Uttar Pradesh Police & Bureau of Police Research & Development

Conference Report

Drishtikon

A Stakeholders’ Conference on CCTV Surveillance Camera Technology and its Sustainable Community Implementation
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Synopsis

The advancement of science and technology has not only upgraded our lifestyle, but has also helped us to protect ourselves better. The use of CCTV (Close Circuit Television) cameras for monitoring has proved to be a game changer for surveillance. These cameras have become an essential part of policing in many parts of the world. In India, the use of CCTV cameras for large-scale surveillance is still an emerging trend and is very ad hoc at this stage. UP Police and Bureau of Police Research and Development (BPRD) took the lead in bringing together various stakeholders involved in CCTV camera surveillance to kick-start a discussion and understand the various aspects of the technology and its implementation.

DrishtiCon - a day-long stakeholder conference on 'CCTV Surveillance Technology and its Sustainable Implementation', was held on 28 June 2018 at the UP 100 headquarters in Lucknow. Three different activities were organized concurrently as part of the conference: panel discussions on various key topics, exhibition of major advances in CCTV surveillance technologies by leading companies in the field and an innovation area where the participants gave presentations on the future of CCTV surveillance technologies.

The panel discussion had three sessions with speakers from the government and private companies at the forefront of either implementation or innovation of CCTV surveillance technologies. The discussions highlighted the challenges faced and the successes seen in using the technology. The need for standardization of the technology and hardware used was also discussed. The need for networking with various state services was emphasized as was the need for data protection. Successful financial models for CCTV surveillance was also explored.

Senior bureaucrats from across India and various renowned networking/telecom companies shared their vision on how to implement a state-side surveillance project. Administrators from the Government of India as well as several State Governments, including, but not restricted to, Raipur, Telengana and Ahmedabad), as well as the senior leadership of Vodafone, Reliance Jio, Microsoft, Airtel, Honeywell, Idemia, Videonetics, CP Plus, PWC, Axis, Ernst & Young, enriched the conference with their ideas, experiences and latest technology enabled products and solutions.

Video Surveillance technology has been identified as a key arsenal in the fight against crime. It is set to become an integral part of India’s policing and security efforts as India takes the 'SMART' way forward. If this robust technology has to be seamlessly implemented, there is a need for knowledge and resource sharing between private and government organizations. DrishtiCon, by bringing in all the stakeholders in one single place, was a vital step in that direction.
Chapter 1: Agenda of the Conference

DrishtiCon was a well thought-out conference that was strategically designed to deeply engage all the stakeholders with all aspects CCTV camera surveillance technology. The conference had three different sections - panel discussion, innovation and exhibition - that were simultaneously held within the UP100 premises. The panel discussions were held in Abhivyakti auditorium. The main agenda of the conference was as follows:

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Panelists/Speakers</th>
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<tbody>
<tr>
<td>09:45 - 10:30am</td>
<td>Inauguration</td>
<td>1. Welcome &amp; Opening Remarks – DG BPR&amp;D (Shri. A.P Maheshwari, IPS)</td>
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<td></td>
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<td>2. CCTV Cameras in Urban/Smart City Development – Principal Secretary, Nagar Vikas (Shri Manoj Kumar Singh, IAS)</td>
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<td>3. CCTV Cameras and Town Planning – Principal Secretary, Housing &amp; Town Planning (Shri. Nitin Ramesh Gokarn, IAS)</td>
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<td>4. Address by Chief Guest– DGP UP (Shri. O.P. Singh, IPS)</td>
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<tr>
<td>10:30 - 10:32am</td>
<td>Inauguration of Exhibition Area</td>
<td>1. Ribbon cutting by Chief Guest</td>
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<td>10:32 – 10:45am</td>
<td>Tea</td>
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<tr>
<td>10:45 – 12:00pm</td>
<td>Session 1: Advanced Video Analytics and Standardization of Surveillance Camera Protocols</td>
<td>1. Honeywell (Shri Yudhveer Rana)</td>
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<tr>
<td></td>
<td></td>
<td>2. Videonetics (Shri Tinku Acharya)</td>
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<td>3. Axis- (Shri Anand Chandrashekhar)</td>
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<td>4. Idemia (Shri Rajesh Batreja)</td>
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<td>5. Globus/CP Plus (Shri Shailendra Singh)</td>
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<td>6. Standardization of Camera Protocols (Jeevan Reddy, Telangana Police)</td>
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<td>7. PWC- (Shri Vishal Goel)</td>
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<td></td>
<td>Chair: Sh. Raja Srivastava, IPS, IG Agra</td>
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<tr>
<td>12:00 - 01:15pm</td>
<td>Session 2: Networking with Emergency</td>
<td>1. Joint Secretary, Women Security, MHA (Ms. Punya S. Srivastava, IAS)</td>
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<tr>
<td>Time</td>
<td>Session/Event</td>
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<tr>
<td>01:15 – 01:45pm</td>
<td>Technology Demonstration by various vendors in Exhibition area</td>
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<tr>
<td>01:45 – 02:30pm</td>
<td>Lunch</td>
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<td>02:30 – 03:00pm</td>
<td>Session 3: Sustainable Finance Models for Community Video Surveillance and Success Stories</td>
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<tr>
<td>03:30 – 04:15pm</td>
<td>Closing Ceremony</td>
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<tr>
<td>04:15 – 04:45pm</td>
<td>High Tea</td>
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### Innovation cum Technology Demonstration

1. **Technology Demonstration by various vendors in Exhibition area**

### Session 3: Sustainable Finance Models for Community Video Surveillance and Success Stories

1. **Framework for Sustainable Models** (Shri Aditya Mishra IPS, ADG UP100)
2. **Airtel** (Shri Gaurang Rao)
3. **Reliance JIO** (Shri Vibhu Narain)
4. **Successful Community Video Surveillance Raipur (Chhattisgarh)** (Shri Rajat Bansal, IAS)
5. **Regulatory Framework Telangana Police** (Shri Jeevan Reddy)
   - Chair: Sh. Asim Arun, IPS, IG ATS

### Closing Ceremony

1. **Overview of Conference by ADG PAC** (Shri R.K. Vishwakarma, IPS)
2. **Presentation on Video Surveillance by Ahmedabad Smart City Manager** (Shri. Yatindra Naik)
3. **Address by Chief Guest** – Shri. Suresh Khanna, Hon’ble Cabinet Minister for Parliamentary Affairs, Urban Development, Urban Employment and Poverty Alleviation, Government of Uttar Pradesh
4. **Closing Remarks** (Shri Aditya Mishra IPS, ADG UP100)
Chapter 2. Inaugural Session

Advancement in technology has brought about iconic changes to the lives of modern man. From health to transport, disaster management to emergency response, technology has made the lives of human beings easier. Especially, in ensuring public security and emergency services, technology has brought phenomenal changes, making lives of people more secure and safe.

Use of technology in policing has redefined the whole concept of police-public relationship. Today the police force is empowered with the latest equipment that enable them to offer effective services. The use of upgraded vehicles, sophisticated cameras etc., is seeing the police force improve their response rates to emergency situations. Thanks to cutting-edge technology, the emergency response system is just a click away from the citizens. The need of the hour is to include more and more state-of-the art technology for better policing.

Keeping in view the latest advancements in surveillance technologies, a day-long conference on CCTV Surveillance Camera Technology and its Sustainable Community Implementation was held at UP100 HQ, Lucknow, under the aegis of Bureau of Police Research and Development and UP100. Various stakeholders came together on 28th June 2018 to put forward their valuable inputs on using CCTV to ensure public safety.

The conference began with a short inaugural ceremony. Delivering the welcome address, Shri A.P. Maheshwari, Director General, Bureau of Police Research & Development, spoke about the idea of security and safety of citizens in smart cities. Shri Maheshwari emphasized the development of infrastructure for video surveillance. Shri Manoj Kumar Singh, Principal Secretary, Nagar Vikas, Government of Uttar Pradesh focused on the importance of technology and the rapid developments taking place in this field. Shri Nitin Ramesh Gokarn, Principal Secretary, Housing and Town Planning, Government of Uttar Pradesh, also added his valuable thoughts.

Shri O.P. Singh, Director General of Police, Uttar Pradesh, also expressed his views on the use of surveillance cameras. He said that the police force would be facing a great challenge due to paradigm shifts in demographics, values and most importantly technology, and that we have to be ready to harness these for public good.

