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Introduction

A smart city is a safe city. Sometimes we use those terms interchangeably. However, while they are connected, they are not the same thing. A smart city is a metropolitan municipality that leverages technology to gain insight and enhance the quality of life for citizens. This definition is a big umbrella that covers many technical capabilities. For example, it can cover building management, traffic control, mobility improvement plans, transportation technology, cloud-based services, and public safety tools, such as citywide security camera networks. The systems are widely diverse, collect a lot of data, and typically help city administrators solve specific problems. But the leveraged data helps them gain insights and improve beyond the initially intended need.

When systems are integrated and share data, they can accomplish more together than they might achieve individually. The integrated solutions are where smart cities find their power through technology. Open architecture platforms allow data use across multiple resources.

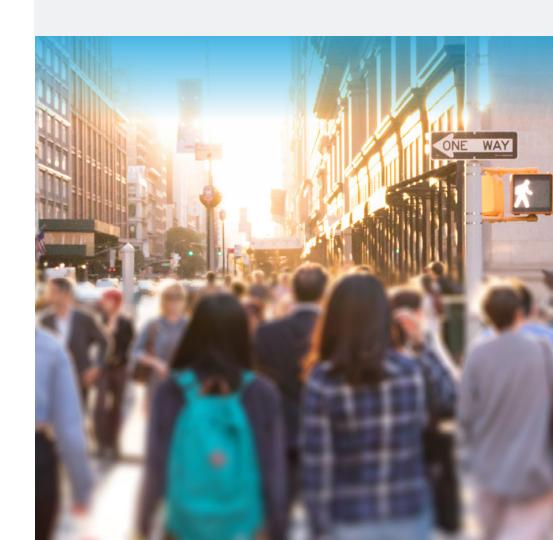
Safe city tools are a subset of smart city applications. The tools and solutions are similar, yet they focus more specifically on security or life safety. For example, a security surveillance system can capture data to share with other municipal systems. A traffic department might be able to use video to analyze traffic patterns captured on security cameras at a dangerous intersection. The findings could reveal insights that lead to recommended improvements to help save lives.

This book describes how smart cities impact people's lives. We'll look at 5G connectivity and how it enables IoT devices to capture and transmit data in previously impossible ways. In addition, we'll see how video analytics determine behavioral activity and improve a proactive response by police when troubling events occur. Furthermore, cities can help their residents get to work on safely monitored roads. Moreover, tourists can feel safe traveling to areas knowing that city planners are doing their part to keep visitors protected while they travel.

Cities differing in population have different needs and budgets. As a result, all municipalities debate the demand versus the cost of security tools. We'll provide some ideas and use cases for technology that can impact metropolitan areas and make a difference in people's lives.



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SITUATIONAL AWARENESS:

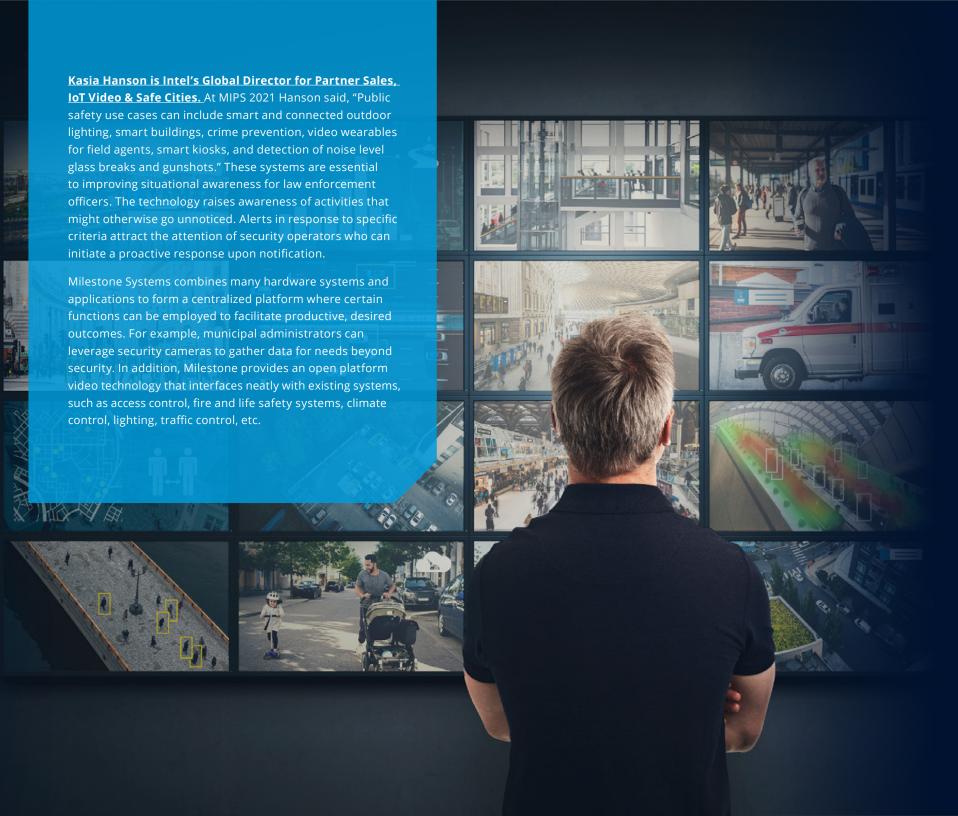
Emergency Services and Everyday Citizens

