

City Surveillance is clearly a trend that is booming in India. The new government at the centre has taken proactive steps for city surveillance projects. Some of the recent city surveillance projects are Mumbai and Kolkata. These cities are in news for their scale and innovative solutions. The clear trend in city surveillance projects is city specific solutions. This is a very good sign for the security industry and system integrator community. This brings lot of sense into the city surveillance projects including specifications, tendering process and implementation. Many tier-II cities have implemented city surveillance projects successfully. These include Pune, Nanded, Indore, Junagarh, Puri and Surat among others. Each city has implemented innovative solutions as per local environment and specific requirements. a&s India explores the trend by discussing with key stakeholders.

BY ANANT JOSHI, a&s INDIA



CITY SURVEILLANCE

Boom in India Moves to Next Level

According to Atulya Chandra, General Manager-South Asia, Honeywell Security & Fire (HSF), "In recent years, urban public security has become more important.

Numerous cities have started to put forth efforts in construction of centralized surveillance management system. In other words, integrated approach is adopted for urban planning and design with the hope that city surveillance system works more efficiently and reliably in a wider range and helps to enhance comprehensive safe management of public security, improve response capacity and the ability for handling emergency in a scientific way, simultaneously providing response solution for public emergency management system to make fast settlement for various activities, accidents and natural disaster."

According to Ashish P. Dhakan, "Rise in anti-social elements, terrorist activities, threat perceptions, growing crime rates, data thefts, remote monitoring, growth of public infrastructure, increase in IT spending, and government initiatives are the main reasons for the unprecedented boom in the spurt of City Surveillance projects. The global push for city surveillance, particularly by governments and law enforcement agencies has spawned an entire 'industry'. India too is setting up surveillance infrastructure called the Centralized Monitoring System."

He further added, "For example Surat, a vibrant city in Gujarat, unveiled a comprehensive closed-circuit camera surveillance system that spans almost the entire city. This makes Surat the first Indian city to have a modern, real-time CCTV system, with eye-tracking software and night vision cameras, along with intense data analysis capabilities that older systems lack. Similar systems are planned for cities across India."

According to Aditya Khemka, CEO and Director, Aditya Infotech, "Every state government is gearing up to the need of the hour - to provide security and safety to its citizens. City surveillance is not only needed for ensuring security within a city's premises but to instill a sense of discipline among its citizens as well."

He further added, "Video Surveillance is vital step to creating smart cities, a concept presently leading the priorities of the Indian government. High rise buildings, broad roads and flyways, seamlessly connected metro ways, smooth mobility and transportation facilities - notable specs of a smart city



Atulya Chandra,
General Manager,
Honeywell Security &
Fire (HSF)



Ashish P. Dhakan,
C.E.O. & MD,
Prama Hikvision



Aditya Khemka,
CEO and Director, Aditya
Infotech



Prasenjeet Bhattacharyya,
Business Head, Security &
Mobility, Panasonic India



Divanshu Gupta,
Product Manager -Video
Security, Sony

would all be impossible to manage and regulate without a stable security and surveillance system in place. All of this has led to state governments becoming proactive about adopting security surveillance, thereby fueling the boom in city surveillance."

According to Prasenjeet Bhattacharyya, Head, Security & Surveillance Systems Solutions, SSD, Panasonic India, "Urban India faces a wide spectrum of unpredictable events ranging from terrorism to rising crime rates, civil unrests, shootings, natural disasters, traffic snarls and other emergencies. To mitigate the impact of these situations, city authorities have begun to invest in real-time visual, audio, and location-based information and insights in the drive for safer and efficient public infrastructure. With the rising vigilance in the country since the 2011 Mumbai serial blast, the Indian government has allotted huge budgets for the installation of electronic security equipment as part of its homeland security strategy."

According to Divanshu Gupta, Product Manager -Video Security, Sony, "The Indian security market is experiencing unprecedented boom and there is a lot of demand because of various reasons like growth of public infrastructure, growing new technology and the recently launched "The Indian Government's Initiative "Smart City Mission" which is planning to build 100 smart cities will help us to secure India through this initiative."

"The Smart Cities drive by the Government combined with the tangible threat to sovereign security has accelerated the city surveillance story in India. Cities today have realized that being a safe city is not only the first step to being a smart city, but it also brings about an outcome that can be easily demonstrated. While the definition for smart city is still being created, while the technology companies are yet to showcase a true smart city project in India, we already have a lot of examples for city surveillance. The socio-economic pressure at the policy level is providing further impetus to overcome the ground level challenges. With the pull and push factors working simultaneously right now in India, we have got an unprecedented boom for city surveillance projects," observed Santosh Pillai, Director & CTO, 2020 Imaging.

"The growing incident of terrorist attack has alerted the Government on the need to have an effective surveillance system for real time situational awareness that will help in adopting proactive measures to prevent a terrorist threat from materializing. It has also triggered a demand from the citizens as well as the media to have such a system in place in cities that are not yet covered," Jawahar Ali, CEO ISG, Allied Digital Services.