The conference was divided into three different sections:

1. Panel Discussion
2. Exhibition
3. Innovation
The panel discussion, that included three different sessions, was held at Abhivyakti auditorium. The first session was on ‘Advanced Video Analytics and Standardization of Surveillance Camera Protocols,’ where the participants included Honeywell, Videonetics, Axis, Idemia, Globus and PwC. Session 2 was on ‘Networking with Emergency Response/Enforcement Agencies and Data Security’ and the participants included representatives of Microsoft, Vodafone, JIO, UP100 and women’s security. Session 3 focused on ‘Sustainable Finance Models for Community Video Surveillance and Success Stories’. The session started with a speech by Shri Aditya Mishra, ADG of UP100 who said that the primary focus is on the emergency response system, since the PRVs have the capacity to integrate a camera network. He remarked that the most financially viable and sustainable model would be a crowd-sourced model. The participants in this session included representatives of Reliance Jio, Airtel, Raipur Smart City and Telangana Police.

In a separate section of the conference called ‘Innovation Theatre’ companies at the forefront of the CCTV surveillance technology revolution presented their most innovative products. Through their presentations, the companies unveiled the future of CCTV surveillance. They demonstrated how integrating cameras that have the latest in-built technologies with the emergency response system would help to deliver better safety and security to the citizens.

The third section of the conference involved an exhibition of various cameras by leading companies. Noted participants included CP plus, Choate Tech, Idemia, Staqu, Globus Infocom Ltd, Innefu Labs Pvt. Ltd and Forensic Guru.
Chapter 3. The course of activities in DrishtiCon

The conference brought together all the different stakeholders in the CCTV camera surveillance technology. The main panel discussions were conducted at Abhivyakti Auditorium, where the stakeholders put forth their thoughts on the importance of CCTV surveillance. At the parking area of UP100 office the companies put up an Exhibition of their products. Another activity called Innovation Theatre was held at Vatayan, where the stakeholders presented their products.

A brief discussion on the course of the whole conference follows.

A. The Panel Discussions

The panel discussions had three different sessions. The first session was on Advanced Video Analytics & Standardization of Surveillance Camera Protocols, the second session was on Networking with Emergency Response Agencies and Data Security, the third session was about Sustainable Finance Models for Community Video Surveillance and Success Stories.

Session 1: Advanced Video Analytics & Standardization of Surveillance Camera Protocols

Session 1 was moderated by Shri Raja Srivastava, IPS (IG Range, Agra).

The participants included Shri Yudhveer Rana of Honey well who touched upon Efficiency and cyber security in cyber surveillance, Dr. Tinku Acharya's (Founder & Managing Director, Videonetics) whose topic of discussion was Experience world's first A.I. and deep learning enabled visual computing platform, Shri Rajesh Batreja (Head Public Security Business, Idemia who spoke on Facial recognition and video investigation, Shri Shailendra Singh (Head Business Enterprises, CP Plus) shared his knowledge on Role of A.I. in Police Modernization, Shri Vishal Goel, Director at PwC India spoke on Standardization in CCTV-based Surveillance Systems, and Shri Anand H. Chandrashekhar (Head Business Development, Axis Communications), spoke on Best Practices in Choosing a Surveillance Solution for your city.

All the speakers discussed about the necessity of improving the security system. Today, cities face a wide range of threats, ranging from terrorism and civil unrest to kidnapping and murder. To reduce the impact of these threats, it is critical for the authorities to capture real-time information on what is happening in and around the city. Therefore, there is a growing
requirement for utilizing the new and emerging technologies to make our cities safer.

The need of the hour is to have an advanced video analytics system that can immediately flag this event as a potential problem and allow quick intervention. There are extensive powerful video analysis methods and tools that are deployed in a number of application domains, including surveillance and security applications. Video Analytics like motion detection, trip wires, object removal or abandonment, facial recognition, license plate recognition, etc. enables video surveillance to become a proactive monitoring tool that signals the need for immediate intervention.

Video analytics application can be improved by using node analytics (which eliminates the communication with cloud; consumes lesser bandwidth; and reduces latency) and logarithmic imagers (giving higher dynamic range for image processing and overcoming problems of luminosity changes like shadows, reflections and abrupt alterations in light).

When it comes to video surveillance protocols, there are two major standards adopted universally PSIA and ONVIF. PSIA (Physical Security Interoperability Alliance) offers advantages like easy interface for analytics integration and easier implementation. However, it fails to provide 100 percent interoperability. On the other hand, ONVIF (Open Network Video Interface Forum) can provide 100-percent interoperability between compliant products.

It is recommended that establishments should install CCTV cameras and related components meeting open and consistent standards (and avoid any system with proprietary standards). CCTV cameras and related systems should comply with the ONVIF or PSIA standards.

A detailed overview of the presentations is mentioned below:

**a. Honeywell**

Mr. Yudhveer Rana from Honeywell gave a presentation on ‘**Efficiency and Cyber Security in Video Surveillance**’. Shri Yudhveer Rana (Head Product Marketing, Honeywell) possesses 11+ years of diverse experience in smart cities, IoT, consulting and technology sectors. He has had a stint with Panasonic, Bosch, and Godrej.

In his presentation, he focused on the importance of video analytics, integration, latest technological advancement in video surveillance, the need of cyber security standardization and Honeywell’s contribution towards enhancing cyber security.

The product complemented with Scene Adaptive Control, Ultra HD 4K technology and low light surveillance. This feature of the equipment, helps in detailed wide area monitoring with a single camera.

The focus areas in his presentation included:

- **Video Surveillance: Drivers and Challenges:**
The need for Video Surveillance is to protect people and provide them security. There is a need of proper project planning and strategy for proper rolling out of the project.

Latest Technology for efficient video surveillance: The latest technology should be tied to a good quality camera that is itself not less than 4k Ultra HD in resolution. It should give a good wide area monitoring. ONVIF is given more preference when it comes to selecting standards for efficient video surveillance.

- **Video Analytics:**

Induction of artificial intelligence in video analytics has helped police to do early detection and effective intervention, and thus minimal loss.

- **Cyber Security and standardization:**

The threat of data theft and attack of hackers leaking important data and intruding in our privacy are a few challenges that need to be overcome. In order to ensure that the data is protected Honeywell initiated a programme called Cyber-Security Assurance Programme (CAP)

**b. Videonetics**

*Dr. Tinku Acharya (Founder & Managing Director, Videonetics) holds a Ph.D. in Computer Science from University of Florida, USA and is a fellow of IEEE, INAE, and IETE. He is an inventor of more than 150 granted patents in electronic imaging, data compression, multimedia computing, computer vision, intelligent video, and VLSI. He has also worked with Intel, AT&T Bell Laboratories among other renowned corporations.*

Dr. Tinku Acharya represented Videonetics. In his presentation, he emphasized on the need for Indian Standards for **video analytics and the need for indigenous products.** In the conference, he put forward the idea of designing the product according to the need of the demographic needs. He also explained that the video surveillance kit must have the capacity to capture crowded areas. The community areas and the streets of India are far more crowded than foreign countries and hence the camera installed, should fulfil the requirement.

According to him, we need to have:

- **Defined Indian standards:** There is need to have a law that ensures privacy protection. The surveillance cameras should be according to the demographic size. It should also have high resolution for identifying even a small detail of an incident. In addition to cover broad, the cameras should be built in such a way that the narrow lanes are also covered.

- **Encourage Indian innovation:** Dr. Acharya emphasized on ‘Make in India’ concept and asked people to develop products that go with Indian requirement. He also explained that
there is a need for innovation according to Indian standards.

- Adopt Indian Innovation: He quoted that we should also try to adopt the products developed in India.

- Promote Indigenous Technology: The Indigenous technologies of India need to be boosted.

- Value Indian Intellectual Property: Being a responsible citizen of India, it is everyone’s duty to value and protect the intellectual property.

He also focused on integrated intelligent server-based system and method adapted to facilitate fail-safe integration and optimized utilization of various sensory inputs.

c. Idemia

Idemia was represented by Shri Rajesh Batreja, Head Public Security Business, Shri Batreja has worked with government sectors across South Asia and India in various government, telecom, banking, and manufacturing industries. He holds an MBA degree in International Business from the University of Southern Queensland.

His presentation enlightened on Morpho Video Investigator (MVI). He advocated the need for biometric reorganization system for a safer payment gateway. He also talked about post-event analysis and real-time analysis. A brief on modalities for detection and the process of investigation was also shared.

Some of the features and uses of MVI were:

- Enables a biometric search by suspect face and license plate search by character count.
- It tracks the movements of a person and any unauthorized access.
- Matches facial images irrespective of age differences.
- Analytics classifies detection on the basis of gender, age, body colour, license plates by character.
- Select and search a particular area of crime rather than searching in the whole area.
- Analytics helps in re-identification and finding relations between persons/suspects.