In today's urban environments, municipalities are utilizing technology to improve the lives of their residents. As a result, situational awareness from an organizational perspective has become a reality.

Smart cities, or more specifically, safe cities, have intentionally included situational awareness components in their systems, covering public safety and mobility.

Situational awareness is paramount to public safety. There doesn't seem to be any argument there. Yet its efficacy is greatly amplified through smart-city applications, such as video technology platforms paired with artificial intelligence (AI), video analytics, and machine learning.







VIDEO TECHNOLOGY:

Advancements and Insights

Police officers have increasing requirements for connectivity, though emergency conditions often complicate the ability to connect with other systems. For example, police vehicles and officers might have legacy mobile video surveillance cameras—vehicle-mounted or body-worn devices. However, with low bandwidth connections, the recording device stores the video locally and then moves it to shared storage after the officer returns to the station.

The delay in gaining access to video evidence is unfortunate. Supervisors must be able to see live or recorded video as soon as possible, with little to no latency in video delivery. Live access to video data also allows for intelligent monitoring of data streams to trigger rapid response to emerging situations.

New technology advancements are helping close the gap for law enforcement officers. For example, IoT devices with 5G connectivity can better stream data with little latency, providing a near real-time live video stream to police commanders monitoring from the command center. However, this new technology is expensive, and 5G connectivity is still rolling out in many areas of the United States. Artificial Intelligence (AI) depends on the ability of computers to translate and quantify video data so that humans can make more efficient and better-informed decisions. Cameras and video surveillance platforms couple with analytical tools and intelligent search capabilities to automate many decision-making routines that slow down response time in critical incident scenarios. While AI is necessary for data processing, pairing it with human intelligence brings successful implementation and a proactive response to the findings.

Many police precincts are speeding to upgrade their systems to take advantage of these new technologies. While the infrastructure upgrade of hardware and software capabilities presents a challenge in some places, the payoffs deliver rapid response, officer safety, automation of standard processes, and improved real-time access to intelligence.

Cybersecurity for Public Agencies

The Enterprise Strategy Group is an integrated technology analysis, research, and strategy firm that provides market intelligence, actionable insight, and go-to-market content services to the global IT community. An ESG research survey found that 18% of respondents reported that they deal with ransomware attacks daily, 24% said they experience attacks weekly, 13% reported monthly attacks, and 15% claim attacks on a more sporadic basis.

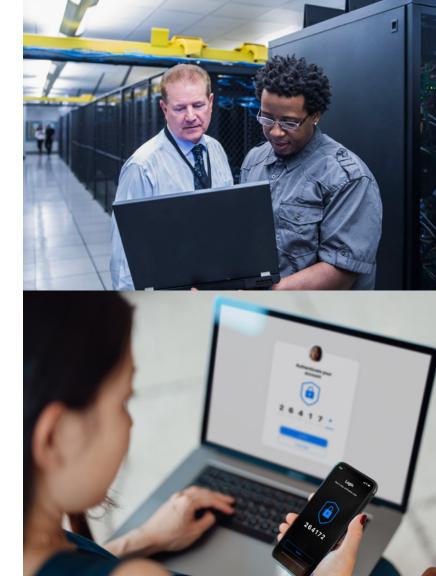
Cities fall into this category as well. Public entities often experience cyber-attacks because criminals look for information they can exploit. To strengthen your city against a cyberattack via security systems, your teams can take many steps, including:

- Add strong camera passwords following industry-recommended standards.
- Isolate your security networks from other PC and workstation networks.
- Secure the network to ensure only the installed cameras can communicate.
- Deploy individual logins with permissions appropriate to the operator's role.
- Do not share logins. Each user should use their private login to ensure logins and passwords don't fall into the wrong hands.
- · Keep note of unusual events.
- Only purchase cameras from reputable security companies and avoid organizations with known cybersecurity vulnerabilities.

