

# Synopsis of System Integrator for Implementation of Smart City Solutions

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One of the objectives is to apply Smart Solutions in order to make infrastructure and services better (Guideline 2.3). Moreover, solutions services contracts should be used instead of hardware procurement contract only and generic specifications should be used (Annexure 4; criteria 4.1,4,a). In order to fulfill the conditions prescribed by the Guidelines, Smart Command & Control Centres should have the following elements.

### **Component 1: City back bone Network**

- It is proposed to have a dedicated, fail-safe and secure fiber network backbone to be established across the city.
- The network will connect to State data centres and control / Monitoring centers.
- The City network will meet demands of bandwidth needs for all smart city components.
- The solution will easily integrate with Wi-Fi system that will be connected on the same backbone infrastructure.
- It will bring together different city management on a single foundational network infrastructure.
- Two options have been suggested for the city to obtain such network:
  - Creating a fresh network in the city
  - Leasing out through the existing telecom service provider/s without diluting the need of being dedicated, fail-safe and secure fiber network backbone.
- Both these option can be explored based on:
  - Economy of scale
  - Current infra availability in the particular city,
  - Starting with Option (b) for pilot phase and slowly migrating into owned network as no. of smart city components increases.
- In case of Owned network, the city can explore monetization of the network so created, by leasing out the bandwidth/ dark fiber to other service providers.

## Component 2: City Wi-Fi

- With a high demand for digital connectivity “on the move”, there is an increasing demand for public Wi-Fi services to be made widely available.
- It is proposed to provide public Wi-Fi services at identified locations across the city, like Market Places, Government Offices, Recreation Spots, parks & lakes, Holy places etc.
- Citywide public Wi-Fi will leverage City Network Backbone, which would be made available across identified city Wi-Fi Locations over high-speed fiber network.
- The City Wi-Fi network will be manageable (to prioritize where coverage will start and expand) from a central location at City operations center.
- All users will get access to only those services for which they are authorized and will be able to manage their account on the self-service portal.
- There will be a central authentication and Billing system in-built in the system and the monitoring of the same will also be with the city.
- The proposed Wi-Fi system will be scalable and allow future expansions in terms of increased user density and geographical coverage.
- The system will support user authentication and one time OTP based registration.
- Once the complete solution is implemented, the entire key services available for citizens can be catered using City Wi-Fi access.
- The City Wi-Fi system implemented will ensure all compliance with Regulatory and Legal guidelines issued by authorities such as:
  - Department of Telecommunications (DoT)
  - TRAI and Government of India issued from time to time.
- Citizen can incorporate on-line payment gateway system to automate the payment collection for additional service usage.

### Component 3: City Surveillance

- Protecting citizens and ensuring public safety of **women, children and the elderly** is one of the top most priorities for a smart city. CCTV based video surveillance is a security enabler to ensure public safety.
- It is proposed to implement a city wide Surveillance System to monitor and manage the events.
- The proposed system will comprise Surveillance system (Pan-tilt-zoom camera, Fixed Box Camera, Dome Cameras, Thermal Camera) infrastructure at identified places in the city.
- The surveillance system application includes:
  - a. Video Management System (VMS)
  - b. Video Analytics (VA)
  - c. Red Light Violation Detection (RLVD) System
  - d. Automatic Number Plate Recognition (ANPR) System
  - e. Facial Recognition System (FRS)
  - f. Integrated Operation Platform (IOP)
- The proposed system will leverage City Network Backbone infrastructure being created for City.
- The system will include state of the art command control center and city operation center.
- The system will be equipped with software which will incorporates online video analytics on live video images.
- The proposed City Surveillance System will also provision for seamless integration with other government databases like Vaahan, Sarathi, Dial 100, e-challan etc. as and when they are available from respective agencies.
- By implementing an integrated, Digital City surveillance system, the city will have the real-time insights and information that can help in terms of:
  - a. Effectively protect citizens and property
  - b. Enhance city's image
  - c. Deter vandals and reduce reparation costs
  - d. Reduce criminal investigation times by providing clear, high quality images

