

Safe and Secure Ahmedabad: E-challan & Sanitation Memo

Executive Summary (Brief Description of Proposal)

Smart City Ahmedabad Development Limited (SCADL) with its SASA project – Safe and Secure Ahmedabad project – aims to open a new frontier in serving the citizens by using cutting edge technologies with state-of-the-art four storied Integrated Command and Control Centre (ICCC) forming the nerve centre of information and monitoring of Ahmedabad city.

Safe and Secure Ahmedabad aims at improving the living standard of citizens, making city safer by using cutting edge technologies with over 30000 IOTs devices installed in the city which include 50 environment sensors, 1120 Solid Waste Management vehicles tracked through GPS, 600 free public Wi-Fi spots and over 6500 surveillance cameras with Automatic Number Plate Recognition and Red-Light Violation Detection facility.

Under the same project, **130 zero-tolerance junctions** are being designed in order to bring traffic discipline and any violation to same punish offenders through its **automated E-Challan system**. Ahmedabad is the first Smart City to introduce Automatic e-challan at 130 zero tolerance junctions, is unique blend of governance, where city police and municipality come together. Automatic Number Plate Recognition (ANPR) and Red Light Violation Detection (RLVD) ensure better traffic. The zero tolerance junctions dispatch automatically E-challans through its E Challan system to traffic rules violators, crowd control, criminal acts and riotous situation footages in the city which are captured and transmitted automatically to the command control center for initiating rapid action by the security forces.

Leveraging use of the same infrastructure, a stop-spitting initiative has been started by Ahmedabad Municipal Corporation. Through the use of CCTV cameras at this command and control centre under the Smart City Ahmedabad, it is being described as the first case of the country. All traffic signs and public places of the city are being examined by as many as 5000 CCTV cameras installed under the Smart City. CCTV footage being traced to the number of vehicles of those who spit on the road by taking video clips and capturing photographs. Then the memo has been prepared in the predefined format approved by Solid Waste Department of Ahmedabad Municipal Corporation, and fine is imposed.

The implementation, as a result of its use of already existing technology, has been very quick to deliver results. Since July 2018, over 29.32 lac E-Challans have been issued for Red-Light Violation (130 zero-tolerance junctions) of which over Rs. 17.09 Cr. has been collected as a result. For BRTS lane violations (32 active stations), 2756 challans were generated. For spitting, 2010 incidents have been captured so far, and offenders are recognized and grouped by vehicle category (two-wheeler, auto, truck, four-wheeler). Similarly, improvements in cleanliness will also be observed as the Stop Spitting Movement catches on.

Being the first smart city in India to use its technology in this unique way, Ahmedabad is the pioneer in truly leveraging established infrastructure to enforce strict traffic and cleanliness discipline.

Background and Context – Description of Problem to be addressed

The city of Ahmedabad is now the seventh largest metropolis in India and the largest in Gujarat State. Ahmedabad is growing very fast in respect of population, area, trade and commerce, industries, education, training etc. The infrastructure facilities like roads, transportation, water supply, sewerage and sewage treatment, storm water, street lights etc; which are already provided by Ahmedabad Municipal Corporation. AMC recognizes that the duty of the Corporation does not end with simply the provision of these services, but also setting up the structures that ensure full use of these services.

The concept of a planned urban administration is the key to success as severe supply and demand gaps are addressed to tackle urbanization. Smart City Ahmedabad launched an Integrated Command and Control Centre along with networked infrastructure across the city consisting of over 30000 IoT devices. These devices are being used for several purposes to improve specific aspects of city infrastructure and services. The potential and scope of this technology is such that new use cases for them are being discovered every day.

Major Problem identified:

- Poor traffic management
- Traffic Rule violations
- Reckless driving
- Congestion
- Spitting Behavior

These leads to challenges like:

- Safety
- Accidents
- Enforcement of traffic rules
- Traffic congestion
- Commuters travel time
- Pollution
- Identification of violations
- Dirty Streets
- Habitual Spitters
- Lack of awareness
- Requirement of Cultural change

On this front, SCADL and AMC identified two major use-cases that could be addressed and implemented with nearly no new infrastructure setup required. First, the problem of mobility. Ahmedabad is developing into a large, sprawling metropolis, and its wide network of roads are incredibly busy. In such a scenario, the problem of rash drivers and traffic rule violators is already proving to be a nuisance. As the city gets busier, though, this problem cannot be allowed to persist. Indiscipline in the use of roadways causes unnecessary traffic, inefficiency, logjams, accidents, safety hazards, and other undesirable issues.