In addition to these steps, cities can also bolster their security measures through "hardening" — the process of continuously identifying evolving security risks and countering them. To harden a VMS, public agencies can enact several actionable steps:

- Identify the components that need protection.
- Harden the surveillance system's servers, computers, devices, networks, and cameras.
- Document and maintain security settings for each system.
- Train your team to help you identify future threats and implement countermeasures.

These manual steps are only the first stage of a successful VMS defense. There are still opportunities for hackers to attack. However, municipalities can better protect their vulnerable security infrastructure by automating and strengthening processes with Milestone.





CITIES OF ALL SIZES:

SECURITY TECHNOLOGY COVERING A BROAD SPECTRUM

Cities of all sizes have different needs. The needs vary as much as the cities, and you can't make assumptions based on the size of the metropolitan area. We can no longer count on the comforting belief that the future will resemble the past. Urban areas are experiencing explosive growth, affecting how people live, move around, and their sense of safety.

An action plan is a prerequisite to ensuring a better quality of life in the future. City leaders must act now. One of the best avenues open to city leaders is exploring opportunities offered by data-driven video technology.

With centralized solutions, data generated by cameras and loT sensors flows into central, connected video management systems. Now, operators can monitor, analyze, and examine live and recorded video streams throughout the coverage areas in a single interface. The video is viewable in security operations centers or remotely via a connected remote device.

With the ability to monitor security camera streams anywhere, law enforcement first responders have full situational awareness. Better information about a developing situation allows a proactive response so officers can act quickly on critical decisions, react quickly to events, and prevent harmful incidents. The added situational knowledge also enables security operators, city authorities, law enforcement, officers, and other government departments to get on the same page to collaborate using the same information.

Milestone has a goal of helping people see ways to realize the full potential of video data generated by surveillance cameras and other security tools. **XProtect® Video Management Software (VMS)** is an open platform technology. Milestone works with technology partners to ensure that diverse systems are integrated and work together to provide solutions to city customers' problems.

DEFINITION OF URBAN POPULATION BY CITY SIZE

THE PERSON NAMED IN COLUMN

BEER

There are many ways to classify cities by size. The definitions vary almost as much as the various regions across the globe. However, the Organisation for Economic Co-operation and Development (OECD) has an excellent description. The organization is an international group comprised of policymakers from member countries advising best practices for economical solutions. Here is their breakdown of urban populations:

"City size is determined by population density and commuting patterns; this better reflects the economic function of cities in addition to their administrative boundaries. Urban areas in OECD countries are classified as: large metropolitan areas if they have a population of 1.5 million or more; metropolitan areas if their population is between 500,000 and 1.5 million; medium-size urban areas if their population is between 200,000 and 500,000; and small urban areas if their population is between 50,000 and 200,000. This indicator is measured as a percentage of the national population."

Metropolitan Areas

Metropolitan areas typically center around one large city, with smaller suburban areas surrounding the urban center. Many people live in the region—usually a population of at least 500,000—with residents commuting daily to and from the city center. The metropolitan area may have a healthy tourism industry, with visitors to the city traveling seasonally for events or entertainment.

These metropolitan cities are using surveillance tools in several different ways. These cities often establish citywide surveillance networks by tying together IP-enabled security cameras and managing them with one platform while monitoring activity in a Security Operations Center (SOC) operated by multiple agencies. In addition, there is often close collaboration with other suburban agencies. When these agencies share information, they can better picture widespread public safety problems across a region.

XProtect VMS is an open platform application that connects remote cameras to a central location, establishing monitoring for the security network. Additional security tools may integrate to provide further control over the security environment. For example, camera feeds can be paired with access control entry points to allow operators to verify personnel before authorizing entry into sensitive areas.