MVI can be a boon for:

- Law Enforcement Agencies
- Airports
- Railways
- PSUs
• Hotels/ Universities
• Municipal Police
• Intelligence Agencies
• Criminal Justice System
• Smart Cities/Safe cities
• Temples and Pilgrimage sites

Apart from the above-given sectors, MVI can also be used to find missing children, give live alerts in missing person passing by the camera and search for criminals.

d. CP Plus

Shri Shailendra Singh (Head Business Enterprises, CP Plus) offered his valuable inputs on the current state of surveillance.

He briefly discussed about the challenges that are faced by surveillance system, despite successful implementation. The importance and benefits of CCTV health monitoring was also a part of the discussion. The prime benefit of monitoring the health of the CCTV system is that one can ensure that if something fails, automatically problem will be reported to control room and a service visit can be arranged to rectify the problem. He also proposed the setting up of a Health Monitoring dashboard.

His main focus was on importance and use of Artificial Intelligence for surveillance. AI can further support predictive policing where it can help in the following ways:

• ANPR and Face recognition.
• Crowd management
• Tracking Objects
• Accidental Pattern Monitoring
• Gang Violence monitoring.
• Biometric Identification

Need and use of updated policing products was also a part of the discussion. He advocated on the need of an integrated solution and the need of a single platform.

e. Axis Communications

Shri Anand H. Chandrashekhar, (Head Business Development, Axis Communications) holds a management degree in marketing and is skilled in building business with a focus on the Go-To-Market plan, Channel, Alliance and End-user management. He has over 15+ years
Shri Anand Chandrashekhar from Axis gave a presentation on 'Best Practices in choosing a surveillance solution for your City'. Cyber Security, analytics, trends, were the prime topics of discussion. Shri Chandrashekhar highlighted the solution given by Axis for Smart City. The solutions are safety- security, traffic- parking and environment.

He also emphasized, that any surveillance device must be able to cover the following features:

- Situation awareness
- Intrusion protection
- Wanted person
- Vehicle identification
- Crime prediction
- Forensic search
- Drone detection
- Sound detection
- Crowd management
- Automatic incident detection
- Traffic data collection
- Parking management
- Video-based penalties
- Intersection control
- Vehicle status control
- Pedestrian Crossing
- Double lane parking detection

His presentation also showcased analytics. Shri Chandrashekhar pointed out about trends like edge-based sensor integration environmental sensor. The presentation primarily aimed at performance, image, bandwidth control and network security.

f. PwC

Shri. Vishal Goel (Director, PwC) holds a management degree from IIM Lucknow and has done B. Tech in IT. He has worked with renowned firms like IBM and Capgemini and has now over 15+ years of cross-industry experience.

Shri. Vishal Goel gave a presentation on 'Standardization in CCTV based Surveillance
The emphasis was on the model of safe and smart cities, the need for a command center and surveillance services and the importance of location-based services. The key topic of the presentation was about intelligent collaboration and integrated operations. Smarter public safety was also discussed later in the presentation.

Shri Goel opined that there is a need for standardization in order to ensure hassle-free flow of information. He spoke about a collaborative monitoring framework for surveillance systems under which various types of surveillance cameras and networks can be integrated to a single platform using standardized protocols, methodologies, technologies, and architecture.

Session 2: Networking with Emergency Response Agencies and Data Security

Session 2 was moderated by Shri Sujeet Pandey, IPS (IG Range, Lucknow) and Shri Satish Ganesh, IPS (IG PAC Central Zone/HQ)

Security and law enforcement agencies can take advantage of the extensive network of surveillance cameras deployed by communities across the city as well as the cameras of other private and government establishments. The advantage provided by leveraging the extensive network of external cameras ensures enhanced crime monitoring through a cost-effective, widespread and scalable model.

In cities, where every government and private establishment has realized the necessity to secure its infrastructure and establish surveillance, monitoring and incident response systems, it is important that the data gathered by these agencies is shared among them. In such cities, CCTV-based surveillance systems are being deployed by government agencies at places like bus stands, metros, railway stations, airports, other critical infrastructure spots and public places.

These collaborative monitoring systems can conveniently share their data in real time with security agencies of the city. Similarly, live feeds from CCTV systems deployed by private establishments such as malls, hospitals, business parks and entertainment houses can be provided to the security and law enforcement agencies and emergency response centers, which can make effective use of the information.

Data security and privacy protection are the two chief concerns in any sharing of private video feed with public agencies. In short, it includes data privacy, data protection, data location, and secure transmission. Any insecure embedded device connected to the internet is a potential target for attacks and can easily provide a gateway to the public agency's entire network,
enabling anyone with malicious intent to corrupt all their systems or extract huge amounts of data.

Data security can be ensured by adopting encryption methods, following security standards and policies at all levels, and by implementing a comprehensive legislation. All the gaps and potential threats need to be carefully thought of any identified vulnerability plugged.

The speakers in the session included:

- Mrs. Punya S. Srivastava, IAS who said, "Technology is an enabler but it also poses a challenge and we have to strongly address such challenges".

- Shri Ritesh Bhargava of Vodafone said, "Data is at the heart of video surveillance; security is everyone's responsibility."

- Shri Shakti Sharma of Jio Networking, who shared his views on 'Predictive Policing' said, "Data Analytics develops hindsight into insight and further into foresight."

- Shri Raghvendra Dwivedi, SRO UP100, threw light on the 'Practical issues of Drishti- the city surveillance project in Lucknow' highlighting the challenges faced and mitigated during the implementation.

Other presenters included Shri Vikash Chourasia, Scientist MEITY, Gol and Shri Akshya Singhal (Technology Consultant) of EY.

a. Ministry of Home Affairs

Mrs. Punya S. Srivastava, IAS (Joint Secretary, Ministry of Home Affairs) is from 1993 batch of AGMUT cadre and now heads the Women Safety Division which comprehensively addresses all issues of women safety in coordination with relevant Ministries/Departments and State Governments.

She emphasized on the need of an emergency response system but the challenge is that the systems must be integrated so that they can be connected to each other, i.e., for information sharing.

b. Microsoft India

Shri Prashant Shukla (National Technology Officer, Microsoft), has an experience of about 25 years and he spans successful leadership roles in marketing, sales, product management and software development in the US and India. He successfully drove the first TV Whitespace Pilot to provide an alternative for cheap rural Internet. He also drove the design of a framework for the first Indian digital village and its implementation.
Shri Prashant Shukla emphasized on innovative policing in modern world, growing video trends, the promise of cognitive video analytics and use the artificial intelligence in video analysis. The point of the presentation was use of AI for decoding human gestures, language, motion and mood. Artificial intelligence can be used to solve many cases as it helps a law enforcement agency to get detailed information about the suspect. With the help of AI, a surveillance team can get alerts like crowd building, covered faces, mob distress, fight, trespassing and vandalism.

He also gave an insight on how any organization should be dealing with data, and the need of a properly integrated infrastructure to manage that data. Prashant also emphasized on the need for a nationwide integration of all emergency response system. Apart from detecting and decoding human gestures, artificial intelligence is equally helpful in smart transit monitoring. Transport department usually faces the issue of red light violation and rash driving. Now with the help of ANPR the culprit can be easily caught. ANPR is a technology that uses optical character recognition on images to read vehicle registration plates and then it creates vehicle location data. It can be used on existing closed-circuit television cameras, road-rule enforcement cameras, or cameras specifically designed for this task. ANPR is used by police forces around the world for law enforcement purposes, to check if a vehicle is registered or licensed. It is also used for electronic toll collection on pay-per-use roads and as a method of cataloguing the movement of traffic, for example, by highways agencies. Microsoft advocated the need of integration and a uniform platform for efficient functioning of police.

c. Vodafone

Shri Ritesh Bhargava (National Solution Head, Vodafone) has 16+ years of experience across total telecom solutions, network design, global service delivery, operations & business development.

Shri Ritesh Bhargava from Vodafone showed a presentation on advanced video analytics and standardization of surveillance camera protocol. He first underlined the things that should be considered during implementation. Among the essential points, the solution provider must first meet the customer's expectations of providing a good network connection.

