

# BUILDING SAFE & SECURE CITIES



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## Abstract

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Today's cities face a wide spectrum of threats ranging from terrorism to rising crime rates, civil unrests, shootings, natural disasters and other emergencies. To mitigate the impact of these situations, city authorities require real-time information and insights into what is happening in and around their districts. There is a growing case for utilizing new and emerging technologies in the drive for safer and efficient cities.

In this context, integrated public infrastructure security solutions provide a comprehensive framework for a single, holistic operational view and access to real-time visual, audio and location-based information. These solutions help make cities safer and secure by empowering authorities to prevent, manage and respond to potential risk scenarios effectively.

The explosion of city populations in recent years, spurred by globalization and urbanization has made them an attractive target for violence and terrorism. According to a United Nations forecast, it is estimated that about 70% of the world's population will be living in urban areas by 2050, with cities and towns in Asia and Africa registering the biggest growth. Considering the sheer scale of people and infrastructure involved in confined locations, it is becoming a huge challenge to monitor and keep cities secure across the globe.

The 2011 serial blasts in Mumbai, the infamous bomb attacks on London's transport network, numerous riots in Egypt and the recent wave of mass shooting in the US including the shocking Sandy Hook Elementary School shooting have all accentuated the urgent need for a comprehensive security system. While governments worldwide are deploying billions of dollars in response to these events, they are largely focused on national defense strategies. Which brings us to these questions foremost on everyone's mind - are our cities doing enough to protect our citizens? Is the existing public security infrastructure sufficient to deal with escalating threats and vulnerabilities within our cities? How can we ensure quick and effective responses to potential threats and criminal acts?

This whitepaper aims to address these questions and discusses the need for a multi-stakeholder approach and an integrated physical security infrastructure towards ensuring safer and secure cities.

## Public Safety Requires a Holistic Approach

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In recent times, the emergence of smart technologies like unified communication and IP networks is increasingly driving the shift towards a 'safer city'. At the core of this safe city is an underlying connection between various stakeholders, including law enforcement and public/government agencies. With advances in technologies enabling greater interoperability and seamless flow of information through unified networks, it has become far easier to collect and collate widely available data for coordinated responses. This framework also ensures that a common platform and shared portfolio of solutions will drive actionable insights and intelligence to make effective decisions and quickly respond to critical situations.

In line with this view, there has been a growing trend as cities worldwide embrace these technologies in their drive for a safer city. In the United States, the Department of Homeland Security distributes billions of dollars annually as grants for state and local agencies to invest in modern video surveillance technologies. New York alone already has close to a million CCTV cameras while Chicago plans to have a surveillance camera interconnected with a centralized monitoring center on every street corner by 2016.

London is home to more than 1.85 million CCTV cameras strategically placed across the city. This system was recently revamped before the Olympics in 2012 to include a new range of scanners, biometric ID cards, number-plate and facial-recognition CCTV systems, disease tracking capabilities, new police control centers and checkpoints.

Closer home, the recently inaugurated “Safe City Surat” initiative is the first-ever CCTV surveillance project based on the Public-Private Partnership model in India. A total of 5,000 CCTV cameras will be installed across three phases at 500 locations in Surat, including entry and exits points of the city, important traffic junctions and other sensitive areas.

The ultimate goal for today’s cities is to create a unified security fabric to ensure an effective response to any major emergency situation. At the core of this is information technology that enables seamless integration of various individual components into a complete, consolidated view of the city’s security infrastructure.

## Integrated Solutions for a Secure City

There are several challenges that local and state authorities face in ensuring high levels of physical security. These include significant manpower and associated costs, limited budgets, multiple and often legacy systems, and most daunting, the lack of interoperability between these systems. With real-time visibility and quick responses an absolute imperative in today’s fast-evolving cities, there is a strong need to move towards integrated security systems

and centralized information.

An integrated public security system should ideally encompass three main elements – Monitoring, Communication and Mobility solutions. These aspects are linked together by the fourth element, a Command and Control Center Solution (PSIM) to mitigate risk across the city environment by providing actionable intelligence and enabling speedy security incident resolution.