Milestone open platform video technology works with the access control solutions above to integrate events and associate security cameras with the access control hardware. In addition, XProtect VMS is an open platform that takes access control capabilities and supplements the logged events, tagging video, and providing an additional layer of verification for the activity.

For example, when a guard is touring a facility, his keycard swipes are logged in the security software.

Associated cameras will provide video evidence of his activity while XProtect tags the video with the associated information provided from the access control event. Data and video cross-check to produce logs of guard activity and verifiable evidence that supports the business's goals. XProtect Rapid REVIEW helps operators and investigators quickly find and solve problems—from missing children to bad actors wanted for criminal activity, from reckless driving to the getaway car from a bank robbery.

Locating the incident on video can be time-consuming, especially when an installation has multiple cameras recording 24/7. Operators and investigators historically report spending hours and sometimes days searching through video archives to find a relevant piece of video evidence. Rapid REVIEW helps to reduce the time it takes to narrow down the search, sometimes finding a video clip from hours of recorded video in minutes using detailed search criteria and a robust video analytics algorithm to locate the evidence.

Large cities combine various technologies and manage the data to gain valuable insights. In addition, the collaboration makes their task more manageable by sharing information across department lines.

Furthermoret, multiple cities in a metropolitan area can collaborate and share resources across political boundaries. If cities can agree to cooperate, residents can realize the benefit by seeing safer streets, cleaner public spaces, and crime reduction, reducing the need for police presence on site.





Medium-Sized Urban Areas

Cities in the middle of the size spectrum are known as mid-sized cities. These have a population between 200,000 and 500,000 people. The cities are still sizable and have significant needs to keep citizens safe. These cities might still have commuter traffic during the workweek, but they don't experience problems in the same way the large metropolitan areas do.

There may be fewer resources in mid-sized cities to alleviate some of the security problems these cities experience. However, city staff are innovating and finding creative ways to keep citizens and employees safe. By unifying their security systems on Milestone's XProtect open platform, medium-sized urban areas can get the most out of their security tools by leveraging the systems across departments and sharing data and insights to improve operational efficiencies. For example, a traffic department could use existing security cameras deployed in public areas to evaluate and analyze traffic patterns. As a result, operators could monitor dangerous intersections, and city planners could implement new traffic controls to keep drivers safe.

Unifying systems across operational departments could allow city planners to spread the cost of security improvements among multiple departments. For example, cleanup crews could monitor trash removal in public areas, receiving automated notifications when a pickup is required. Of course, there are many more examples, but these are a few that mid-sized cities are researching.



Small-Sized Urban Areas

Towns and villages are relatively small—usually under 50,000 people—but cities that are 50,000 - 200,000 in population are still small in scale compared with larger urban centers.

These small urban areas have less of a tax base than the medium and large-sized metropolises. However, there are still ways they can work to enhance their city surveillance. By using legacy security cameras, many small cities are using Milestone's XProtect to tie together existing assets and still improve their ability to monitor trouble spots on a single security platform.

XProtect works with any camera manufacturer and other standard security tools, such as access control readers for entry and exit doors. As a result, city municipalities are learning the value of using a common security platform that is open and hardware agnostic.

Some smaller cities partner with local businesses to collect video from privately-owned camera systems. The cities collaborate with private companies to collect video streams from their security cameras. Law enforcement can keep a watchful eye on the business and monitor criminal activity with these feeds. The solution is a win-win scenario for the business owners and the police department. The result is an enhancement of public safety and the ability to use video assets to aid investigations for law enforcement and first responders.



LARGE URBAN CENTERS BY POPULATION

World Population 2022: 7.9 billion US Population 2022: 332.5 million

Many countries use a minimum population size to define an urban area, but that size can be 200 (as in Denmark), 2,000 (Argentina), 5,000 (India) or 50,000 (Japan) or even 100,000 (China).