He further added, "Furthermore the successful GO Live of the Pune City Surveillance Project that has been widely covered in the media, has reassured the Government and the Police force in other Cities that an effective comprehensive City Surveillance system is implementable."

INNOVATIONS

"There are lot of innovations happening in the field of video surveillance and many new technologies are brought to the forefront which may reduce the total cost of ownership. Some of the solutions or benefits of technologies are: High definition cameras, long range PTZ cameras, analytics, and vandal proof cameras for specialized applications," informed Atulya Chandra.

He further added, "The VMS available are open, scalable and can be easily integrated with 3rd party applications like ANPR and RLVDS," said Atulya Chandra.

"Advanced sensor integration, data fusion and visualization capabilities are the latest innovative solutions providing insights for managing the safety and security in a city surveillance project, said Ashish P. Dhakan.

He further added, "By integrating various components like Camera based Surveillance, Mobile Surveillance Vehicles, Access Control System, Licence Plate Recognition, 2D & 3D maps etc., for building an integrated Common Operating Picture to provide users with enhanced actionable situational awareness allowing greater insights for managing the safety and security environment. Hikvision's automated wide area surveillance solution provides immediate situational awareness in any environment. It combines video inputs from any number of cameras with other sensor data and display it on a single screen."

"Latest solutions include a wide range of networked solutions for efficiently monitoring public areas in cities and effectively managing security, safety, and communications. Hikvision's IP networked video surveillance is best sought after solution," observed Ashish P. Dhakan.

He further added, "Video Analytics is the best innovation happened in the security domain. Hikvision offers customized Video Analytics and connectivity solutions. We have developed video management software exclusively for city surveillance which offers smart features. Our high tech cameras are giving new dimensions to Video Analytics."

- Hikvision's Darkfighter is designed specifically to capture sharp color and monochrome images in extreme, low-light conditions
- Hikvision's GIS map helps track in



“100 Smart Cities’ has finally begun to take shape with the Ministry of Urban Development (MoUD) identifying roughly all the sites where the Smart Cities will be built and the existing cities remodeled. City Surveillance is one of the most critical and important part of a smart city project.”

Atulya Chandra,
General Manager, Honeywell Security Group – Asia Pacific

real time criminals’ vehicles by integrating video surveillance management system with the GIS. It offers a clear visual overview of the location of the vehicle by transmitting live video coverage.

- Hikvision’s IVMS-5200 Professional Video Management Software is a boon to law enforcement agencies. It’s Centralized video software that allows one to manage all security subsystems in one platform. Managing from a single platform gives one control over one’s security subsystems including video surveillance, access control, license plate recognition, intelligence and video wall.

"When we talk about instilling discipline at a city-wide level, the technology deployed should be both powerful and state-of-the-art. Thankfully, the security surveillance industry has advanced to a stage where this is possible. Among the latest, 4K resolution, Video in the Cloud, and Video Analytics are three that can be imbedded with city surveillance projects for significant results," suggested Aditya Khemka.

He further added, "Though these technologies are new in the surveillance market at this moment, considering them can aid the government in reinstating discipline and law & order within cities."

"The Government of India's '100 Smart City' initiative has added a new dimension to Panasonic's existing relationship with real estate developers in India to understand their local needs for security solutions. We showcased our security products at a seminar in association with CREDAI in August 2015, demonstrating the full range of solutions that Panasonic offers for the development of safe cities. Our products and services have been effectively utilized in Panasonic's Fujisawa model town, where each home includes our integrated suite of technology-centric security and surveillance applications. These include public and private HD surveillance cameras, LED street lights with motion sensors, and wireless video door phones in every home. Given India's rapidly changing urban landscape, Panasonic hopes to continue to work closely with security systems' integrators in India," informed Prasenjeet Bhattacharya.

According to Divanshu Gupta, "Some of the Latest Innovative solutions that can be embedded with City surveillance will be like Facial Recognition System, License



Plate Capture, Speed detection, Red Light Violation System, Wrong Lane driving detection, Vehicle Tracking System, Vehicle Mounted Cameras and Integrated with Public Addressing System, Integration with e-challan smart traffic enforcement. But for implementing many of these Solutions you will require the camera's with outstanding image performance, Excellent low-light capabilities, Efficient use of network bandwidth with Intelligent Cropping, Smart analytics, Clearer views in fog, smog and haze, Evidence Shot for high-resolution still image capture."

He further added, "Sony's first 4K network security camera brings industry-leading clarity and sensitivity to critical video monitoring and surveillance applications. Thanks to the camera's large, highly sensitive 1.0-type back-illuminated Exmor R™ CMOS image sensor, high-speed image processing engine and high-quality zoom lens, the SNC-VM772R captures detail-packed 4K/30 fps video footage with a minimum illumination of 0.06 lx - even in near darkness."

"Intelligent Coding gives selected of-interest areas maximum detail, while reducing bit-rates in the other areas of the image to save network bandwidth by up to 50% and minimize storage costs," informed Divanshu Gupta.