## Component 4: Smart lighting

- The Streetlights that are currently installed across the city are proposed to be replaced with Smart LED streetlights/ floodlights and are to be integrated with Smart Light System due to their operational and management limitations.
- It is proposed to implement an energy efficient LED based Street Light System & ambient light sensors along with Smart controllers.
- The proposed smart lighting operation management system will have the provision for:
  - a. Individual switch on/off, increase/decrease luminosity as per ground situation
  - b. Policy based Operation example: set up policies like light up alternate lights during low traffic density, increase the luminosity of the lights as per the dullness of the day lights
  - c. Real time status of the Smart Lighting System on a city map
  - d. Automatically switched on /off on the basis of lux level.
  - e. Amount of electricity used in street lighting and information about the amount of natural lux levels and that created by the streetlights on a 24 X 7 basis. It will help the city for allocating the amount of power required for streetlights.

## Component 5: ICT Enabled Solid Waste Management

- It is proposed to implement a GIS/GPS enabled Solid Waste Management System within the city. The proposed system will help ensuring complete coverage of door to door and community collections served by vehicles in an effective and efficient way.
- The proposed ICT based Solid Waste Management System will have the following features:
  - a. GPS tracking of the waste pick up vehicle for real time tracking
  - b. Route Optimization which will help in reduction of trip time, fuel saving and serving more locations
  - c. Manage routes and vehicles dynamically through an automated system
  - d. Efficient monitoring and management of waste collection bins
  - e. Attendance Management System - Field Staff
  - f. Ensure complete coverage of door to door and community collections served by vehicles
  - g. Monitor and track other municipal corporation vehicles under Solid Waste Management Dept.
  - h. Record history of vehicle routes, attended sites and other details
  - i. RFID devices with vehicle and RFID tagging of Bin to ensure serving by requisite vehicle
  - j. Weight & Volume Sensor based bin to indicate maximum utilization status and trigger vehicle pick up
  - k. Alert / Alarm management - Real time management of missed garbage collection points
  - l. Monitoring & Reporting Application - reports of vehicles, garbage collection status, bin status etc.

## Component 6: Smart Traffic

- It is proposed to implement a Smart Traffic Management System within the existing landscape to:
  - a. Automate the process of traffic management by optimally configuring the traffic junction lights on real time basis
  - b. Minimize the traffic congestions and waiting time
  - c. Centrally controlled traffic management system to ensure smooth movement of emergency services like ambulance, police etc.
  - d. Managed & coordinated VIP movements
  - e. Availability of traffic data to further analyse and optimize the traffic flow
  - f. Real Time Incident Message and Advisory Messages to citizens
  - g. Improved Traffic Regulation
- The Smart Traffic will have the following components:
  - a. Adaptive Traffic Management System to monitor and control traffic signals, including signaled pedestrian crossings, using a traffic responsive strategy based on real time traffic flow and vehicle presence information
  - b. Public Announcement System
  - c. Variable Message System
- The system will be driven by a central control system, on real time basis, with the capacity to calculate the optimal cycle times, effective green time ratios, and change intervals for all system traffic signal controllers connected to it which in turn can also work in configurable manner
- Smart traffic system will also monitor health of the traffic lights with Auto / manual mode of controller, Flash mode or normal mode, Power interruption, Intrusion in controller, Aspect monitoring of traffic lights etc.