### Monitoring Solutions

#### Video Surveillance and Analytics

There has been a growing shift to IP based CCTV cameras that provide significant advantages such as scalability, remote monitoring over internet and easy sorting of digital video files. These IP-based solutions also support intelligent video analytics that augment the video surveillance systems with real-time detection and alerts for defined events.

#### Collaborative Monitoring

Many cities typically have surveillance systems deployed by multiple public and private establishments. A safe city solution with a collaborative framework can receive video feeds from these systems and sub-systems to ensure real-time responses.

#### Automatic Number Plate Recognition (ANPR)

This surveillance solution uses optical character recognition on images to read the license plates on vehicles. This is mostly used at borders or traffic signals to identify and cross-check vehicles with a comprehensive vehicles database to provide actionable intelligence in case of vehicle theft, etc.

#### Facial Recognition System (FRS)

This solution is a computer application which automatically identifies or verifies a person from a digital image, or a video frame from a video source. This solution uses a combination of eye zone extraction and facial recognition on neural network technology. Recognitions are regardless of vantage point and facial changes (glasses, beard and expression). The system has a short processing time and a high recognition rate of upto 100 faces per image/frame.



## Communication Systems

### Network Connectivity

Robust, reliable and scalable networks are required to enable converged communication. These points of connections include cameras, data centers, Regional Command Centers, traffic command centers, police stations and other critical government databases. In addition to terrestrial connectivity, satellite connectivity is required at data centers, command centers and mobile vans as the former network systems are typically the first casualty in the case of an incident or disaster.

### Unified Communication Solution

This solution entails messaging and call channel across heterogeneous networks and systems to provide guaranteed message delivery, efficient routing, security and priority based messaging.

### Data Centers

Data centers are used to record the video feeds for viewing at Command Centers and for future references. These data centers house NVRs, servers and storage required for recording and processing video feeds. The Command & Control Centers at both the regional and the central level will get required video feeds and alerts from the data centers.

### Application Portfolio

This solution is built on open standards and a Service Oriented Architecture (SOA) to ensure seamless interoperability and integration for maintaining law and order in a city. Some of the key components of the Application Portfolio include video management system, recording system, analytics system, GIS and a customized dashboard for various categories of personnel. Customized applications can be created to integrate criminal database, RTO database, etc.

## Mobility Solutions

### Vehicle Mounted Camera

The vehicle is equipped with basic CCTV equipment, communication equipment, and video display systems along with seating capacity for operators. The Mobile Video Van is maintained in a complete state of readiness and is capable of capturing and streaming real-time video feeds of an incident.

### Vehicle Tracking System on GIS maps

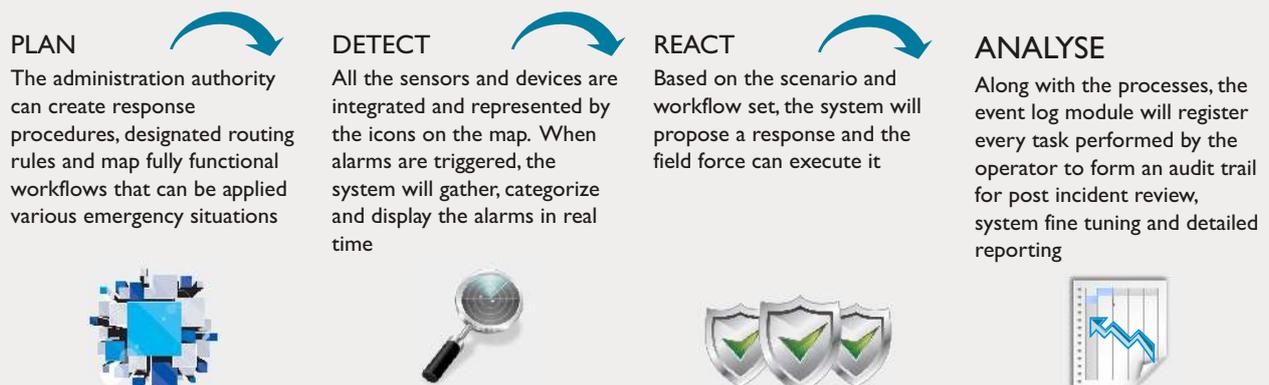
GPS based vehicle tracking of police vehicles/QRT vehicles/fire brigade trucks/ambulances enabled on GIS maps, enable the command center operator to accurately and easily locate these vehicles in case of any eventualities. The operator can communicate with these vehicles through a unified communication system to report to the location of casualty.