Top 10 Largest Cities in the United States by Population 2022NOTE: According to the US Census Bureau, these 10 cities in the US have surpassed 1 million citizens

- 1. New York City, NY (Population: 8,622,357)
- 2. Los Angeles, CA (Population: 4,085,014)
- 3. Chicago, IL (Population: 2,670,406)
- 4. Houston, TX (Population: 2,378,146)
- 5. Phoenix, AZ (Population: 1,743,469)
- 6. Philadelphia, PA (Population: 1,590,402)
- 7. San Antonio, TX (Population: 1,579,504)
- 8. San Diego, CA (Population: 1,469,490)
- 9. Dallas, TX (Population: 1,400,337)
- 10. San Jose, CA (Population: 1,036,242)

Top 10 Largest Cities in the World by Population 2022

- 1. Tokyo (Population: 37,435,191)
- 2. Delhi (Population: 29,399,141)
- 3. Shanghai (Population: 26,317,104)
- 4. Sao Paulo (Population: 21,846,507)
- 5. Mexico City (Population: 21,671,908)
- 6. Cairo (Population: 20,484,965)
- 7. Dhaka (Population: 20,283,552)
- 8. Mumbai (Population: 20,185,064)
- 9. Beijing (Population: 20,035,455)
- 10. Osaka (Population: 19,222,665)

Learn more about world population prospects here





Security Enablement Using AI

While AI, autonomous vehicles, and technology-based security solutions may seem like science fiction, it is rapidly becoming a scientific fact in today's world. The beauty of artificial intelligence is that the operator can brainstorm a scenario, develop a set of criteria and appropriate responses, then allow the solution to manage itself.

Businesses have driven the integration of access control, building management systems, video surveillance, and software to manage the AI decision-making process. In addition, cities are leveraging this technology to improve the management of their city spaces as well. Emergency scenarios, frictionless access, crowd and traffic management, and situational awareness drive many of the newest security technologies.

Frictionless access control is the ability to authenticate and approve access to a secured area without impeding the user's entry experience. The goal of frictionless access is to make entry easier or even invisible to the authorized user. The need for security guards, check-in desks, or security badges would disappear in the completely frictionless environment.

In newer and more advanced technologies, license plate recognition, facial recognition, and biometric data capture are bringing frictionless access control to city spaces. Many of these authentication methods can be captured on the fly and paired with access control software to allow access to secure areas without the need to clear credentials at every checkpoint. Multipixel HD cameras with multiple imagers have increased the accuracy of facial recognition and reduced the chances of false positives, allowing for unintentional, unauthorized access. The back-end software can gather data from various sources and compare it with stored information in a database to decide whether to grant access or not.

Video analytics software employs artificial intelligence (AI) to make automated decisions based on findings within the video data. Computers receive information captured from disparate input systems, compare captured data against the database, determine access authorization, and trigger the appropriate access control device to allow access—all in the blink of an eye. With the speed of modern technology, clearance occurs immediately without sacrificing any level of security. In addition, the database logs the interaction for later audit.

License Plate Recognition in City Environments

Technological innovations in Automatic License Plate Recognition (LPR) are helping law enforcement personnel to identify, apprehend, and investigate suspects and crimes. As it has evolved, LPR is also an essential tool for smart cities because operators can quickly and accurately identify vehicles and deliver vital information that can benefit all city departments—from traffic patrol to parking services.

Milestone has developed an innovative LPR product that is an optional software add-on. XProtect LPR detects license plate information from vehicle number plates and links it with video through dedicated optimized recognition algorithms. As a result, users can automate processes based on the information gathered and supply it to any department within a city—law enforcement, traffic management, and parking enforcement.

Tim Smith is the VP of Technology for the Houston First Corporation. His organization operates and organizes entertainment at the George R Brown Convention Center in Houston, TX. In addition, his team is instrumental in managing the parking garages surrounding the convention center. Smith says Milestone XProtect VMS make up the foundation for their video technology systems, including the parking garage operations.

The parking operations team uses the system to see the problems drivers are experiencing while they communicate with the customer remotely. Smith tells us, "What we learned is it worked really well with our clients. And so, we were able to take that and integrate it into our system full time. So now it manages the backbone for our entire infrastructure at the convention center, as well as all of our outlying facilities, including all of our parking operations. Working with Milestone and being able to create that smart system, versus scrolling through 500 and something cameras hoping you catch something, has been a huge, huge help."

The main steps in XProtect LPR include capturing live images, image analysis, and matching recognized license plates. Then, when it's time to investigate, it's easy to find, and document detected vehicles. A combined search and filtering option in the dedicated LPR tab in the XProtect Smart Client makes it possible to search across multiple cameras, countries, specific match lists, and partial wildcards. Furthermore, XProtect LPR can validate incidents and alarms with the instant playback function.