He further added, "A single camera can automatically 'chase' multiple objects in its field of view, tracking each one independently with VGA or Full HD-cropped view with an original 4K resolution. It's a cost-effective alternative to using multiple PTZ cameras to track several objects simultaneously. High-quality recording of 20 megapixel (5,472 x 3,648) still images can be triggered by the camera's motion detection capability, or by external inputs. Built-in IR (infrared) illuminators give a clear view in complete darkness (0 lx) of objects at a distance of up to 50m from the camera."

"Video analytics leveraged from digital video technologies is certainly proving innovative. From preventing chain snatching to identifying vehicle thefts, video analytics is slowly being adopted for proactive



Santosh Pillai,
Director & CTO,
2020 Imaging



Jawahar Ali,
CEO ISG,
Allied Digital Services

actions. Integration of social media and citizen participation along with surveillance is bringing in sentimental data into the system. For example, a buzz on social media about a protest can now be triangulated against citizen generated images sent to the command centre. Along with real time feeds from nearby cameras about accumulating traffic and gathering crowd, the city authorities can now get actionable data. With geospatial knowledge about traffic and police personnel deployed, the actionable data can be quickly converted into real actions," informed Santosh Pillai.

According to Jawahar Ali, "Technology has been progressing every fast and innovations in the City Surveillance project are regularly announced by Security Systems OEMs."

He added, "Some of the latest Innovative solutions that can be considered are as follows."

- Advance Audio Analytics for detection of specified sound such as bomb explosion, gun fire for triggering appropriate timely response by law enforcement authority. This will also help in monitoring noise levels in the city during festival time and in silence zones such as those near Hospitals.

- Face Detection system will detect and capture humanfaces in the field of view of the camera and create a database for surveillance application. After an incident, such as bomb blasts occurring at public places. Police can effectively use the facial data base created from the images captured near these sites for forensic analysis and identifying the perpetrators of the act. Instead of relying only on facial descriptions provided by witnesses, the police can use these images of the suspects at site to further narrowing down their search for the guilty. Facial Recognition System is used for matching a suspect's or targets facial image with the image database for quick identification. These are new technologies and are undergoing rapid development.

- Social Media Monitoring System. There are several available platforms to continuously crawl a massive amount of open Web sources such as Facebook, Twitter and WhatsApp to extract and analyse the information they hold. This information is used for generating statistics with virtually unlimited number of customized alerts and early warnings to identify events, suspect targets, threats, and related activities rapidly and efficiently. The collected information is organized and stored on databases for subsequent enrichment, analysis, and investigation. For example words such as "gun" "attack" or name of terrorist organizations used on the social media by people in a group can be put under surveillance and tracked and their data stored on database for further investigations. A comprehensive analysis of the usage of such words by the group in the database will alert the police to act proactively to prevent



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Ashish P. Dhakan,
MD & CEO, Prama Hikvision

occurrence of any undesirable incident.

He further added, "Therefore rapid and efficient processing and analysing of content from Social Media helps in identifying, tracking, and profiling of designated suspect entities. Comprehensive information on each entity's profile, background, online social networks, online activity, and behaviour patterns over time is obtained. A variety of advanced automatic, configurable tools for investigation is used for gaining insight into specific events, people, and groups, and for analysing the links and relationships between them."

- Video Analytics (VA) Software is a tool used for analysis of the information contained in the Video eliminating the need to be dependent on the alertness of the operator. Using this software users can define potential events of interest for example a boundary fence that should not be crossed and receiving instant alert whenever anyone attempts to cross that fence for prompt response to the event. Video Analytics software could be used in real time on a streaming Video or on a recorded video footage of any event. However not all Video Analytics Software deliver on promised features resulting in customer dissatisfaction. Therefore it is extremely important that only Video Analytics Software that is certified by a recognised agency such as CPNI Assessment Program (previously known as I – LIDS Assessment program) should be chosen. There are several VA features that are useful in a city Surveillance Project such as: Wrong side parking, illegal U Turn, Stopped Vehicle, Speed Analysis and Crowding.

STORY SO FAR

According to Atulya Chandra, "100 Smart Cities' has finally begun to take shape with the

“City surveillance isn't only about the government stepping forward to install some 500 cameras throughout the city. Effective security would be possible only when there would be an active participation from the community as well.”

Aditya Khemka,
CEO and Director,
Aditya Infotech

Ministry of Urban Development (MoUD) identifying roughly all the sites where the Smart Cities will be built and the existing cities remodeled. City Surveillance is one of the most critical and important part of a smart city project."

He further added, "There are approximately 28 cities where the City Surveillance projects have been successfully implemented with around 35 live projects currently going on in various cities of India."

"Although the concept of city surveillance came late to India it is catching up fast. The progress is good. The present government has come out with a plan of creating 100 Smart Cities and all of them require city surveillance. So, there is much to do in the next few years to make all Indian cities safe and secure through effective and seamless city surveillance. The surveillance industry has been demonstrating double digit growth over recent years and is forecast to continue with double digit growth for years to come," suggested Ashish P. Dhakan.