Secondly, one problem unique to India is people's habit to spit in public spaces and soil the place with paan stains. This problem is extremely widespread, and completely defaces the look of the city. By their very nature, the stains are very hard to clean; and the extent of the problem just makes it even more impossible. The habit posing a health risk to people around due to its utter defiance of hygiene is also a significant issue. In the context of the Swachh Bharat Mission too, tackling such a ubiquitous issue so ingrained into the Indian psyche should take priority.

Leveraging today's technology to set up an Integrated Command and Control Centre for Ahmedabad is in line with modern citywide implementations across the world. Over 30000 IoT devices look after vehicular traffic, environmental conditions (air quality, UV exposure, etc), citizen safety, water supply and water level SCADA, solid waste management, and so on. This infrastructure itself, which includes around 6500+ CCTV cameras, Automatic Number Plate Detection (ANPD), and Red-Light Violation Detection (RLVD), is used to tackle the above problems.

The use of already set-up infrastructure for these complementary purposes does good on the investments made by Smart City Ahmedabad and justifies further expansion of the solution – indicating greater payoffs for its scalability.

Implementation Objective – Details of Solution

As per the Gol guidelines, Ahmedabad Municipal Corporation has formed a separate Special Purpose Vehicle (SPV) as Smart City Ahmedabad Development Limited (SCADL) for the implementation of projects under the smart city mission for the city of Ahmedabad. This SPV carries end to end responsibility for vendor selection, implementation and operationalization of various smart city projects. The Pan city ICT Infrastructure is essentially intended to provide a high-speed connectivity at Government offices and public places through creation of Wi-Fi hotspots to support/implement all the smart solutions, city surveillance system, transformation of static boards to digital boards.

One of the primary objective of SCADL under the Smart City initiative is to enhance the safety and security, improve efficiency of municipal services and promote a better quality of life for residents, Ahmedabad desires to foster the development of a robust network infrastructure that supports digital applications and ensures network connectivity is available throughout the city and in government departments. There is an undoubted necessity to:

- Improve the city security
- Track vital data such as pollution levels, water levels, traffic
- Integrate emergency services such as fire, police, ambulance etc.
- Be adept with intelligent solutions for disaster management and city operations.
- Ensure access to and have better tracking of all electronic public services that the city administration delivers to its citizen.

The primary objective of Phase 2 of Safe and Secure Ahmedabad (SASA) under the Smart City Ahmedabad Development Limited (SCADL) is to instill good traffic discipline and tackle the spitting menace. The robust pan city ICT Infrastructure backbone, particularly the zero-tolerance junctions with Automatic E-Challan issuance for violating traffic rules, and the CCTV infrastructure for catching spitters, serves as the system upon which the implementation for the new use-cases have been adapted.

The Smart ICT Infrastructure essentially makes possible what was infeasible before. Monitoring public places with IoT devices 24x7 allows AMC to achieve the level of service quality that was previously unthinkable. Earlier, dedicated manpower was deployed to perform these various functions. Traffic policemen need to be deployed at each signal. The paanspitters simply cannot be monitored with manpower alone.

Real-time 24x7 monitoring with instantaneous action capability enhances efficiency manifold. All traffic signs and public places of the city are being examined by as many as 5000 CCTV cameras installed under the Smart City. CCTV footage being traced to the number of vehicles of those who spit on the road by taking video clips and capturing photographs. E-Memos are generated and fines levied and sent to violator. Similarly, the zero tolerance junctions dispatch automatically E-challans through its E Challan system to traffic rules violators, crowd control, criminal acts and riotous situation footages in the city which are captured and transmitted automatically to the command control center for initiating rapid action by the security forces.

