City Surveillance Grid Management

Recommendations for Long-Term Surveillance Efficiency in Metropolitan Police Jurisdictions

1 Background

You might be living in a city with a million cameras, but when a serious crime is reported from a crime prone area, there is a very high probability that the vicinity is either not covered by cameras or the installed cameras are not working. Such scenarios unfold mostly owing to the absence of a documented city surveillance grid management policy. In this blog, I am sharing the components that should be factored in by decision makers while deciding to instal surveillance equipment in their cities.

2 Introduction

The evolution of surveillance in urban policing reflects the shift from isolated enforcement activities to coordinated, technology-driven oversight. This paper, drawing from operational insights in the tri-commissionerate zone of Hyderabad, Cyberabad and Rachakonda (which forms the Greater Hyderabad region), proposes a robust, replicable model of surveillance grid management for urban police organizations.

3 Surveillance: Concept and Historical Basis

The term "surveillance" originates from the French word *surveiller* — "to watch over." Historically, it was deeply tied to policing marketplaces and ensuring civic discipline. It comes from the French verb surveiller '

It also comprised from the start the complementary notion of watching over oneself and one's own behavior. ' Surveillance' is first attested in 1768, in an article (in the economic journal Ephémérides du citoyen) pertaining to the role of the police in marketplaces, drawing together individuals and the state, public and private interests, law and law enforcement

Surveillance refers thus to "any collection and processing of personal data, whether identifiable or not, for the purposes of influencing or managing those whose data have been garnered" (Lyon 2001).

Surveillance can be thus understood a consequence of processes of modernity (Giddens 1985) and has become an inherent part of our network societies (Castells 2001).

4 Technological Enablers and City-Level Constraints

The operational success of a City Surveillance Grid hinges not just on organizational design but on the intelligent deployment of enabling technologies. Below is a consolidated table presenting four critical technology pillars, their core functions, resource demands, and the practical bottlenecks encountered at the city level.

5 Technology Integration Matrix

Technology	Main Function	Key Resources Required	City-Level Issues
Multi-Service Integration	Integration of existing surveillance and communication subsystems	- Access control mechanisms - Data signalling - Media transmission - Application layer integration	- Infrastructural network gaps - Bandwidth constraints - Internet provider limitations
Large Sensor Populations	Streamlining & conversion of sensor feedback from disparate sources	- Parsing tools - Format conversion engines - Data storage & configuration frameworks	- Non-cooperative device behaviors - Legacy system integration issues
Rule-Based Coordination	Automation of actions through IoT-based security rules	- Predefined action protocols - Synchronization logic for subsystems	- Conflicts between subsystems and commands from police/emergency services
Visualized Command & Dispatch	Real-time graphical rendering of incidents and impact areas	- GIS tools - 2D/3D graphical mapping for emergency response	- Processing load on operator consoles - Real-time data visualization bandwidth

6 TENETS OF A BASIC CAMERA STRATEGY

A legally compliant and ethically grounded surveillance strategy must adhere to the following:

Camera Deployment Checklist

Criteria	Requirement
Public Scrutiny	Must be transparent and open
Governmental Backing	Essential for credibility and sustainability
Public Space Use	Cameras only in non-private areas
Legal Compliance	Must adhere to the Surveillance Camera Code of Practice
Privacy	Safeguards for individual rights mandatory
Safety Contribution	Should directly enhance citizen safety

7 THE SURVEILLANCE ECOSYSTEM

Modern surveillance includes a network of:

- CCTV feeds (including ANPR, FRT, Object Recognition)
- Body-worn cameras
- Vehicle-mounted mobile cameras
- Drones and UAVs

8 COMPONENTS OF A STRATEGIC SURVEILLANCE VISION

Component	Description / Purpose
Standards and Certification	Define minimum technical, legal, and quality benchmarks for surveillance assets and systems.
Standardization of Data Specs	Establish uniform data formats to ensure seamless integration across platforms and jurisdictions.
Deciding on Data Access Protocols	Clarify who can access what data, under what circumstances, and through which authorization channels.