"City surveillance is quickly catching pace in India, despite bottlenecks hindering the implementation pace in various regions. The progress is a mix, with some cities still under the planning stage, some just starting out, and some considering advanced plans. However, the overall responses are positive and encouraging. Mumbai alone is planning on installing five thousand cameras to begin with, whereas advanced plans are already underway for cities such as Ahmedabad and Surat," observed Aditya Khemka.

"Due to the sheer scale of the 100 Smart City project, and given that the budget will be allotted over the next five years, we do not expect to see results overnight. We are positive about the Government of India's vision, however, its momentum and success depends on the participation of all involved stakeholders, including state legislatures, private sector entities, and interested foreign governments. As of now, the Smart City project is in its design phase, with consultancy firms preparing action plans for the proposed cities. This first step is crucial as it lays the blueprint for the city, on the basis of which potential sponsors and service-providers will come together to raise funds and invest in the development of Smart Cities," suggested Prasenjeet Bhattacharya.

"With the exception of Pune City Surveillance project where the entire city has been comprehensively covered stretching over an area of 640 + Sq. Kms all other city surveillance projects have covered only part of the city. Many cities are now coming out with RFP for city surveillance project and there is an increase in the number of bidders responding to them," suggested Jawahar Ali.

CHALLENGES

"Ideally such projects should be implemented in a time bound manner. The authorities can start with small, pilot projects and gradually increase the scale in a phased manner so that budget constraints, resource planning can be taken care of gradually. The projects pertaining to CCTV cameras installations goes under tedious process related to connectivity, storage and approvals from local bodies of implementation. Steps for implementation are long and need to follow several processes of approvals and require all



stakeholders to work towards easing out the overall process," suggested Atulya Chandra.

He further added, "The requirement from the authorities should be very clear in terms of what is a "must" and "good to have" in order to avoid bidder disqualifications and re-tendering process. All the stake holders from the govt. as well as private parties should work closely and constructively so that there is no delay from SI / OEM side due to constant queries."

According to Ashish P. Dhakan, "There are many bottlenecks that come in the way of fast track implementation of these projects. The major ones according to me are Plethora of approvals required at every stage."

- Absence of an effective institutional mechanism which has sufficient authority, to coordinate with the concerned authorities and get these projects moving on the ground,
- Environmental concerns
- Vested interest groups
- Delay In land acquisition
- Intra -state disputes
- Law & Order
- Militancy & Insurgent Problems.
- Dearth of Competent Indigenous/Local Agencies
- Lack of Adequate Experienced Skilled Manpower (Technical and Managerial)

- Topographical Conditions
"Realizing the benefits of city surveillance, and implementing the same are two different things altogether. There are many bottlenecks in the fast track implementation of such projects. Lack of proper planning and strategy, network bandwidth requirements, lack of technological awareness, multi-departmental collaboration for project funding, and controversial government policies are some of the major roadblocks in the way of quick implementation," elaborated Aditya Khemka.

"The foundation of a safe city project is conceptualization and the creation of a consolidated roadmap for planning and execution. The market for the concept is newly emerging, and to ensure its speedy, countrywide application, concept-building is crucial to understanding the obstacles that may hinder its adoption," explained Prasenjeet Bhattacharya. He further added, "The typical challenges to be expected in this phase are the absence of a synergized approach due to limited coordination and data exchange among policymakers while adopting a pan-India strategy, and the limited involvement of public agencies responsible for the maintenance of law, infrastructure creation, and governance such as the state police, state municipal corporations, and public works departments. Other bottlenecks include

limited technological awareness, securing funding for high-value projects, ensuring network bandwidth infrastructure for 24x7 connectivity, policy and tax related limitations, and variable operating environmental factors for field infrastructure."

Significant manpower and associated cost, limited budget, depending and permission from multiple government agencies, involvement of many stake holders.

"There is a general feeling of lack of transparency in Government projects. While there has been a lot of effort made to bring in this transparency, the trust is still far from being achieved. Many tenders are floated with open ended and ambiguous scope of work that makes it subjective to interpretation, even going to the extent of creating conflicts during the tender process. Availability of budget, though has improved over the last few quarters, continues to remain a challenge in providing effective solutions. On top of this, once the project is awarded, ground level challenges of cable laying, network aggregation, equipment protection, etc. further complicate the implementation leading to delay," elaborated Santosh Pillai.

According to Jawahar Ali, "There are several bottlenecks in the fast track

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implementation of the project."

He added, "Some of the critical ones are:

1. Coordination with Multiple Agencies such as Municipal Corporation, Power Supply Board and Telecom service providers. The hierarchical set up in these organizations make the decision making process very slow. Obtaining series of approvals at multiple levels in these agencies before getting a final approval to go ahead with the activities of the project is challenging and time consuming. This has an adverse impact on the execution timelines since delayed approval sets off a chain reaction of delays in other related activities such as civil work, deliveries of materials as shipment depends on the site readiness.

