what this means for their data. The more connected devices a safe city uses, the greater the risk to individual privacy. People are concerned about the misuse of their data, loss of sensitive and personal data in the event of a cyberattack or breach. City leaders must work to alleviate these worries by communicating the benefits of using safe city solutions. Transparency is also key, telling people how their data will be collected and used, and letting them play a role in shaping safe city strategies.



### GDPR compliance

The EU's General Data Protection Regulation (GDPR) is ultimately a positive thing for safe city leaders. It provides clarity around the purpose of personal data collection and storage and gives citizens greater confidence and control over their data.

As [Jamie Cudden](#), Smart City Program Manager, Dublin City Council explains, "From a city perspective, being GDPR compliant builds consumer confidence in the organisation. Similarly engaging with companies that are GDPR compliant provides trust that their organisation is a good data custodian. Having a GDPR compliant framework lays the groundwork for improving data security throughout the organisation."

Complying with GDPR, and using GDPR-ready systems, will also improve data quality and reduce legacy or duplicated data, therefore reducing data storage and maintenance costs. Improved data quality will produce higher-quality insights, leading to more informed and accurate decision-making.



### Cybersecurity

Government bodies are increasingly concerned about the risks and costs of a cyberattack. [Europol](#), the European Union's (EU) law enforcement agency recently warned, "The possibility of a large-scale cyber-attack having serious repercussions in the physical world and crippling an entire sector or society, is no longer unthinkable."

This was highlighted by the WannaCry ransomware attack that crippled several government departments, local governments, courts, universities and healthcare systems (notably the UK's National Health Service).

The risks of a breach increase as city infrastructure becomes more connected (and therefore vulnerable) and multiple parties - including other countries - begin cyber attacking cities. North Korea, for example, was accused by the [U.S.](#), [U.K.](#), [Canada](#) and [Australia](#) of being behind the WannaCry attack.

A cyberattack can bring down entire city systems, causing widespread disruption and ongoing financial costs. A 2018 cyberattack on public computer systems in [Atlanta](#) shut down many of the city's functions for months and led to almost \$10 million in recovery costs. Plus, there's the ongoing loss of trust among citizens, visitors, businesses and other governments to consider.

To counter these risks, safe city cybersecurity plans must be created to safeguard the city's critical infrastructure. Some [European cities](#) are already implementing such safeguards and are additionally asking residents to opt into the system voluntarily. Biometric systems, cryptography and digital privacy policies are also helping to place cybersecurity at the heart of safe city efforts.

# THE FUTURE OF SAFE CITIES

With many people moving to live in cities, the power to create significant change in global wellbeing, lifestyles and safety lies in the hands of city leaders and organisations.

Technology increases this potential; creating new ways for businesses to understand the use and movements in their cities, to have their eyes and ears to the ground. The potential is vast. In just a few years we will likely see video combined with heating, water, and electricity sensors to improve operations and sustainability. The IoT will become integral to the fabric of our cities. Buildings and other public sites will collaborate to improve the citizen experience.

Video analytics and management software will play a vital role in the technological changes ahead. Open platforms will form the foundations of smart and safe cities.

Now is the time to get ahead of these innovations - to understand how you can shape the future of your city beyond traditional bricks, bin collections and bus journeys.





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**Any questions?**

Please reach out to us [here](#) if you have any questions or inquiries.



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