He stated that artificial intelligence would be vital in the future and gave examples of the same by describing the usefulness of machine learning technology in police work, such as in the identification of criminals through camera feed. Shri Ritesh also provided an insight into the scale of the future use of data. He quoted statistics to point out that 'India video surveillance analytics software market was projected to grow at a CAGR of 35% during 2017-23.' This presentation also showcased the standard and design principles.
d. Reliance JIO

Shri Shakti Sharma (Head Loss Prevention, Reliance Jio) is an Indian Army veteran who has been associated with Reliance for over 11 years and is currently heading the security and loss prevention operations. He shared his views on 'Predictive Policing'.

Shri Shakti Sharma spoke about a software developed by Jio which helps efficiently analyze large set of data, information vital to detect terrorist activities. He stated that if analyzed properly, data could provide a lot of insight regarding potential incidents that the police might investigate. This could be a huge boost for predictive policing. He added that, "Data Analytics develops hindsight into insight and further into foresight."

e. UP100

Shri Raghvendra Dwivedi (State Radio Officer, UP100) is an alumnus of BITs Pilani and was instrumental in the Implementation of UP100 Emergency Management System in the state of Uttar Pradesh. He threw light on the 'Practical issues of Drishti- the city surveillance project in Lucknow'

Shri. Raghvendra Dwivedi, SRO, emphasized the need for proactive policing to minimize crime rates. He also discussed at length the various challenges the team encountered in the course of the implementation of the "Drishti" project. "Drishti" is the city surveillance project in Lucknow.

Shri Dwivedi, also threw light on how the team came up with innovative solutions to overcome the various challenges to successfully implement the project in the state.

f. Ministry of Electronics & Information Technology, Govt. of India

Shri Vikash Chourasia (Scientist, Ministry of Electronics & Information Technology, Govt. of India) is a seasoned Information Security professional presently entrusted with the responsibility of formulating legislation for 'Data Protection Framework for India'. He is also contributing to the Lieutenant Governor's committee on SOPs for installing CCTVs at public places.

Shri Vikash Chourasia emphasized on the need for data security. He advocated that there was a need for a strong legal framework in order to protect data. He mentioned that the Supreme Court also has now recognized the right to privacy as a fundamental right. The objective of the government of India is to ensure the growth of the digital economy while keeping personal data of citizens secure and protected. He also discussed various global data protection models that are being followed by different nations. He opened that India may follow a hybrid model of data protection so that India can find the right balance and take
advantage of a data-driven ecosystem, but with all reasonable restrictions. The key principle of data protection in India would have the following seven attributes:

- Technology agnosticism
- Holistic application
- Informed consent
- Data minimization
- Controller accountability
- Structured enforcement
- Deterrent penalties

In order to implement these key principles of data protection, a White Paper has been drafted. The White Paper has been further divided into three parts.

- Scope and Exemptions
- Grounds of Processing, Obligation on Entities and Individual Rights
- Regulation and Enforcement

Shri Chourasia also mentioned that comprehensive data privacy guidelines for surveillance systems must cover aspects that can help hassle-free rollout of the projects.

g. Ernst & Young

Shri Akshya Singhal represented Ernst & Young. He is a technological consultant at Ernst & Young with over 15 years of experience in the consulting domain. Skilled in business process re-engineering, technology advisory, business analytics, market entry, and risk management with a focus on both private and government sector.

His presentation was on 'emergency response system and integration with surveillance team'. The main agenda of his presentation was Modern Integrated Emergency Response System, CCTV integration with ERS and Global Best Practices in Emergency Management.

In his presentation, he talked about the working model of emergency response system, types of emergency call that were likely to come us and what the attributes the emergency response system should have. These are:

- Instant response with timely assistance dispatch to the incident location.
- Low turn-around time for ensuring availability and turnaround of trained ER personnel (depending on the type of emergency).
- Near real-time profiling, location tracking, and incident analytics.
- Provision of multiple failover mechanisms.
- Swift decision making by competent authorities and work-flow based triggering of response (as per the criticality of the incident).

Three kinds of implementation models were discussed in his presentation which were:

1. Centralized Call Taking, Centralized Dispatch.
2. Centralized Call Taking, Decentralized Dispatch.
3. Decentralized Call Taking, Decentralized Dispatch

The pros and cons of these Implementation models were also discussed in his presentation.

The working model of emergency operation center was an important part of the presentation, as it would help to streamline the working in future.

Shri Akshya Singhal also highlighted the benefits of integrating the application with the police. The advantages of Video Surveillance Integration with Command Centre were also discussed in his presentation. He also talked about the challenges and benefits of cloud computing and data processing for emergency response systems.

Session 3: Sustainable Finance Models for Community Video Surveillance and Success Stories

Session 3 was moderated by Shri Asim Arun, IPS (IG ATS, Lucknow)

A video surveillance project requires vast experience, expertise, technical and financial capability for the successful implementation of the project as well as for subsequent management, operation, and maintenance.

It is, thus, imperative to select a suitable funding model to ensure that the safe cities project is sustainable and remains effective throughout its operations and maintenance.

There are two funding models that can be adopted for implementing and maintaining a video surveillance project: Government-funded and Public Private Partnership (PPP). The latter has become increasingly prevalent these days in every sector and industry. PPP models can be annuity based, transaction-based and collection based.

Another supplementary source of funding could be in the form of corporate social responsibility (CSR) contribution from business corporates operating in the region.

Departments like health, municipal corporation, power distribution, water supply can be integrated with a surveillance system and these departments can contribute monetarily in lieu of the benefits of the services given to the citizens. Public safety must be considered a right of all citizens. Institutions and civil society must build safer cities together by creating inclusive
and equal urban environments. The city leadership needs to take the initiative to coordinate community-wide prevention strategies to reduce crime and violence. Success depends on partnerships between local governments, citizens, and the civil society.

The speakers include:

• Shri Aditya Mishra, IPS, ADG UP100, delivered a speech on ‘Framework for sustainable model’ saying, ‘A community-based model should be implemented which has both economic and social benefits’.

• Shri Vibhu Narayan of Reliance JIO spoke on ‘Digitization of Police: A sustainable model’ saying The biggest challenge would be the transportation of data.

• Shri Gaurang Rao of Airtel spoke on Changing relevance of Cloud infrastructure for today’s city surveillance system saying, we need a model that is not cost-centric but revenue generating. We can benefit from a pay-as-you-grow business model.

• Shri Rajat Bansal, IAS shared his views on ‘Sustainable Finance Model for Community Policing’ and pressed on, ‘Convergence and synergy between departments is the need of the hours for effective delivery’.

• Shri Jeevan Reddy threw light on the ‘Regulatory framework of Telangana Police’ saying, “the purpose of community surveillance is to build safer communities by partnering with citizens”.

A detailed discussion of key presentations is mentioned below:

a. ADG UP 100

Shri Aditya Mishra, IPS (Addl. Director General, UP100) is a 1989 batch Uttar Pradesh cadre officer, presently heading the Integrated Technology Enabled Citizen Centric Services (ITECCS) wing of Uttar Pradesh Police. He has also served in Border Security Force on deputation.

Shri Aditya Mishra, ADG of UP100, said a community-based model should be implemented as it has both economic and social benefits. He added the system could be further customized, for example, waste management systems could also be linked. He said that the proposal should be such that it is a crowd-sourced model as it could be the most financially viable one. He added that the primary focus was on emergency response system since the PRVs have the capacity to integrate a camera network.
b. Reliance Jio

Shri Vibhu Narayan (Head Corporate Affairs, Reliance Jio) is a Border Security Force veteran who holds an MBA degree from ISBM and is an alumnus of Delhi University. He has been associated with Reliance for more than 5 years.

Shri Vibhu Narayan said that India was generating a large amount of data, beating even some of the developed countries in this area. However, the biggest challenge that came up with this huge quantity of data was its transmission. He also added that security services currently did not have the means to pre-empt the crime.

c. Airtel

Shri Gaurang Rao (DGM Products, Airtel) possesses an extensive background of 11+ years in product management, alliance management in the field of IT infrastructure, cloud & managed services, data center & IT services, and telecom.