VIDEO TECHNOLOGY:

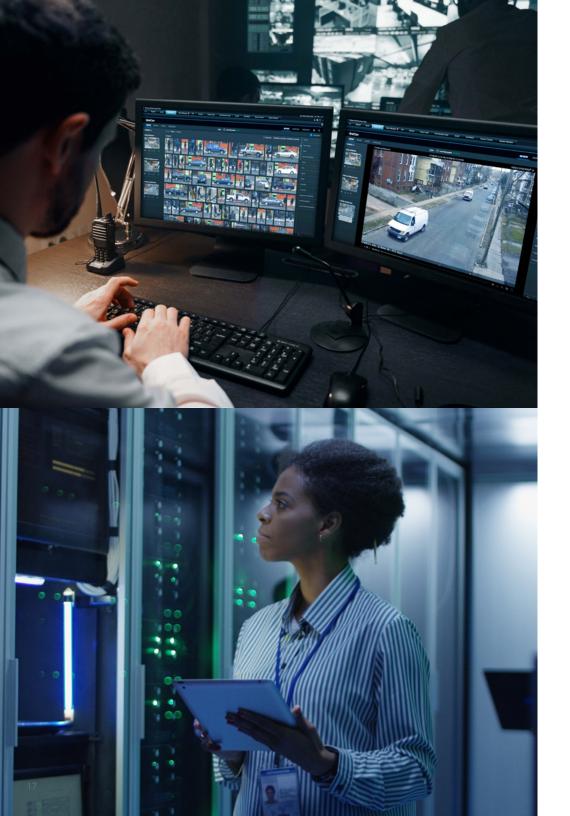
A Proactive Approach to Security

Video technology can play a crucial role in improving city safety, far beyond surveillance. Alongside its standard functions, XProtect allows the integration of a broad range of software and hardware options that will enhance safety across the board. Police and security teams can also monitor public buildings, entry points, and occupant behavior. Al also allows movement analysis while preventing unauthorized access.

When crowds gather for a planned event or an unexpected incident, realtime visualization will help establish centralized control centers to reveal what's happening. Consequently, teams can identify risks or emergencies and increase communication and collaboration in a proactive response.

Milestone connects video solutions to give first responders enhanced situational awareness to deploy resources more effectively and advanced post-event evidence gathering and analytics. With crime prevention, detection, and forensic tools, investigators can exploit the full potential of cameras, sensors, and analytics to quickly investigate and resolve crimes. Furthermore, the combination provides an ideal atmosphere for developing preventative measures.





VIDEO TECHNOLOGY:

Operational Insights Beyond Security

These days, data is more available than ever—with the data from video technology being particularly invaluable for cities. But it needs to be a shared asset that enables citywide operators, authorities, and decision-makers to act more efficiently together. Additionally, municipalities must ensure that diverse video installations are connected and under centralized management to enhance operational insights.

Too often, data disappears in a siloed infrastructure, where teams and technology can't talk to one another. The results are inefficiencies and miscommunication—or even worse, accidents and injuries that happen unnecessarily. With centralized solutions, all the data generated by cameras and sensors channels into connected video management systems. Central management enables operators to monitor, analyze and examine camera footage throughout the coverage areas in a single interface. Video displays on wall monitors in a Security Operations Center (SOC). In addition, it can display on a smartphone or tablet for remote viewing. Insights gained from video footage help administrators better understand situational realities.

This situational awareness enables operators to act quickly, making critical decisions to react to events and proactively prevent them. It also allows people with different functions to communicate and collaborate using the same information.

Building a safer city takes a reliable video management platform that makes complex technology intuitive and accessible to everyone. Pair that with the proper integrated security hardware and software, and you are well on your way to realizing your safe city aspirations. XProtect VMS is ready for large-scale and high-security deployments. In addition, the open video technology platform provides an appropriate tool for the efficient administration of connected city operations.

XProtect features advanced video grooming functions and encryption capabilities, helping organizations reduce video storage costs while ensuring the integrity of video evidence and compliance with industry and federal regulations.

What Makes XProtect Ideal for Safe Cities?

XProtect Open Platform Video Technology

Large-scale, high-security deployments are perfect for **XProtect Corporate**. The management platform enables the configuration and administration of IP cameras and devices. XProtect brings all the video surveillance puzzle pieces together to foster a safe environment.

Milestone offers multiple software editions to meet your specific needs. However, XProtect Corporate provides the best scalability for mission-critical security deployments.