2. Unmapped utility Infrastructure such as underground cable, drainage and water supply pipelines slows down the pace of execution. Digging for cable laying and pole foundations are challenging in the absence of details of underground infrastructure of these utilities that necessitates constant interaction with the agencies.

OPPORTUNITIES

"A city surveillance projects typically consists of 3 components. First is IT infrastructure, second the bandwidth availability and third component is the CCTV / Security. The security part amounts for approximately 15-20% of the project. The integrated security platform to support edge devices and its integration with analytics like RLVDs (red light violation detection system) and ANPR (automatic number plate recognition) etc. possess huge opportunities," opined Atulya Chandra.

He further added, "The complexity in setting up the IT infrastructure is one of the greatest challenges. This includes managing the video streaming with current bandwidth limitations."

Master System Integrators have got oodles of opportunities in the city surveillance ecosystem. For the past two decades there has been an accelerated growth and development of open-systems, industry protocols and standards that allow communication and connectivity among sub systems.

The real challenge in the industry is to design a common platform architecture using open protocol standards that will result in complete transparency and functionality to these subsystems. The MSI is the key component in the overall design, development and implementation of the various systems.

As MSI is not a subsystem provider but instead is a direct report to the owner or facility manager it is important to ensure that all systems are connected and integrated per the design requirements. Therefore, close coordination is required among all parties including contractors, consulting engineers and various agencies to include sub controls providers whether it be HVAC, Electrical, Security or Fire & Safety.

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Prasenjeet Bhattacharyya,
Business Head, Security & Mobility, Panasonic India



Other challenges include

- Data definitions are different in different applications.
- Data are in different format causing standardization and integration cumbersome.
- Data ownership is not strictly practiced.
- Data transfer cause errors.
- Integration between applications is laborious.
- Master data is not defined properly causing confusion on understanding.
- No common data model.
- Data maintenance is laborious.
- No standard process for updating data.
- No ownership of data.

"Lack of awareness and process standardization poses major operational and implementation hurdles for system integrators. There is no single, nationally established strategic approach to regulate security frameworks or central monitoring, thereby discounting the effectiveness of the entire securing process. However, the security market offers ample opportunities to system integrators at various levels, including transition, upgrades, customization, and other value added service," informed Aditya Khemka.

"The increased focus of the central and state governments on security and surveillance projects is poised to create bigger safe city project opportunities for system integrators and technology partners. The existing and future tenders have mostly been awarded for the implementation of projects across Tier 1 and Tier 2 cities and towns. Government bodies are working in collaboration with state police agencies towards creating high security standards by undertaking security projects that include the deployment of modern security infrastructure such as CCTVs, gunshot detectors, video analytics, data mining solutions and such. Master system integrators that provide and leverage their operations and maintenance support are at an added advantage," explained Prasenjeet Bhattacharyya.



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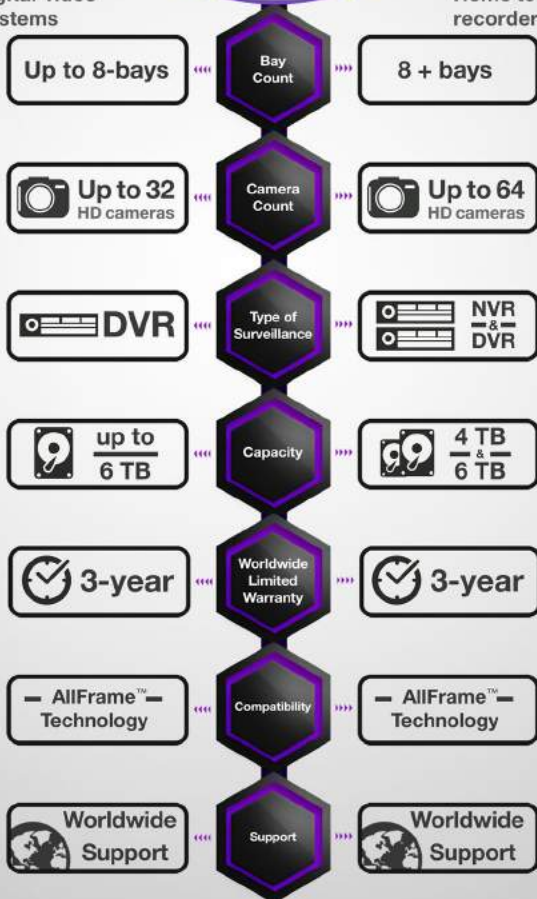
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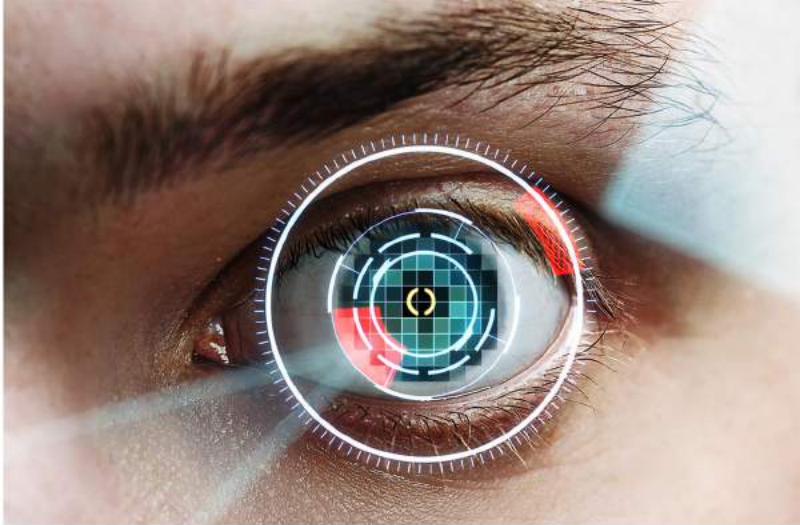
"As a growing market of city surveillance projects many system integrators have opportunity to work on bigger scale via which their scale of bidding project will be high, gain more experience and good association with big contractors. Most of these projects will be high value projects which will help them to increase their Bidding Qualification," suggested Divanshu Gupta.