Scope of Implementation – Elaborate work done

Stop Spitting Movement: The movement is by the Smart City Ahmedabad in co-ordination with solid waste management of AMC. AMC has started dispatching e-memo to those caught dirtying roads, especially with paanstains. Initial fine is Rs. 100 as per the Public Health Bylaws, 2012; followed by a Rs. 500 penalty on late payment.

- India's First of its kind Sanitation Memo
- Evidence of violation – RLVD context camera picture provided on memo
- Name and address of the violator, fine amount, payment details provided on memo
- Traffic signals and public spots spotted on the road being marked through CCTV
- CCTV cameras that are used for traffic violators are also target those spitting on the road.
- The SCADL personnel is taking photos, generating e-challan and taking action against the guilty for not keeping the city clean.
- Training to personnel has been given in detecting and zeroing on the offenders.

In the future, BRTS/AMTS stops, civic centers, AMC Offices, and other major public areas in the city shall also be monitored for spitters. The fine is to be paid at civic centers, but online functionality will soon be implemented.

Automated E-challan system: Ahmedabad is the first Smart City to introduce the system at 130 zero-tolerance junctions. Automatic Number Plate Recognition (ANPR) and Red-Light Violation Detection (RLVD) ensure better traffic control.

E-challans automatically dispatched through its E-Challan system to violators which are captured and transmitted automatically to the command control center for initiating rapid action by the security forces.

Ahmedabad city traffic police has launched website <https://payahmedabadechallan.org> for the online payment of fine. To know whether one has been fined for any offence or not, one has to enter the vehicle number.

Innovative Characteristics of Proposal

There are over 30000 IOTs devices installed in the city which include 50 environment sensors, 1120 Solid Waste Management vehicles tracked through GPS, 600 free public Wi-Fi spots and over 6500 surveillance cameras with Automatic Number Plate Recognition and Red-Light Violation Detection facility. Under the same project, 130 zero tolerance junctions are being designed in order to bring traffic discipline and any violation to same punish offenders through its automated E-Challan system. Moreover, there are 126 smart LED boards that connect citizens and keep them informed with pertinent information like parking data, traffic movement, health advisory, entertainment etc. on LED boards. Furthermore, streetlights, E-governance services, Customer Complain Redressal System (CCRS), and Water SCADA and SMART311 are system integrated with ICCC. The Smart ICT Infrastructure essentially makes possible what was infeasible before.

Around 6500+ cameras are installed at 1000+ locations for surveillance; these cameras are then connected to Command Control Center where the entire monitoring of the city is done. Any misconduct is recorded and helps the concerned department to take faster decision. Under the same project, 130 zero-tolerance junctions are being designed in order to bring traffic discipline and any violation to same punish offenders through its automated E-Challan system. Ahmedabad is the first Smart City to introduce E-Challans. It is unique blend of governance, where city police and municipality come together. Automatic Number Plate Recognition (ANPR) and Red Light Violation Detection (RLVD) are used.

The zero tolerance junctions dispatches automatically E-challans through its E Challan system to traffic rules violators, crowd control, criminal acts and riotous situation footages in the city which are captured and transmitted automatically to the command control center for initiating rapid action by the security forces.

Payment of traffic offence fine was a major problem for people served with e challans. As per the Ahmedabad city traffic police e-challan payments were to be made either at the traffic police station or nearby police station. Now, the payment can be made online.

Another initiative is the Stop Spitting Movement, started by Smart City Ahmedabad in coordination with Solid Waste Management of AMC leveraging use of CCTV cameras. It is being described as the first case of the country.

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Results – Output/Outcomes & Impacts derived from Project

The Phase 2 of ICCC has added to the success of Phase 1. Since July 2018, over 29.32 lac E-Challans have been issued for Red-Light Violation (130 zero-tolerance junctions) of which over Rs. 17.09 Cr. has been collected as a result. For BRTS lane violations (32 active stations), 2756 challans were generated. For spitting, 2010 incidents have been captured so far, and offenders are recognized and grouped by vehicle category (two-wheeler, auto, truck, four-wheeler).