Gaurang Rao from Airtel gave a presentation on sustainable finance models for community video surveillance. The importance and need for Collaborative Monitoring were discussed during the presentation. Basically, Collaborative Monitoring is meant to support more effective and efficient monitoring practice. In Collaborative Monitoring, all locations like, airport, malls, and multiplexes, government offices, hospitals, schools and colleges, gated compounds, railway stations and Bus stops, markets and community sensitive areas are inter-connected via a single network. If any incident occurs in, any of the areas then the surveillance camera will directly send information to the emergency response team. He also gave an insight on Layered Approach Participation (in the context to Uttar Pradesh) and talked about donor and client methodology. In Layered Approach he defined the following points:

- There are numerous CCTV systems in UP, many of which have cameras facing public areas.
- The strategy provides the mechanism by which CCTV owners can volunteer to share the data from any public facing camera that they manage, to one or more agreed upon clients.
- The Donor & Client Methodology
- A Mobile Video Sharing solution will be tested to unlock this potentially rich source of data, providing a new way for us all to contribute to safety and security.
- UP100 Community Connect Program

He also advocated a strategy which allows a user to share data from any public forum.
In the context of the financial model, Shri Gaurang emphasized that there is a need for a revenue-generating model rather than a cost-centric one.

d. Raipur Smart City Ltd

Shri Rajat Bansal, IAS (CEO, Raipur Smart City Ltd) is presently Commissioner of Municipal Corporation, Raipur and is leading the sustainable community projects in the city. Under his leadership Raipur has secured 3rd rank in the country by successfully completing 10 projects.

Mr. Bansal discussed the challenges that he faced during implementation of the project. He also gave a brief on how his team overcame the challenges during rolling out of the project. He shared the success story of Raipur Smart City and gave his inputs on Community Surveillance.

On the basis of his experience, he gave a brief about the challenges that a community video surveillance team is likely to face, some of them are given as follows:

- Multiple stakeholders
- Waste of resources (if not planned correctly)
- Government accountability and procedural safeguards
- Standardization and interoperability
- Lack of awareness within communities
- Funding and maintenance issues
- Equal protection and anti-discrimination
- Existing laws and regulatory proposals
- Government accountability and procedural safeguards
- Privacy and anonymity issues
- The risk to freedom of expression and association
- Crime/incidents displacement/closure

He also mentioned the role of CCTV in solving many pending cases. A few of them were discussed to show how community surveillance has helped to nab the accused. He also talked about the adoption of ONVIF standards, for hassle free roll out of the project. An insight about the role of AI, in finding in-depth details of the criminal were also given by him.
e. Telangana Police

Shri Jeevan Reddy (Consultant, Telangana Police) is a technical consultant for Telangana police.

Shri Jeevan Reddy, Consultant Telangana Police gave a presentation on 'Community Video Surveillance Project'. Enhancing safety and security, consulting the citizens to improve their own neighborhood, building safer communities by partnering with citizens, and deploying city-wide video surveillance project through community involvement were some of the points that were discussed by him. The steps for deployment of Community CCTV System were elaborated in the presentation. Below are the steps that are required to deploy the CCTV system.

- Formation of core technical group
- Defining technology and process standards
- Designing the system's technical specifications
- Formation of field teams for overseeing the deployment.

A brief overview, on process structure for a successful rollout of the project, was also given by Shri Reddy. Under the process structure he discussed the following:

- Empaneling of selected bidders through open tender.
- Allocation of police stations in each zone to the empaneled bidders for system deployment.
- Model CCTV system should be deployed in one of the police station neighborhood as a reference site.

To know about the pitfalls of the project, it was suggested to initially launch a pilot project and conduct training sessions for community, police, and stakeholders. Funding was one the biggest challenges that needed to be overcome. Shri Jeevan also talked about financing models and funding channels that could be adopted for the project. Few of them are given below:

- Contribution from community groups based on the need.
- Contribution of funds from MP / MLA / MLC in their respective constituencies through public intervention.
- Funds from Private and Public corporates under their CSR program.
- Contributions from various agencies or individuals based on their willingness.
- Sponsorship from various vendors for this social cause.
B. Exhibition

Along with their presentations, the participating companies also exhibited their products. The exhibitors who presented their products were as follows:

a. Choate Tech

Choate Tech highlighted the Passenger Maker and Vehicle Security Solution product PAAS2. The USP of the product is that it provides an on-demand security alert system that can be installed in any commercial or private vehicle. In case of an accident, a camera and alert system automatically sends information to the local police station. There is also an inbuilt panic button that is exclusively meant for single travelers and women. PAAS2 is equally accessible on mobile platforms too.

b. IDEMIA

Idemia is the global leader in trusted identities for an increasingly digital world, with the ambition to empower citizens and consumers alike to interact, pay, connect, travel and vote in ways that are now possible in a connected environment.

With close to €3bn in revenues, IDEMIA is the result of the coming together of OT (Oberthur Technologies) and Safran Identity & Security (Morpho). This new company was a team of 14,000 employees of more than 80 nationalities and serves clients in 180 countries.

AFIS – Automated Fingerprint Identification system is the process of automatically matching one or many unknown fingerprints against a database of known and unknown prints. Automated fingerprint identification systems are primarily used by law enforcement agencies for criminal identification initiatives, the most important of which include identifying a person suspected of committing a crime or linking a suspect to other unsolved crimes.

Idemia is world number one in providing such system. With more than 180 system deployed around the globe, they are the world leader in this field. FBI US has been trusted customer from last 35 years.

MVI (Morpho Video Investigator) - Designed by IDEMIA, Morpho Video and Image analytic platform (MVI) is an innovative, intelligent, and intuitive video and image analytics software solution for both real-time and post-event video and image analysis. MVI rapidly processes and analyzes large quantities of raw video and image, automatically identifying and flagging points of interest throughout the recordings. The system detects, records, and classifies all elements of interest, quickly isolating potential clues and evidence so that analysts only have to review relevant information. MVI is also an intuitive interface that investigators can leverage to create a highly advanced and organized data structure.
c. STAQU

Staqu showcased its Facial Recognition and camera inbuilt smart glasses that can be worn in the crowd by the cops to identify crime suspects.

d. Videonetics

Videonetics showcased its product TAALASH-the eyewitness description tool in the exhibition.

e. CP PLUS

CP plus showcased body worn cameras, mobile DVR, IP Camera for city surveillance and BMS software in the exhibition.

f. Globus Infocom Limited

The products showcased were:

- **Globus Integrated Virtual Media Collaboration System** - A comprehensive solution best suited to deliver quality trainings, sessions & official meetings. It comprises of Globus Interactive Flat Panel Display, VC Camera, Visualizer & Virtual Meeting Room Software.

- **Globus Digital Signage solution** - IR based, slim, efficient & tough Vertical Signage solution.

- **Globus Video Data Wall Display** - Super narrow bezel width of 1.8 mm & seamless, high resolution, superior onscreen visibility for Large-scale visualization requirements like Command & Control centers, Emergency operation centers, Public information hubs, Security centers etc.


- **Globus CCTV solution** - This Comprehensive solution consists of advance high quality Full HD IP Dome Cameras, IP Bullet Camera, IP PTZ Camera along with switches, NVRs, DVRs & Display monitors etc. The focus products for the event were **Body worn cameras** & **Mobile Tracking devices** for smooth execution of surveillance requirements.

Globus Infocom is a “Make in India” brand with product designing, development & manufacturing facilities in India having a strong **Pan India sales & service network** to deliver impeccable service. Their complete range of products & solution is available on **GeM** (Government e-Market place).
Innefu Labs Pvt. Ltd

Innefu is an Information Security R&D startup, providing cutting edge Information Security & Data Analytics solutions. They count among their clients the biggest corporate entity in the country apart from some of the most sensitive and critical organizations in Government of India. They have 2 major solutions, which are as follows:

**Prophecy** – a Big Data Analytics framework based on cutting edge advancements in Artificial Intelligence & Machine Learning techniques delivering 6 modules:

- Facial Biometrics, Video Analytics and Object Identification Solution - Identify missing children, study mob behavior, use surveillance images with databases of ID photos to identify suspects, track suspicious movement of people, vehicles, etc.

- Social Media Analytics – to aid Law Enforcement in civil unrest, communal disturbances, disasters and investigations

- Intelelinx for Call Data Record Analytics - a Software Application which will help Police Department, Security Agencies and Law Enforcement Agencies to Analyze, Investigate & Work on ‘Call Data Records’ and any other such type of records, received from various Mobile Operators quickly and efficiently, regardless of difference in File Formats, Column Formats & Operators Layout Formats.

- AI based Analytics over unstructured Data, to generate intelligence out of routinely reported CCTNS data etc.

- Financial Fraud Analytics – Transaction, Billing and Check Monitoring

- Predictive Intelligence – Using all of the above solutions come

‘Authshield’ is a solution for computer access control in which a user is granted access only after successfully presenting at least two or more separate pieces of evidence (including Facial Biometrics and Fingerprint Authentication) to log into applications. They have implemented possibly the world's largest Multifactor Authentication solution for the Government of India.

Their Solutions have been selected in BSF, Delhi Police, Assam Rifles, Indian Army and other leading Law enforcement and Defense Establishments in India. They would welcome an opportunity to showcase our solutions and their applicability in various situations.