According to Jawahar Ali, "City Surveillance system comprises of several sub systems from Multiple OEMs and suppliers that need to be integrated seamlessly into a Single System to be managed from a Central Command and Control Centre and viewed from several distributed centers across the city. Therefore unless the Master Systems Integrator has experience and proven capability in integrating such systems, the final integrated system will not be stable in its operation. For example the Video Management System, Automatic Number Plate Recognition, Face Recognition system and Video Analytics Software has to be integrated seamlessly for interoperability and to be managed from a Single Command and Control Centre. Furthermore the MSI has to ensure that solution design and support team are Multi-platform and Multi OEM Certified for such a project. And most importantly the MSI should have a competent team of certified Project Management Team with best practices to execute the project within the agreed Project timelines time lines."

He further added, "The resulting opportunity for the Master Systems Integrator from a successfully executed project is a definite opportunity of future business from upgradation of the system resulting in increased cash flow from the operations and maintenance for a period of five years. Additionally, the experienced gained from previously executed project reduces the turnaround time for executing subsequent projects and also in optimizing the solution design."

BEST SOLUTIONS

According to Atulya Chandra, "Honeywell Security & Fire offers a diverse range of solutions pertaining to surveillance and security. Honeywell's security solutions can be integrated with various applications like RLVDS, ANPR, Video Analytics and Traffic Challan Systems to monitor public areas (roads, highways, parks), heavy traffic zones (tourist spots, religious spaces, shopping areas), crowded locations (roadways, railways, waterways, etc.) and points of traffic movements (toll points, bus and rail stations, etc.). ANPR integration has been one of



the widely implemented strategies which has become a key component of security operations on an everyday basis."

He further added, "ANPR or Automated Number Plate Recognition System is a mass surveillance method that uses optical character recognition on images to read vehicle registration plates."

- Use of high speed CCTV cameras.
- Scan number plates in real time.
- Used mainly by law enforcement agencies.
- Detect hot listed/stolen vehicles.
- Also used in parking lot management/ toll road management.

"All weather IP Surveillance Cameras suitable for deployment IP based surveillance technology allows users to integrate audio and motion detectors into cameras, without the need for additional hardware and cabling. Plus they make it possible to analyse captured video content and raise alerts automatically when suspicious activity is detected, for round the clock surveillance with minimal staffing," informed Ashish P. Dhakan.

He further added, "Network Video Recorder (NVR) surveillance systems with Network Attached Storage (NAS)-based installations."

"Quad Brid DVR (QB DVR), an open technology that meets the varied requirements in India. The Hikvision QB DVR offers one single DVR that is compatible with 4 diverse technologies namely Analog, HDTV1, IP and AHD. It is a comprehensive one-stop solution for all security needs HD Vandal Proof cameras, motion sensors, emergency alarm, audio vision communication through internet, speed dome outdoor cameras," suggested Ashish P. Dhakan.

"The best solutions available in the city surveillance segment are IP security, 4K Resolution cameras, Cloud video surveillance, and Video Analytics. When strategically deployed, these solutions can offer remarkable results, helping governments maintain the desired security and decorum levels within their area of governance," opined Aditya Khemka.

"The key to an effective public security strategy is integration. Integration between monitoring, communication and mobility solutions, linked together by a command and control center solution to mitigate risk across the city environment by providing actionable intelligence. IP based CCTV cameras which support video surveillance and analytics with real-time detection, automatic number plate recognition (ANPR), and facial recognition systems (FRS), are some of the most advanced solutions available in this space," suggested Prasenjeet Bhattacharya.