E-challan dash board key statistics:

- Effective Traffic Management by means of Zero Tolerance Junctions across the City
- AI Based automatic generation of Challans.
- Total Challan's issued by the system: 29.32 lacs
- Total revenue collected: Rs.17.09 crores
- ANPR cameras installed at 32 BRTS station and generated 2756 E challans against BRTS lane violators
- Repeated Violator Identification
- Live Traffic Movement/ Congestion Data & Provide Vehicle Movement History
- Tracking of Stolen / Suspicious vehicles

Sanitation memo statistics:

- Around 2010 Sanitation memos issued
- No. of 2W violators - 1651
- No. of 3W violators - 175
- No. of 4W violators – 128
- Others vehicles - 56
- More than 50% memos have been paid
- Bringing cultural change to the society

Overall, the ICCC infrastructure supports the inclusion of all digital assets onto a common platform, which ensures confluence of data from multiple sources, applications, sensors, objects and people. The establishment of this project provides high quality, reliable, cost effective ICT Infrastructure to the city administration. It is the provider of various smart solutions under the smart city mission for the city like smart surveillance system, Smart parking, and smart traffic monitoring system, Sensors, Digital boards, Wi-Fi hotspots and availability of high-speed connectivity.

Government have now increased operational, financial efficiency and effectiveness. High-quality video footage and sensor data has helped police department and improved security. Traffic management has improved, responsiveness of fire department has improved, environmental monitoring and water level monitoring using SCADA has become possible. Educational institutions have improved connectivity across schools and universities. Healthcare services and hospitals now utilizes next generation applications, devices and processes such as tele-medicine to serve the citizens.

Replicability/Scalability of Proposal

The use of IoT devices, sensors, and other technological implementations in order to monitor the city services and infrastructure in a better way is a field that cities across the world are still exploring the possibilities of. The potential and scope of this technology is such that new use cases for them are being discovered every day.

These new use-cases may be keep being discovered, but with the implementations already in place, Ahmedabad still has some ground to cover. The 30000 IoT devices cover major portions and busy regions of the city where their utility has been realized, but a citywide implementation is the most desirable end result, which is yet to be achieved. Ahmedabad Municipal Corporation is committed towards expanding the installation of the technology across the city. The Integrated Command and Control Centre shall have direct connectivity with all these devices. Setting up this network is inherently scalable, and the model can be expanded such that the network grows along with the city.

A pan city ICT infrastructure supports the inclusion of all digital assets onto a common platform, which ensures confluence of data from multiple sources, applications, sensors, objects and people. The establishment of this project provides high quality, reliable, cost effective and ICT Infrastructure to the city administration. Integration with GIS infrastructure allows all locations to be monitored on a real-time basis in a much more accurate fashion from the ICCC central location only.

Currently, the infrastructure covers the main touchpoints such as BRTS bus stops and main traffic junctions. The network can be expanded to more locations on poles and support infrastructure all through the city in a phased manner.

E-challan:

- Scaling up the operation of E Challans for all 130 zero tolerance junction
- Improvement on dispatch system

Sanitation memo:

- Introduction of Joint Enforcement team along with Traffic Police
- Ward wise teams to nab violators

Enforcement:

- In Collaboration with City Traffic Police & RTO, all violators will be enforced to pay the E challans
- CCTV cameras other than junctions will be used for E challans & Sanitation memos

In Recent Event of Heavy Rainfall, Command & Control Room acted as nerve center for all activities

- CCTV cameras used for identification of water logging
- Citizen Grievance mechanism was used to generate complaints for such case
- Smart 311 application was used to check the on field availability of staff and completion of work.
- Further to this, water logging spots were identified and continuously monitored.
- Total 263 incidents were reported through CCC and resolved within time limit.
- Status of pumping stations was also monitored online at CCC

The Integrated Command and Control Center (ICCC) acts as the “nerve centre/ brain” for operations management, day-to-day exception handling and disaster management. It also provides insights by

processing complex data sets at an aggregated level to derive intelligence for improved planning and policy making. On this front, it is important to recognize that part of the objective of the ICCC project is to make use of the data collected by the sensors and devices to improve service delivery and maintenance. Therefore, the scalability of this project must also be supported with capabilities to respond to the real-time events related to water, waste management, energy, mobility, the built environment, education, healthcare and safety. Response capability is a crucial supplement to the monitoring capability developed through the ICCC for its success.