Managing Geographically Distributed Systems

Milestone offers two products to optimize the connection of multiple sites. Federated Architecture allows the centralization and interoperability for a few large sites that are remotely distant from each other. In addition, Milestone Interconnect makes it possible to unite widely dispersed systems into a single, centrally operated, and managed solution. This solution is optimal for connecting many small sites.

Husky IVO is Optimized for Surveillance

Husky IVO is a video appliance that gives you a convenient, reliable, and scalable way to power your video management system. It works perfectly with XProtect and includes a 5-year warranty and centralized support by Milestone support technicians. The servers are powered by Intel and include on-site support as needed by Dell Technologies.

Integrate Third-Party Applications

The Milestone Integration Platform Software Development Kit (MIP SDK) makes it easy to create applications or device drivers that work with XProtect. The MIP SDK is perfect for cities needing to expand and customize their systems while sticking to a single platform. As a result, cities can get the best out of the latest IoT devices while streamlining operations.



Summary

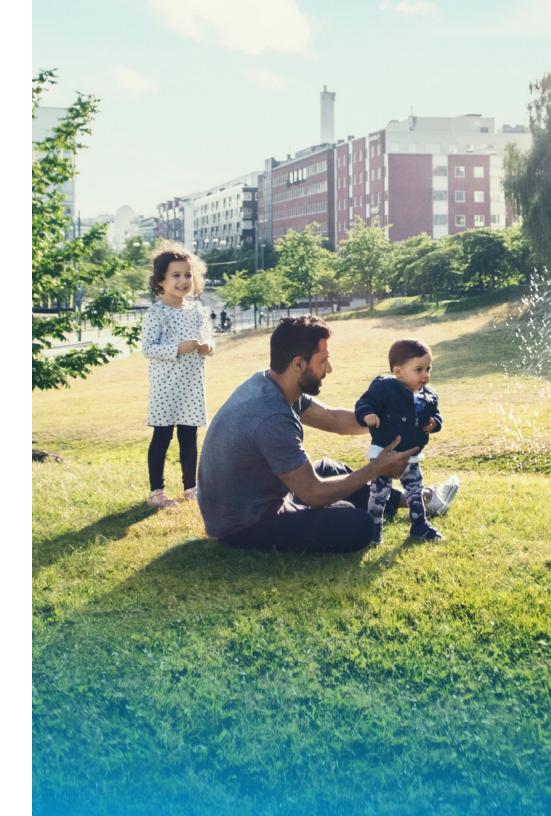
In 1950, just over a quarter (29%) of the population lived in cities and urban areas. Today this number has risen to 55%, and by 2050 it is expected that more than two-thirds (68%) of the world's population will live in cities; an additional 2.5 billion people.

City administrators have thousands of choices to improve citizens' lives and prepare for the future challenges they will face. The rapid advancement and adoption of technology will help city planners to tackle the expected problems. What about the unexpected? Civilian leaders must act now to transform smart cities into safe cities. Recent history has taught us to adapt and improve existing systems. With newly found knowledge, we have better technology, working hand in hand with better data to provide insights, enhancing the performance and quality of services and systems.

Milestone Systems CEO, Thomas Jensen, says, "In order to maintain this momentum and ensure we can continue to future proof our cities, it's integral that we have public support for these developments and do all we can to avoid causing harm to those we are setting out to help—however unintentionally."

We intend to equip our leaders and our citizens with valuable insights and do our part to make the world see, empowering change in our cities—not just here in the United States but around the world. The public needs to be aware of the challenges our cities face. Public officials should begin planning or continue making efforts to prepare for our changing world.

Law enforcement agencies carry the flag of enabling citizens to be situationally aware. They are already striving to keep city-dwellers safe. They are gaining valuable insights into public safety and inter-agency operations. Let's begin sharing these insights within city departments and among metropolitan agencies. We can collaborate better together, choosing the right tools today to make a better tomorrow.



MAKE THE WORLD SEE



Ready to Discuss Your City's Needs?

Milestone has a team of security experts ready to discuss your needs. **Get in touch with us** to learn more today.

About Milestone Systems

Milestone Systems is a leading provider of open platform video management software. Technology helps the world see how to ensure safety, protect assets, and increase business efficiency. Milestone enables an open platform community that drives collaboration and innovation in developing and using network video technology, with reliable and scalable solutions proven in more than 500,000 installations worldwide. Founded in 1998, Milestone is a stand-alone company in the Canon Group. For more information, visit us at milestonesys.com.