According to Divanshu Gupta, "Just as in the broadcast or consumer markets, the transition from SD (standard definition) to HD is pretty much established, and now, the trend is moving to 4K. We believe as evidenced by recent product introductions including Sony – that the next innovation in security will be 4K. With 4K resolution, you can cover a larger area and also capture details of scenes like a face or a car license plate number with 1 camera. This solves the current issue of having many cameras or use PTZ camera for specific areas and cannot see other areas at the same time. 4K can expand the potential of security cameras such as sharing same security system for multi-purpose by multi-users. Excellent low-light sensitivity, Efficient use of network bandwidth with Intelligent Coding and Intelligent Cropping, Multi Tracking

Feature, 20 megapixel Evidence Shot for high-resolution still image capture, Highlight Compensation, High frame rate, View-Dynamic Range , XDNR, Gyroscopic Image Stabilizer, Focal Plane Distortion Correction, Defog Image Processing ,Video analytics Integration to provide unique features such as License Plate Recognition, Red Light Violation, Speed Detection, Loitering, Face Detection and Recognition, Sound Detection, Stolen Object."

"As the solution in this segment involves integration of multiple subsystems customized to address the security concerns of the specific city, there are several local factors that determine the choice of system. The quality of solution depends on the competency and experience of the Master Systems Integrator," opined Jawahar Ali.

He further added, "Since the Video Management System (VMS) Software manages all the cameras supported in a network, it should be carefully evaluated to determine its reliability, scalability, manageability and conformity to the open standards for easy integration with third party system. The open system architecture ensures cost effectiveness of the total system by offering a wider choice of seamless integration with other systems."

IDEAS FOR IMPLEMENTATION

"A safe city project involves various stakeholders to come together and work together. Govt. is promoting safe city concept and various state governments and UTs have CCTV already installed or in plan and want to cover newer areas," suggested Atulya Chandra.

He further added, "City surveillance solutions in several areas is either not working /dysfunctional or not properly utilized. Whereas there are several cities which are judiciously using CCTV to their advantage in fighting crime, these are primarily new installations deployed in past 2-3 years. There should be conscious efforts to bring in more and more areas under the purview of city surveillance in order to make it successful and sustainable. The overall planning and design should be complete and sound, and leave enough expansion space for wiring and satisfy increasing demands in the future after completion."

"First of all the City Surveillance Project should have a definite and realistic goals. There should be a time frame within which the entire project must be completed. As for the implementation there must be a proper coordination among various agencies involved in the project so that its functioning is smooth and efficient," said Ashish P. Dhakan. He added, "As security itself is a service industry service tax should be abolished and all other taxes which increase the cost of the equipment needed for City Surveillance projects should be reduced considerably so that more civic bodies go in for keeping their city safe and secure."

He further suggested, "Qualified and experienced personnel should be entrusted with the responsibility manning , monitoring and managing City Surveillance projects at every level so that even if the system fails it can be set right immediately. Always keep two alternative plans ready so that in the event of any emergency the authorities

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Wet	Works	Does not work
Dirty	Works	Does not work
Elderly	Works	Does not work
High ambient light	Works	Does not work

Challenges

Quite often companies face challenges in the recording of attendance due to various difficult finger conditions, such as mehendi covered, oily, wet or dirty fingers, which make fingerprint identification a challenge, especially if the work force is large in corporate environment and even for small workforce in Blue collar industrial environment.

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responsible for City Surveillance won't be caught off guard. It calls for an immediate incident response management. Last but not the least there should be periodic audit by competent authorities certifying about the conditions and functionalities of various devices critical to maintaining safety and security."

"What is required is long-term planning, as the purpose of Smart Cities is to create a sustainable future. All the involved stakeholders should set common targets and clearly defined goals for urban development and work in cohesion. Our Sustainable Smart Town (SST), Fujisawa, in Japan, endures because we have outlined a roadmap for the next century, which we hold as our reference point. In 2007, we jointly laid down the town development policy with the local government for Fujisawa, under the Town Development Council. Our goal was to create a smart growth community that could support sustainable development for at least 100 years," observed Prasenjeet Bhattacharya. He further added, "We followed a consortium model of 18 companies, of which Panasonic was at the helm, together identifying our core priorities for sustainability, which were energy, security, mobility, healthcare and community. A consortium model is ideal for the building of a smart city as each entity, public or private, can best leverage its expertise to provide economical Smart City solutions."

"City surveillance isn't only about the government stepping forward to install some 500 cameras throughout the city. Effective security would be possible only when there would be an active participation from the community as well. Corporates organizations, market associations, RWAs need to come forward and join hands with the government to ensure that the dingiest or the most crowded corners of the city are under constant surveillance," suggested Aditya Khemka. He further added, "For instance, if every organization, office, or market takes the initiative to install a camera outside their premises, they can help the government secure more public places, while simultaneously ensuring their own safety as well."

According to Aditya Khemka, "At CP PLUS, we call it community surveillance rather than city surveillance. After all, we want to advocate the belief – be the change you want to see."

"Before logistical matters, concept-building is at the foundation of any smart city. Municipalities and developers need to



clarify what kind of smart city they want to create, taking in the social, economic and environmental contexts and bandwidths of their localities. Many conventional smart cities focus on a high level of infrastructure, smart energy, and are product- and technology-oriented. On the other hand, the concept behind the construction of Fujisawa was a focus on the resident's life; a service- and community-oriented model that promotes a sustainable and innovative lifestyle. Whatever the vision may be, it is only with clarity and coordination that projects can work as per their timelines," opined Prasenjeet Bhattacharya.