## Component 7: Smart Parking

- The Conventional Parking has many challenges such as high parking search time, traffic congestion, poor usage of parking space, poor occupancy in parking lot, less revenue collection, violations, accidental hazards, pollution, suspicious parking / lack of security arrangements in parking, no real time tracking etc.
- In order to overcome the current challenges it is proposed to include smart parking as a component. The Smart Parking proposes the following solutions:
  - a. Mobile App to find parking space quickly and easily
  - b. Finding parking space with clear and simple directions reducing traffic Congestion
  - c. Detect parking violation in real time
  - d. Assisting user in directing to correct parking slot help in correct parking at correct slot, making optimal usage of parking space
  - e. Real time update of entry & exit of vehicle improve occupancy
  - f. Ease of payment improve collection & save time
  - g. Real time info, Smart meters, ease of payment improve parking operations
  - h. Clear, simple directions & ease in parking reduces road accidents
  - i. Improved user satisfaction by saving time, effort & cost
  - j. Less parking search time reduces emission of gases & control pollution
  - k. Provision for demand responsive parking charges
  - l. Correct detections of violations & suspicious parking/over duration parking
  - m. Availability of data & Analysis for growing need for expansion or more parking slots; subsequently required measures to handle problem



## Component 8: Environmental Sensors

- It is proposed to install smart sensors at various locations in the city to monitor the air quality and other parameters so that appropriate measures can be taken. Under the smart sensors component:
  - a. Environment sensors will be installed to display environment related information at various strategic locations through variable message system.
  - b. The environment sensors will be integrated with the central control system to capture and display/ provide feed on Temperature, Humidity, Pollutants like SoX, NoX, CoX, etc Noise Pollution, Electromagnetic Radiation, Mosquito density etc. The data it collects is location-marked.
  - c. Various environment sensors will sense the prevailing environment conditions and send the data to the integrated control system where real time data resides and the same will be made available to various other departments and applications for decision making.
  - d. The information will be relayed instantaneously to signage – large, clear, digital-display screens which let customers know regarding the prevalent environmental conditions.
  - e. The recorded data will be used by Smart Environment Mobile application to enable user for alarm management and notification of environmental details on real time basis.

## Component 9: City Bus Intelligent Transport System

- The City Bus Intelligent Transportation System will comprise of:
  - a. Vehicle Tracking System
    - Vehicle Location System
    - Passenger Information System
    - GIS information System
  - b. Operation & Management System
    - Schedule Management System
    - Integrated Depot Management with crew allocation and allied services
    - Infrastructure Management System
    - Vehicle Health Monitoring
    - Advertisement publishing and management system
  - c. Fare Collection System
    - On Board and off board ticketing System
    - Pass/ Smart Card system
  - d. Communication System
    - EPABX integration System
    - Crew Communication System
    - Advertisement and Public Announcement System
  - e. Video Surveillance System
  - f. Command Centre management and communication system
    - Integrated Command centre Management with duty allocation and allied services
    - Web based GIS map editing and GIS Map server management system
    - Display management system
    - E-mail server, voice and SMS application and management system
  - g. Green Corridor
    - Expert charging systems
    - Centralized/Decentralized transportation management systems
    - Safety systems
    - E-administrative systems
    - Emissions footprint calculator systems

## Component 10: Smart Governance and Citizen Services

- ICT in governance has been experienced in the form of E-Governance, which redefined the way Governments work, share information, engage citizens and deliver services to external and internal clients for the benefit of both government and the clients that they serve.
  - The components envisaged to be included in Smart Governance are:
    - a. Stamp Duty & Registration
    - b. Online Management Monitoring and Accounting System
    - c. Works & Account Management System
    - d. Web based Land Management System
    - e. Human Resource Management System
    - f. Virtual Museum Builder
    - g. Biometric Attendance System
    - h. Legal Management
    - i. Document Management System
  - The features under Citizen Services will include the following:
    - a. Grievance Redressal System
    - b. Universal Identity (Aadhaar)
    - c. Multi-purpose Smart card
    - d. Utility Services
    - e. Public & Digital Library
    - f. Women & Child Safety
    - g. Assistive living for differently abled
    - h. Property Tax
    - i. Registrations & Certification
    - j. License Facilities
    - k. Tourism & Heritage
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