Foreign Nation Dependence on Surveillance Assets & Technology Monitoring	Monitor and reduce critical dependencies on non-domestic surveillance vendors and solutions.
Public and Private Footage Sourcing Strategy and Framework	Integrate CCTV and other surveillance data from both public infrastructure and private entities securely.
Horizon Scanning for Emerging Trends and Disruptions	Proactively identify new threats, technologies, or disruptions that may affect surveillance capabilities.
Continuous Civil Engagement	Ensure that citizens are aware, engaged, and have feedback mechanisms for surveillance deployment.
Convergence of Agendas	Align interests and activities of: – Police – Local Authorities – Voluntary Adopters (e.g., RWAs, business groups)
Critical National Infrastructure Safeguarding	Extend surveillance protection to sensitive physical assets such as power grids, airports, and data centers.
Installers, Designers, and Manufacturers on One Table	Enable regular consultations to drive innovation, resolve field issues, and align design with policing needs.
Training	Build capabilities across all user groups—from constables to command-level officers—in surveillance tech and ethics.
Regulation	Enforce legal oversight on data use, privacy, operational protocols, and inter-agency responsibilities.
Annual and Long-term Budgeting and Expense Allocations	Create sustainable, forward-looking fiscal plans for technology refresh, repairs, staffing, and innovation.

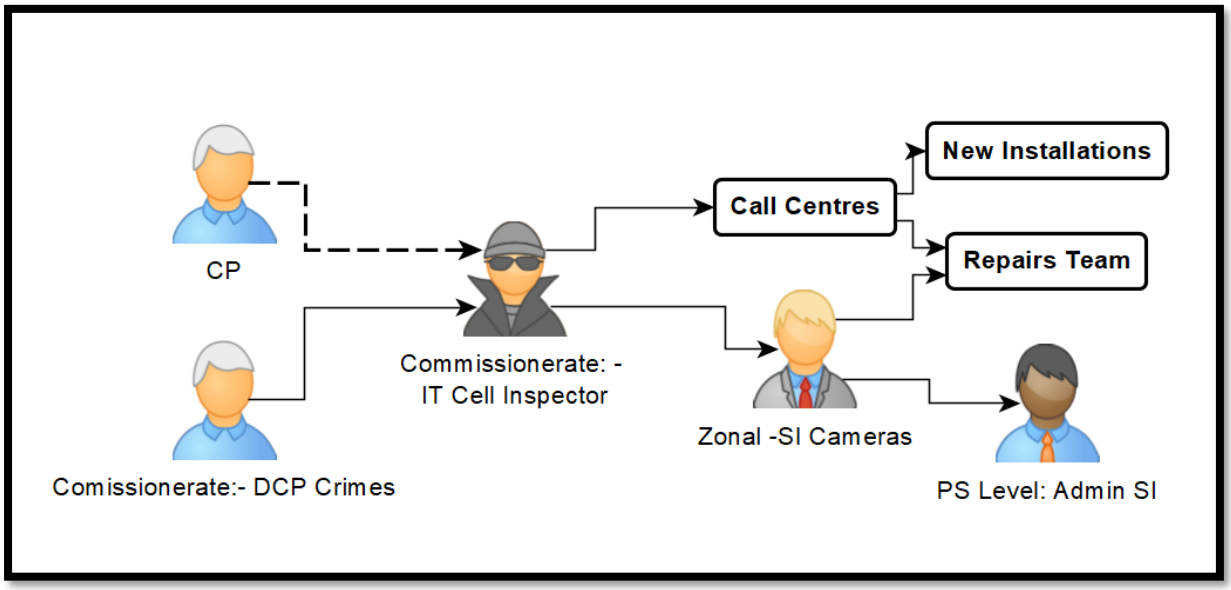
9 In-house Surveillance Artifacts Maintenance and Monitoring:

9.1 Key Recommendations

To reduce dependency on third party players, it is recommended that the Police Organisation itself have a core Technical Team for Surveillance Asset Management (SAM). The following is suggested:

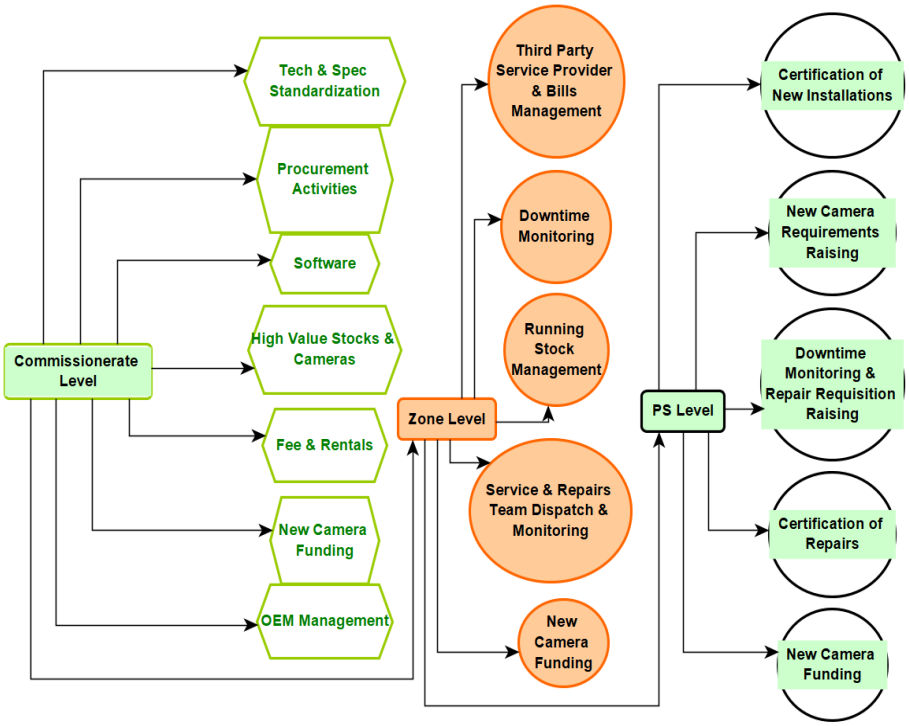
1. Creation of a Surveillance Asset Management (SAM) Corps
2. Drafting a Long-Term Surveillance Strategy [Suggested through half-day leader roundtables].
3. Transition to SAM-driven Surveillance [Moving from SHO-centric to professionalized surveillance teams.]

9.2 Organizational Structure and Governance



It is proposed that the entire Surveillance Grid will be in the charge of the DCP-Crimes or equivalent officer. **However, the Call Centre Operations may be centralized in any one place for all Commissionerates**

9.3 Level Wise Roles and Responsibilities



Given below is the Unit HQ level and SDPO or Zone wise roles and responsibilities of SAM Teams recommended.

While new camera funding across various types will be uniformly shared across all levels, other key responsibility areas will be clearly demarcated

9.4 Centralized Ticketing & Repair Model

It is proposed that the entire set up of CC Camera Team / Sys Admins attached to PS etc. will all be managed and mobilized like in DIAL 100.

SLAs and KPIs will be managed, and analytics generated centrally. How the Ticketing System shall work is given in the infographic below:

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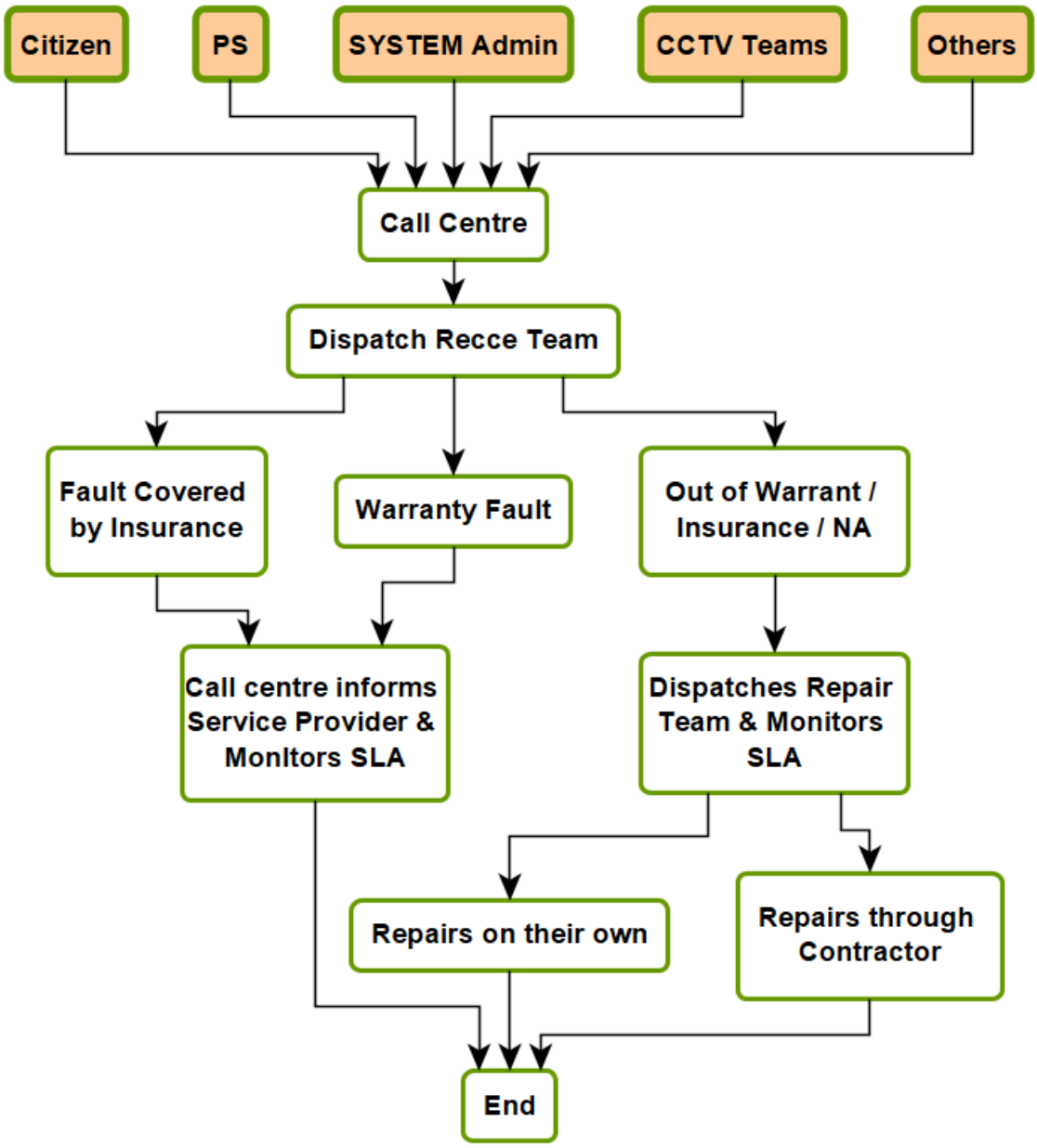
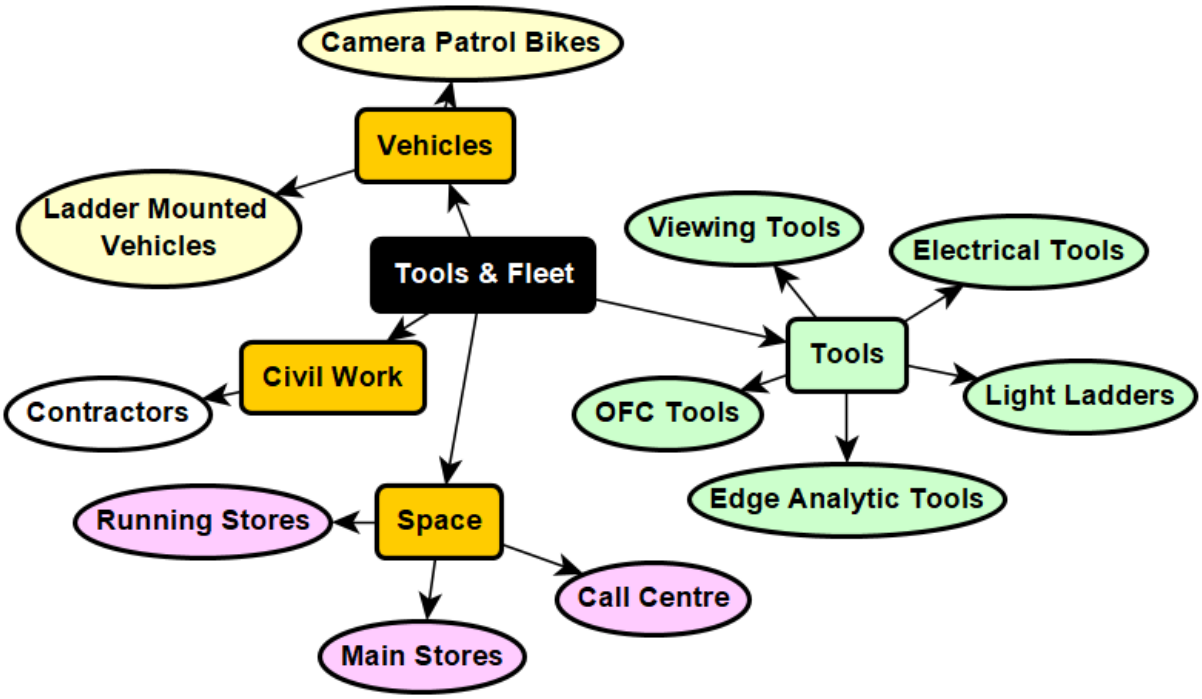


9.5 TOOLS & INFRASTRUCTURE FOR SAM TEAMS



9.6 SAM TEAM OTHER CRITICAL FUNCTIONS

The following are the ongoing critical functions of the SAM team and leadership:

- Asset Coding & Linking with DB
- Unique Pole Number-Every Pole should have a easily identifiable pole number.
- Unique Camera Number
- Code based Classification & Warranty Management-Camera Code based or Mac ID based Classification & Warranty Management
- Adopt a Camera Scheme
- Programmes to be run to Fund Surveillance Infra
- Research & Studies Tie Ups for horizon scanning. Should include:
- Cost reduction strategies
- Surveillance Grid Efficacy Studies
- SOP and current Protocols Efficacy Study

- Full Time Marketing Team to generate funds for camera operations
    - CSR Fund Mobilization
    - Scheme Fund Mobilization
    - Direct Citizen Donations

10 CAMERA DEPLOYMENT PRIORITIZATION

On the matter of where all should a camera be placed and how to prioritize repair and installation of the same, the following table may be considered:

Location Checklist

Location Type	Explanation
Probability of Traffic Offence Locations	Intersections or stretches known for frequent signal jumping, wrong-side driving, or rash behavior that need regulatory oversight.
Under Policed Localities	Areas lacking physical police presence or patrol coverage; surveillance bridges the enforcement gap.
Probable Mischief Areas	Regions vulnerable to public nuisance, youth gathering spots, or previous records of disturbances.
Crime Hotspots	Identified based on FIR density, repeat crimes, or intelligence inputs. High priority for live monitoring and forensic tracing.
Accident Hotspots	Junctions or roads with recurring fatal/non-fatal traffic accidents, where cameras help with evidence and prevention.
Special Temporary Surveillance Areas	Event zones, rallies, protests, festivals, or temporary installations requiring dynamic surveillance deployment.
VIP Routes	Pre-designated paths used by VIPs that require continuous monitoring for threat interception and traffic regulation.
Sensitive Installations	Includes power stations, data centers, public utilities, and government buildings, which need 24x7 perimeter surveillance.
VIP Residence Locations	Residential areas of dignitaries and high-risk individuals requiring added layers of security and access tracking.
Educational Institutions	Schools and colleges, especially those with public access roads, ensuring child/youth safety and incident logging.
Police Stations	Entry-exit and peripheral coverage at police stations enhances both internal accountability and perimeter security.
Border Crossings	City or district borders where vehicle/people movement needs to be recorded and flagged for inter-jurisdictional crimes.
Freeways and Express Ways	High-speed corridors prone to overspeeding and pileups. Surveillance enables violation detection and emergency response.
Commutation and Transit Locations	Bus terminals, metro stations, public transport junctions requiring crowd monitoring and safety assurance.
Tourist Interest Places	Temples, monuments, parks, etc., vulnerable to overcrowding, pickpocketing, and terror threats during peak hours.
Vantage Views	High-rise or crossroad viewpoints offering maximum visibility to track multiple entry-exit zones from one position.

11 Operational Challenges with CCTV Cameras

Technical Committees and Procurement Teams should be aware of the challenges that CC TV Cameras pose and take preventative measures to ensure that police department is not saddled with poor quality cameras. Some issues are as given below:

Issue Category	Description / Observation
Camera Angle	The evidence may be missed because it is outside the camera's field of view.
PTZ Guard Tour Issues	In certain scenarios, **panoramic cameras** provide better and consistent coverage than PTZ (Pan-Tilt-Zoom) models with programmed guard tours.
Analog Cameras	Tend to deliver **low-resolution, grainy footage** that may not be suitable for forensic use.
Frame Rate	For capturing smooth movement, the **minimum frame rate** should be above **25 FPS**.
White Screen Issues	Caused by factors such as:– **IR Illumination problems**– **Voltage fluctuations**– Solution: adopt **True Night Vision (NV)** technology.
Timestamp Issues	Misalignment or absence of time data can be resolved using **VMS systems with automatic watermarking**.
Spider & Other Things	Includes:– Poor camera focus– Dirty glass or lens– Cobwebs or insects– Faulty cabling– No footage due to storage errors– Vandalism or physical tampering

12 Conclusion

For police organizations aiming to modernize surveillance infrastructure, working on a City/ State Surveillance Strategy will result in clarity, long term savings and greater crime solving efficiencies.

The integration of a Surveillance Asset Management Corps, coupled with centralized repair protocols, funding strategies, and deployment prioritization, ensures a scalable approach for future-ready urban policing.

Contact GFI for support in planning your city surveillance stratregy now.
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