**h. Forensic Guru**

Forensic Guru showed the following products:

- Amped FIVE - Forensic Image and Video Enhancement product - works by enhancing
- dark, shaking or videos at an angle from a policing perspective. Can help with faces and number plates.

- Amped Authenticate- can help identify morphed/edited images and prove tampering/authenticity.

- VISUAL - Vehicle Identification System using Artificial Learning - sophisticated system capable of identifying vehicles based on a small/partial fragment of an image such as headlight portion of Grill or tail light exhaust pipe etc., using Artificial Intelligence.

- Cell Site Analyzer - Vehicle mounted Cell Tower Identification device used for identifying cell towers covering the crime scene as well as those covering the escape and entry routes.

- CDAMS - Call Data Analysis and Management System - sophisticated, high speed and high-end CDR and Tower dump analysis system capable of handling very high volumes of data as well as integrating inputs from cellular forensic products.
C. Innovation Theatre

Along with panel discussions and the exhibition, a technology demonstration activity called Innovation Theatre was held simultaneously at Vatayan. The session showcased the future of using CCTV surveillance in security enhancement and emergency response systems. The participants included Axis Communications, Safran, CP Plus, Honeywell, Future Guru, Idemia, Videonetics, Kritikal, Blitskey, Maxworth, Choate, Bosch, and enterprise solutions.

a. Axis Communications

Axis offers intelligent security solutions that enable a smarter, safer world. As the global market leader in network video, Axis is driving the industry by continually launching innovative network products based on an open platform - delivering high value to its customers and carried through a global partner network.

Axis specializes in professional network video solutions for surveillance and remote monitoring. Their product range encompasses network cameras, video servers, video decoders, video management software, and a full range of accessories. These cameras provide excellent HDTV image quality regardless of lighting conditions and the size and characteristics of the monitored areas and saves energy.

Analytic applications developed by Axis and their partners transform the network cameras into business tools. They can alert you to developing situations and help you make smart decisions about operations and resource allocation. Data can also be integrated with your other systems.

Their strategic vision is to be a trusted advisor and recognized supplier of solutions. They have a clear value that solves a target group's needs by providing a validated combination of products and services. Axis talks about opportunities for IP outside video: Network, IP Telephony, Audio/Video, Security, Building Automation.

b. CP Plus

CP PLUS is the global leader in advanced security & surveillance solution. Driven by the vision and commitment to make surveillance simple and affordable, CP PLUS has embarked on a mission to make the world a safe and secure place. CP Plus offers an extensive portfolio of the finest end to end imaging, intelligent analogue and IP video surveillance equipment ranging from CCTV Cameras, high definition IP video surveillance cameras, Mobile DVRs, NAS, Encoders, Time and attendance solutions, Video door phones, Digital locks, Home Automation Solutions, accessories, customized enterprise level security systems and much more. CP PLUS has a global presence with worldwide offices in Australia, Bangladesh,
China, Czech Republic, Eastern Europe, Germany, Hong Kong, India, Indonesia, Middle East, Pakistan, Philippines, Saudi Arabia, Singapore, South Africa, Sri Lanka, Taiwan, UAE and Vietnam.

Their presentation highlighted the role of AI in Police Modernization. To take CCTV to the next level and modernize it, it is important to incorporate Artificial Intelligence in the current CCTV surveillance system.

The new product range offered by CP Plus includes IP cameras, PTZ cameras & NVRs with Artificial intelligence, and DeepSense algorithm- an advanced capability to learn over a period of time. This technology can identify a person's, age, colour, gender, emotions and a host of other features. It can also be applied to vehicles.

These advanced cameras allow police to locate and nab criminals.

CP Plus products are with advance Artificial Intelligence with deep learning algorithm. It supports various applications like:

- Face Recognition
- ANPR
- People counting
- Human Behavior detection
- Intelligent Traffic Management System

Their Applications & Solutions include:

- Police Stations (CCTV Solution)
- PCR & Prison Vans (MDVR Solution)
- Speed Monitoring (RADAR system)
- Mobile Police Force (Body Worn)
- Traffic Junctions (RLVD/ANPR)

They also specially suggested some products for police modernization-ANPR Camera, Face Recognition, 44X, 500m Laser IR, Body Worn, Mobile Surveillance, Panoramic Cameras, Speed Enforcement (RADAR), Red Light Violation, Smart Analytics Camera, Intrusion Alarm System, Embedded NVR, Control Room Products. They emphasized on Edge Devices, Command Center and Networking
c. Safran Identity and Security

Safran Identity and Security SAS develops security and identity solutions for people, government, and business applications. The company offers civil identity, public security, commercial identity, and biometric terminal solutions. It serves customers worldwide. Safran Identity and Security SAS was formerly known as Morpho SA and changed its name to Safran Identity and Security SAS in May 2016. The company was founded in 1924 and is based in Issy-les-Moulineaux, France with subsidiaries and branches in France and internationally. Safran Identity and Security operates as a subsidiary of Safran SA.

During the presentation at DrishtiCon, Safran showcased its product Mestafusion. The main topic of their presentation was driver behavior monitoring an enforcement solution.

It is a highly sophisticated device that would bring about a revolutionary change to the security services. The product is enabled with a wide range of features, such as long range tracking capability up to 200 meters, multilane monitoring up to 8 lanes, 24 GHz Large beam Doppler tracker record, Multi-target including enhanced separation capability for cluster of vehicles, high resolution picture up to 36 megapixels and advanced trajectory analysis. Further Mestafusion has the ability to make illegal number plate detection of all types of vehicles it can make video recording of offences and do online streaming. Moreover, it is empowered with Automatic real time data transmission for speed monitoring by vehicle type, tailgating detection and illegal overtaking detection services.

Operating in approaching or receding or advancing mode, monitoring of low speed vehicles, detection of offences related to seatbelt and cell phone usage are some other features that makes the device a unique system.

As it is empowered with automatic number plate recognition, detection of vehicles of interest, speed on red light and green light ‘offence detection’, Illegal right turn or left turn detection Mestafusion would be a great help to the safety and security of the public. Mestafusion is basically a driver behavior monitoring and enforcement solution.

D. Enterprise Solutions

Providing technological solutions to Multinationals, SMEs and start-ups worldwide, Enterprise Solutions has its operation centers in India and USA. It is a 25+ year old Indian Company of technocrats with strong foot print in India and SEA. The main focus of the company is in Enterprise Mobility space where more than 60% Engineers focused on creating Mobility Solutions.

Prime Solutions Delivered:

- Centralized Emergency Response System
- e-Challan - Police/Transport Dept.
- Real Time Tracking & Monitoring-GPS
- Door Step Services for Citizens
- RFID based Asset Tracking
- Digital Medical Records
- Solid Waste Management GPS & RFID
- E-Challan System has been implemented at State Traffic Police and Transport Dept. Bhopal, Indore and Jharkhand Traffic Police
- Centralized Emergency Response System: Madhya Pradesh, Uttar Pradesh and Jharkhand Police:
  - A 3-part solution on Vehicle Computer mounted in police car.
  - Distress call help ticket is sent to VC.
  - GIS Map assists policeman to reach on location where public distress call is made and help needed.
  - Policeman makes report and takes images at the scene, and uses the VC to send completed report to the police station via 3G.
- Face Detection & Recognition System
  - Face detection & recognition system (FDRS) is a physical characteristics recognition technology using inherent physiological features of human for ID recognition.
  - There are two general applications of FDRS, one is called Identification & another one is called verification.
  - Face IDENTIFICATION means given a face image, we want the system to tell who he/she is or the most probable identification.
  - Face VERIFICATION means given a face image & a guess of the identification, we want the system to tell true or false about the guess.

Applications for Government Use
- Law Enforcement: - Minimizing victim trauma by verifying Identity for court records.
- Security/ Counterterrorism: - Access control & comparing images to identify terrorists.
- Immigration: - Rapid progression through customs.
- Voter Verification: - Where eligible politician is required to verify their identity. This is
intended to stop proxy voting, where the vote may not go as expected.

Application for Commercial Use

- Physical access control of Building and restricted areas.

- Banking with ATM

- Attendance & HR Management: The concept of digital identity

- Seamless, paper-free movement through an airport
  - Enrolment
  - Verify identity of passenger using AADHAAR card and fingerprint or passport.
  - Create biometric token using facial recognition.
  - Add additional documents if required.

d. IDEMIA

IDEMIA is the global leader in Augmented Identity for an increasingly digital world, with the ambition to empower citizens and consumers alike to interact, pay, connect, travel and vote in ways that are now possible in a connected environment.