According to Divanshu Gupta, "When we talk about City Surveillance, one has to ensure that technique or technology is in place to prevent crime and analyze data for investigation. Catch the most wanted complete check on traffic violations. Protect public property and further provide inputs to authorities to effectively handle any kind of risk and crisis. There are available surveillance technologies to protect Crime, Person, and Property before possible issues and also after the real issues to understand and take the right decision and to cooperate among entities public and private. He further added, "There are two major things to successfully implement city surveillance projects, one is a good product and second is the master system integrator/installer. The tender should also be drafted in such a way that it should specify the product requirement hence; only experienced installer having sound knowledge can participate and ultimately win."

"4K technology gives video security professionals powerful new ways to get the whole picture. The ruggedized SNC-VM772R4K network outdoor mini-dome camera delivers exceptional detail and sensitivity, day or night. In addition to providing an extraordinary high resolution wide area overview in 4K, it also

offers a range of valuable additional streaming modes – including intelligent cropping and multi tracking including evidence shot, high resolution still image capture is ideal for evidence," suggested Divanshu Gupta.

"The city surveillance project has to be visualized in conjunction with a smart city project. It does not stop with just deploying IP cameras, but the cameras need to be configured for video analytics. Only then will the passive recording system become an active response system. This has to be augmented at the command centre through resource tracking that will evolve the command centre from being a monitoring centre to becoming a response centre, converting exceptions into actions. Further, the command centre should not just aggregate inputs from cameras, but should also have a channel to aggregate inputs from citizens through mobile devices and internet. The network infrastructure created for surveillance should be scalable to support such a citizen collaboration through Wi-Fi. Once this technology infrastructure is in place, further roll out of a smart city program through smart lighting, smart traffic and smart parking can be made possible without massive revamps," concluded Santosh Pillai.

"A successful City Surveillance Project is a result of selecting a qualified Master Systems Integrator combined with products that conform to certain quality standards. If the RFP has difficult payment terms with vaguely worded prequalification criteria and very general product specifications, then it would not attract bids that could deliver expected results," informed Jawahar Ali.

He further added, "Following steps would be helpful in attracting quality bids for implementing a City Surveillance Project."

- Appointment of a Competent Consultant for Assessing the Security Cover for the city and preparing the solution requirement document for the RFP.

- RFP should provide more weightage to the quality of the solution as compared to the commercial offer and should not be less than in the ratio 70:30 for the Technical and Commercial bids respectively. The weighted average of the two ratios should be considered for L1 Position. It is well known that one cannot get the best solution at the lowest price.

- Only certified make of key solution components such as Cameras, VMS software, Servers, Storage, and Networking devices should be accepted. This will prevent offering of cheaper and uncertified products that would fail on the reliability front.

- Since the execution time lines for these projects are long, a milestone based payment to the Master Systems Integrator would be a factor in lowering the bid value because of reduced finance cost compared to releasing payment only after completion of the project

The above steps would attract several bids with certified product sat attractive rates and the final solution would be close to

expected levels.

APPLICATION CASE

"As for case study I would like to mention Hikvision's appointment as the general contractor for the city surveillance of a Safe City program for Chongqing, one of the municipalities in China. It covers an area of 82 400 square kilometers with a population of more than 31 500 000. Hikvision set up over 500 000 video surveillance points in Chongqing to create a secured environment for the city," said Ashish P. Dhakan. He further added, "Hikvision was also given the responsibility of designing and deploying the whole project as well as providing high-performance video surveillance products and solutions. The project investment was more than US\$800 million. The whole project was finished in three years."

"By upgrading the existing video surveillance system and expanding new video surveillance points to cover the city, this project had enhanced the interconnectivity of video resources among government departments of municipalities, counties and villages, while assisting with public security

management, city management, traffic management and emergency command," concluded said Ashish P. Dhakan.

"Our smart city technologies solutions have already utilized Panasonic's model town in Japan, Fujisawa Sustainable Smart Town, which has adopted the security-oriented residential concept of 'virtually gated' townships. Security is enhanced by the installation of LED street lights with sensors, boom barriers and HD surveillance cameras in public, as well as wireless video intercom systems and video door phones in every home," suggested Prasenjeet Bhattacharya.

"Sony network cameras help Indore Police improve road traffic management. Big cities demand effective road traffic management solutions. In collaboration with Sony India, Indore Police has installed a total of 210 SNC-CH120, SNC-CH240 and SNC-ER580 security cameras as part of the city's automated Red Light Violation Detection system. The cameras are integrated with a system that automatically generates electronic penalty notices (e-Challans), helping Indore Police reduce offending rates and improve road safety," informed Divanshu Gupta. **RIS**



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9C, Laxmi Industrial Estate, Link Road, Andheri (West), Mumbai - 400 053.

Tel : +91 22 2631 0942, 6692 4209 Fax : +91 22 6692 4210 Email : info@kapricorp.com Web : www.kapricorp.com