## Command and Control Center Solution (PSIM)

This integrated solution enforces Standard Operating Procedures (SOPs) and provides greater visibility of all security activity in a real-time single view and helps government authorities to implement and enforce rules and regulations. It enables situational awareness throughout its infrastructure by creating a unified and interactive intelligence picture, drawing data from all sensors, showing the location of the patrols and adding other relevant information such as video from different sources. This combined picture is constantly updated and can be sent by the Control Center to all patrols, thereby serving as a uniform basis for operational planning and allocation of tasks.

The Physical Security Information Management (PSIM) system operates as part of an overall incident cycle that integrates disparate security agencies together. This cycle consist of four key phases – Plan, Detect, React and Analyse – as displayed in the diagram below.

**Figure 2: The Security Incident Cycle Flow at the Command & Control Center**



# How Multiple Stakeholders Benefit

## Government:

Enhances global reputation about the government's ability to promote safety and security in the state

- Highly responsive multiple control center units that add to the state's efficiency
- Increases industries/investors' faith in the government with regard to safety and security aspects
- Enables advanced security for VIP and government buildings, ministries, and VVIPs

## For Center Command Control & other concerned departments:

- Complete real-time information on activities/events in different areas of a city
- Instant exchange of intelligence reports between the city surveillance centers and command & control centers
- Integration with the national database of various categories for effective decision support
- Open communication with all the concerned authorities at a click of a button
- Commands conveyed to the concerned authorities and in turn, to the control units – all in a matter of seconds.
- Results of the actions/decisions can be monitored live and follow up action can be undertaken immediately
- Citizen interaction units can be ordered to respond to a situation immediately
- Traffic, rescue operations, first aid, etc., can be controlled and monitored from remote locations

## For the Public:

- Early identification of potential distress can be minimized/avoided and controlled
- Quick government response to disasters and distress

- Assertive responses to emergency situations enhances public goodwill towards the government
- Motivates industries to invest and run their business in a safe and secure state
- Ensures free flow of traffic and enhanced security, which will be appreciated by the public and industrialists
- Citizens can interact with the surveillance center through an exclusive unit (Citizen Interaction Unit)
- Information about riots, violence, traffic, road blocks, activities/events/processions, warnings, safety related messages/information, etc., can be provided to the public on a regular basis

## For Investors:

- World class intelligence infrastructures attracts more investments
- Unauthorized access and damage to infrastructure can be avoided through proactive surveillance solutions
- Apart from plant & machinery, people will also be safeguarded from unexpected distress. This encourages investors to invest in the state
- Damage to goods in transit, transaction hubs, warehouse, etc., due to unrest/distress can be mitigated

## Conclusion

Public security is not a modern phenomenon, yet the complexity and volume of threats that the modern city faces today has necessitated the need for new capabilities. As governments across the world are increasingly adopting emerging technologies to safeguard public infrastructure, the 'safer city' concept is expected to gain significant traction. An instrumental factor in making cities secure is an integrated platform upon which multiple, disparate stakeholders and security systems work in tandem to provide a seamless surveillance of the city to the government authorities. The ultimate goal is to provide a safer environment and reduce crime levels by deterring potential offenders and helping in crime detection.



The ultimate goal for today's cities is to create a unified security fabric to ensure an effective response to any major emergency situation.

## About the Author

### Chockalingam Chidambaram

Chockalingam currently heads the IBMS and PSS practice of System Integration Services at GIS –Wipro Infotech. He has a comprehensive Sales and Marketing experience for over 2 decades across varied sectors in India, SAARC and the Middle East. He is a known face in the Surveillance Industry with working experience in industry majors like Bosch & Honeywell. He has been associated in quite a few landmark projects. As a part of his current role, he carries the charter of establishing and developing the IBMS & PSS practice for India, the Middle East and Africa for Wipro Infotech.

## About SIMS

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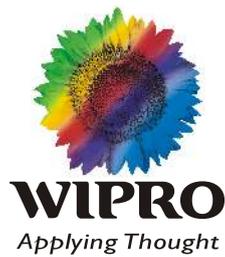
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