Securing our identity has become mission critical in the world we live in today. By standing for Augmented Identity, we reinvent the way we think, produce, use and protect this asset, whether for individuals or for objects.

In their presentation they talked about the possibility of using their products in enabling the safety and security of a citizen-

They offer-

1. A comprehensive offer fulfilling market needs for Terminals

2. Automated Fingerprint Identification System (AFIS)--MorphoBIS is an innovative Automated Biometric Identification System that contributes to identify suspects and criminals in real-time. The MorphoBIS database is capable of managing and storing large amounts of data such as fingerprints, latent fingerprints, palm prints, latent palm prints, face, iris.

3. Road Safety

4. Morpho video investigator (MVI)

5. MVI Solution for Image & Video Analytics- Morpho Video Investigator (MVI) is a software dedicated to the « post- event » and "live" video analysis.

Features of MVI:

- Enables a biometric search by suspect face and license plate search by character count.

- It tracks the movements of person, unauthorized access.
• Matches facial images irrespective of age differences.
• Analytics help classify detection on the basis of gender, age, body color, license plates by character.
• Select and search a particular area of crime rather than searching the whole area.
• Analytics helps in re-identification and finding relations between persons/suspects.

Benefits to users:
• Automatic video analysis, sorting out elements of interest
• Direct focus of experts on interesting sequences
• Can analyze more video or photo material with same effort, can solve more cases
• Reduces the risk of missing the clues
• Proven reduction of workload by 3-4 times
• Multiple analysts can work on the same video in parallel and series

E. Kritikal

Vehant Technologies formerly {KritiKal SecureScan (KSS)) is a pioneer in indigenously developed Physical Security, Surveillance and Traffic Monitoring Systems. The company designs and develops state of the art products and solutions to meet the demands for global standards, keeping track with continuously changing technology. KritiKal SecureScan is the leading manufacturer of Under Vehicle Scanning Systems (UVSS) in India and catering to the requirements of all verticals. KSS designed & developed a range of increasingly integrated security and monitoring products to create complete solution stack, tailored to individual requirements. It develops products and solutions in the vehicle security & inspection domain.

The products of Kritikal are as follows:
• Automatic Number Plate Recognition
• TrafficMon – Red Light Violation Detection System
• VehiScan – Automated Number Plate Recognition
• TrafficMon - Speed Violation Detection System
• No Helmet - Speed Violation Detection System
• TrafScan - Vehicle Detection Camera
• TrafficVios – E-Challan System
• Engineering
Adaptive Traffic Signaling:

Using this Module, the existing RLVD system is capable of observing the movement of vehicle on traffic junction and based on the same, it triggers the traffic light controller to adjust the timing of traffic lights.

Kritikal emphasized on Minimal Hardware Maximum Analytic. The products would enhance the emergency policing system as their products like evidence camera is complemented with-

- Stop Line violation detection
- Red light Violation detection
- Over speed detection
- No Helmet detection
- Wrong Direction movement

Hot listed / wanted vehicle alert and also this module can provide data for adaptive signaling.

e. Maxworth

Maxworth is a 25+ year old Indian Company of technocrats with strong foot print in India and SEA. It is a company that focuses in Enterprise Mobility space where a team of engineers creates Mobility solutions. It delivers services to a wide range of industries, including Aviation, E-governance, healthcare, hospitality, retail, telecom, field mobility and manufacturing.

Their presentation focused on the services provided by the company which include:

- Centralized Emergency Response System
- e-Challan - Police/Transport Dept.
- Real Time Tracking & Monitoring—GPS
- Door Step Services for Citizens
- RFID based Asset Tracking
- Digital Medical Records
- Solid Waste Management GPS & RFID

Maxworth presented an elaborative discussion on the benefits of introducing e-challan, digital medical records and RFID based technique. While emphasizing on the use of technology on the emergency response system, it quoted examples of Centralized Emergency Response
System which are already in vogue at the states of Madhya Pradesh, Uttar Pradesh and Jharkhand Police. An emergency response system can be beneficial in the following ways:

- Photo and Data capture on the spot
- Regular Update
- Increased Productivity.
- Real Time location display of PCR
- Officer’s Accountability

Maxworth Solution leverages the strengths of portable data collection systems and the ability to integrate virtually any data to allow full traceability, analysis and reporting. Another innovative technology Maxworth talks about is facial recognition which is basically a technology capable of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from a given image with faces within a database. The whole presentation emphasized the use of technology in effective emergency response system.

f. Bosch

Bosch empowers you to build a safer and more secure world. Bosch offers a complete range of safety, security and communication products and systems.

Protecting lives, buildings and assets is their aim. The product portfolio includes video surveillance, intrusion detection, fire detection and voice evacuation systems as well as access control and management systems. Professional audio and conference systems for communication of voice, sound and music complete the range. Their products also include:

- Energy and Building Technology
- Mobility Solutions
- Industrial Technology
- Consumer Goods
- Security and Safety Systems

The presentation displayed by Bosch during the day long conference on CCTV surveillance was basically on their video system that encompasses the complete value chain of video surveillance. They highlighted on the application, benefit and special features of their products. As per the specification mentioned, Intelligent Video Systems enable you to focus on relevant information, lower storage requirements and network strain, and help quickly
retrieve the correct information. It can Detect, Notify, Confirm and Act.

Solution Benefits provided by their product includes:

- High quality imaging technologies like 4k ultra HD and starlight
- Intelligent bitrate management
- Highest data security measures

Advantages:

- The advantages of using Bosch security system are as follows:

  - Easily distinguish individuals or objects, even at extreme low light levels, regardless of object movement
  - Reduce bitrate up to 80% and save storage costs without compromising video quality
  - Integrated hardware and software measures to keep video data secure, such as a built in trusted platform module
  - As the number of network video cameras grows, the amount of data grows

Bosch Security Systems has the capability to classify objects based on the position, conditions of size, speed, aspect ratio and shape.

The range of products displayed includes:

- IP 4000i, IP 5000i, IP 6000i
- 4K Ultra HD Camera
- Built-in Intelligent Video Analytics to trigger relevant alerts and quickly retrieve data
- Fixed Camera – Box Type C/CS Mount - NBN-63023-B
- Fixed Camera – Outdoor Mount- UHO-HBGS-51
- Fixed Camera – Illumination - IIR-50850-SR
- Autodome IP moving cameras give the ability to locate, track and zoom in on objects quickly and easily.
- Autodome IP moving Cameras Housing- Withstand extreme weather conditions.
- Built to perform in the most extreme environments MIC 7000i.
- Thermal Imaging Cameras.
- Bosch Security Systems – Video Systems
- Divar AN/ Hybrid/ Network, Recording and Video Management, Enterprise Storage.
g. Choate Technologies LLP

Choate Technologies LLP is a Limited Liability Partnership firm incorporated on 16 November 2017. It is registered at Registrar of Companies, Delhi. Designated Partners of Choate Technologies LLP are Tripathi Ajay Kumar and Tripathi Shailee. Main Business Activity of Choate Technologies LLP is "Computer and related activities".

During the presentation at DrishtiCon, they have elaborately discussed about PaAS2, which is an innovative user-friendly device that provides effective security to passengers in emergency, such as accident, forced entry and criminal activity in a car. Built in smart CVCW (changed vehicle coordinates warning) system prevents vehicle theft and gives accident alert.

Their innovative technology is indigenous and is based on the needs of the Indian scenario. Innovative features of the device include:

- No Video/Audio transmitted unless SOS activated
- SOS button Push, Stress calls above certain pitch, No Video Feed, Accident
- A small clip when ride starts and stops sent to the Security Center
- Built in GPS (inaccessible to driver)
- Driver/Passenger must authenticate himself/herself before starting
- Loud Siren and warning display when SOS activated

They acknowledged that they have already put up a proposal to introduce this device in the cars of various manufacturers.

While taking about the product they highlighted the following benefits of using their products:

- PaAS2 will help curb incessant incidents of misbehavior with women in cabs. Private vehicle owners can also install PaAS2 and secure their family.
- The device employs innovative vehicle theft protection mechanism. Car owner gets prompt alert when vehicle moves. Vehicle can be easily tracked using PaAS2 GPS.
- With PaAS2 installed in every passenger car City Traffic Dept. can do better traffic planning monitoring movement of vehicles in any area and reducing carbon footprint.
- PaAS2 alerts security center in case of accident with location and map. Immediate medical help can be provided to save lives.
- Customized version for school buses can be used to track every activity. AI can be incorporated to raise SOS automatically.
- Thousands of new jobs will be created and tax collection will increase
Further they also said how it could help to improve the image of the police among the citizens. The device would enable Real time patrolling video footage and field evidence recording. Also it would help in Automatic Toll collection at Toll gates for PaAS2 fitted vehicles. It saves commuters time, fuel and reduces congestion, Digital/paperless drive. PaAS2 can access Manufacturing date/PUC & Insurance expiry date/Registration certificate & other relevant details from DigiLocker. Traffic police can verify a car’s credentials without checking physical papers from their own mobile and Increase revenue and decrease carbon footprint by employing odd-even scheme. PaAS2 will automatically debit applicable fee from car owner’s bank account in case an odd numbered car is driven on an even day and vice versa.

h. Forensic Guru

Based in Delhi, with its headquarters at New Jersey, Forensic Guru (Foundation Futuristic Technologies (P) Limited) is an acknowledged market leader, credited with practically creating the computer forensic domain in India single-handedly. Developed globally accepted cutting edge solutions for law enforcement & the financial regulatory sector. It offers globally acclaimed solutions portfolio for digital investigation products, world class training and consulting. Its clients include Homeland Security, Law Enforcement, Digital forensics and Fraud Investigations, BFSI Fraud, Compliance & Investigations.

The presentation of Foundation Futuristic Technologies (P) Limited was about Image & Video Enhancement & Authentication from a Policing Perspective.
Chapter 4. Closing Session

The DrishtiCon conference saw a rousing finale. Shri Suresh Khanna, Hon'ble Cabinet Minister for Parliamentary Affairs, Urban Development, Overall Urban Development, Urban Employment and Poverty Alleviation, Government of Uttar Pradesh, graced the closing ceremony. He emphasized on the importance of technology in improving the state infrastructure and life-style of the citizens. He also opined that technologically updated sectors should share their knowledge and skill so that other departments could work on it for the overall development of the state.

Officials from police department gave their valuable inputs on functionality of emergency services and surveillance at the closing ceremony. Shri R.K Vishwakarma Addl. Director General, PAC discussed the need for integration of disaster management, fire and emergency services. He also emphasized the need for efficient funding for the deployment of surveillance tools to ensure successful roll-out of the project.

Shri Yatindra Naik, DGM (Technical) Ahmedabad Smart City, who was also present on the occasion, threw light on the challenges that he and his team had faced during roll out of the project.

The DrishtiCon conference concluded with a vote of thanks by Shri Aditya Mishra, ADG, UP100. Shri Mishra said that every effort would be made to ensure that cameras adhered to a single standard in the future.

The DrishtiCon conference made it amply clear that CCTV cameras are quickly becoming an integral part of security. The existing CCTV cameras have managed to reduce the work pressure for police personnel, but there is an urgent need for upgrading existing technology. The conference also emphasized the need for integrating technological advancements with the present system so that the state's emergency response services can become more potent.

An integrated, technologically advanced surveillance system will be a win-win for all the stakeholders as this will not only enable real-time processing of data but will also save time and resources for the state security personnel. The conference officially concluded with the hope that the deliberative technology-display and networking would have added much clarity to the envisaged future course of actions of participating stakeholders—and that this would lead to safer societies.
Chapter 5. Learnings

DrishtiCon was an eye-opener in several ways. It provided many crucial learnings and insights into the technology, policy and the economics of CCTV Camera Surveillance. Some of the key takeaways are listed below:

On Technology

➢ Technology is one of the major trends that is going to affect public service delivery. Citizens are going to ask governments to do more, do better and to do it at no extra cost.

➢ Integration is the key. The government departments should stop working in silos and start synergizing their technologies e.g., Smart Cities, Safe Cities and UP100 should have a single command and control when it comes to emergency management.

➢ Smart cameras now adapt to ambient conditions for better pictures and use compression formats that reduce file size while keeping 4k quality. They also have AI built into them. Other AI Software use machine learning, deep learning and neural networks to analyze video and generate crowd alerts, wire tripping, ANPR and RLVD compliance, heat sensing, facial recognition, presence or absence sensing, intelligent traffic management, etc. The need is to spread awareness and understand that in the long run, one good camera may do things at a cost lower than several ordinary cameras.

➢ Protocols need to be standardized for better inter-operability, so that the public can easily plug into an emergency response network. ONVIF and PSIA are currently the two most popular protocols. However, claims of complying to these two standards in full need to be carefully verified.

➢ Transmission of the huge amount of data generated by cameras will be a major challenge. Smarter network architecture, more efficient protocols, preliminary-screening analysis at the edge, use of fewer frames for analysis and cheaper data regime will reduce costs in the long run.

➢ There's a need to leverage the power of cloud-based technologies to deal with the problem of managing mammoth amounts of data generated every day and strengthening predictive analysis capabilities.
On Policy/Regulation

> India has a draft Data Security Policy that is being finalized. We need a policy that is less restrictive than European GDPR and more specific than the American laissez-faire so that our development is data-enabled while also addressing privacy concerns. In the UT of Delhi, a committee has been formed to examine data privacy issues related to CCTV cameras.

On Economics of CCTV Surveillance

> Several models of community-based video surveillance are currently being tried. Raipur has a model where, in addition to the smart city cameras, commercial establishments have been urged to install some for public areas, too. In Telangana, which has a law making it compulsory to install CCTV cameras in public places, augmentation is done through the funds of elected representatives. Corporates do CSR by providing cameras and network equipment. The Police spends only maintenance funds, and a AMC is awarded through tender. A third model, which telecom operators proposed, was a subscription-based model. In this, per-camera charges could be levied by companies, who would carry, manage and analyze data and share it with the customer, as well as law enforcement agencies. This last model could be more effective, if there was a legislative obligation to install cameras.

> A local cable operator of Lucknow (Sikka cables) offered that they would be happy to offer their bandwidth for any exercise that would add to the safety and security of the city.
DrishtiCon Feedback
A. Panel Discussions

Session 1: Advanced Video Analytics and Standardization of Surveillance Camera Protocols

Profile of speakers

- Excellent (%)
- Very Good (%)
- Good (%)

Quality of content

- Excellent (%)
- Very Good (%)
- Good (%)

Time management

- Excellent (%)
- Very Good (%)
- Good (%)

Insights gained

- Excellent (%)
- Very Good (%)
- Good (%)

14
44
42
14
40
46
18
34
14
48
30
14
56
50
48
Session 2: Networking with Emergency Response/Enforcement Agencies and Data Security

Profile of speakers

- Excellent (%): 40
- Very Good (%): 12
- Good (%): 48

Quality of content

- Excellent (%): 30
- Very Good (%): 58
- Good (%): 12

Time management

- Excellent (%): 20
- Very Good (%): 18
- Good (%): 62

Insights Gained

- Excellent (%): 32
- Very Good (%): 14
- Good (%): 54
Session 3: Sustainable Finance Models for Community Video Surveillance and Success Stories

Profile of speakers

- Excellent (%)
- Very Good (%)
- Good (%)

Quality of content

- Excellent (%)
- Very Good (%)
- Good (%)

Time management

- Excellent (%)
- Very Good (%)
- Good (%)

Insights gained

- Excellent (%)
- Very Good (%)
- Good (%)
B. Exhibition

Layout of the stalls

- Excellent (%): 34
- Very Good (%): 14
- Good (%): 52

Quality of exhibitors

- Excellent (%): 38
- Very Good (%): 18
- Good (%): 44

Relevance of products displayed

- Excellent (%): 36
- Very Good (%): 12
- Good (%): 52

Display of cutting edge technology

- Excellent (%): 38
- Very Good (%): 14
- Good (%): 48
C. Innovation Theatre

Quality of participants

- Excellent (%) 42
- Very Good (%) 18
- Good (%) 40

Relevance of presentations

- Excellent (%) 48
- Very Good (%) 12
- Good (%) 40

Insights into cutting edge technologies

- Excellent (%) 42
- Very Good (%) 18
- Good (%) 40

Time management

- Excellent (%) 64
- Very Good (%) 28
- Good (%) 8
D. Conference Management

Registration Process
- Excellent (%)
- Very Good (%)
- Good (%)

Food Arrangements
- Excellent (%)
- Very Good (%)
- Good (%)

Overall Arrangements
- Excellent (%)
- Very Good (%)
- Good (%)

Graph percentages:
- Registration Process: 72% Excellent, 20% Very Good, 8% Good
- Food Arrangements: 64% Excellent, 24% Very Good, 12% Good
- Overall Arrangements: 64% Excellent, 28% Very Good, 8% Good