

## CASE STUDY 1



Vehicle Tracking System & Passenger Information  
System on 100 buses and 50 Bus Queues Shelter (BQS)  
on  
**Chandigarh Transport Undertaking Buses**

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**CLIENT:** Chandigarh Transport Undertaking

**PROBLEM DOCUMENT:**

1. Facing challenges in the form of logistical.
2. Mismanagement of the drivers.
3. Manhandling of the GPS device.
4. Timely allotment of buses for installation of the GPS devices.
5. Timely allotment of Bus Queue Shelters for installation of PIS.
6. Getting timely approvals from different stakeholders.

7. Connectivity issue – Whenever bus goes on hilly terrain, there is a connectivity problem.

**BRIEF SCOPE OF WORK:**

To install Vehicle Tracking System & Passenger Information system on 100 buses and 50 Bus Shelter Queues on Chandigarh Transport Undertaking Buses and to develop a web and GPS based VTMS (Vehicle Tracking & Management System) using state of the art information system for locating, monitoring and managing the buses with a view to improve their route and output monitoring, improving fuel efficiency and ensure that the quality and timeliness of buses is improved.

**TECHNOLOGY USED:**

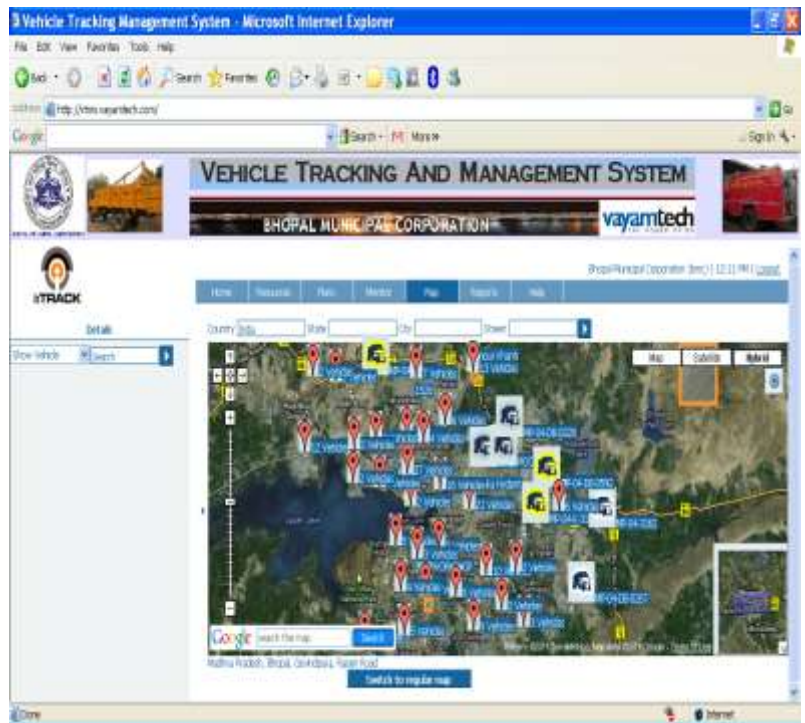
- GPS based Vehicle Tracking system
- Open Source GIS-MIS based Vehicle Tracking System

**STATUS OF THE PROJECT:** Completed

**BENEFITS OF THE PROJECT:**

- Web enabled Map based locating of positions of Vehicles with customized layer of other key locations
- Providing complete audit trail on the movement of Vehicles
- All the devices will communicate with central server directly through GPRS, making the system more secure while providing information in real time
- MIS Reports and Alerts which facilitate monitoring of drivers' behavior, unscheduled stops, long breaks, over-speed, non-stoppage of the truck at the scheduled stoppage point and route deviation, etc.
- Event logging (viz. start of journey, end of journey, emergency, breakdown, etc.) with time stamp and providing information about routes traversed by each Vehicle
- Data backup of at least six months historical data with maps
- Facility for management in offline mode of buses
- Establishing text messaging with drivers of Vehicles issuing need based instructions
- Collecting data that would provide detailed and exception reports in order to analyze and improve the system
- Helping in route planning and Route programming

## CASE STUDY 2



### Implementation of Vehicle Tracking and Management System for Bhopal Municipal Corporation (BMC)

#### **CLIENT DESCRIPTION:**

Bhopal Municipal Corporation (BMC)

#### **PROBLEM DOCUMENT:**

1. Facing challenges in the form of logistical problems.
2. Mismanagement of the drivers.
3. Manhandling of the GPS device.

4. Timely allotment of buses for installation of the GPS devices.
5. Timely allotment of Bus Queue Shelters for installation of PIS.
6. Getting timely approvals from different stakeholders.
7. Connectivity issue – Whenever bus goes on hilly terrain, there is a connectivity problem.

**BRIEF SCOPE OF WORK:**

- GPS based real time Vehicle locating of 300 municipal vehicles
- Web enabled map based locating of positions of vehicles, locations of garbage collection and disposal and water supply and other key locations related to the other services
- Providing complete audit trail on the movement of trucks vis-à-vis their position and speed with time stamp
- MIS Reports and Alerts - Drivers' irregular behavior, unscheduled stops, long breaks, over-speed, non-stoppage of the truck at the scheduled stoppage point and route deviation, etc.
- Event logging (viz. start of journey, end of journey, emergency, breakdown, etc.) with time stamp and providing information about routes traversed by each Vehicle
- Data backup of at least six months historical data with maps
- Facility for management in offline mode of trucks/utility vehicle
- Facility for voice communication with drivers of Trucks using the VTMS
- Text messaging with drivers of Truck
- Collecting data that would provide detailed and exception reports in order to analyze and improve the system
- Helping in route planning
- The integration with BMC's Municipal Administration System (MAS) which is based upon SAP ERP solution
- The System interfaces with the Complaint management system

**TECHNOLOGY USED:**

- Application: Java Technology (J2EE framework) using Struts MVC Framework.
- Front end: JSP
- Business Logic Layer: EJB Components
- Back end: Oracle9i Database
- Application/Web server: IBM Web Sphere Application Server/BEA Web Logic/Sun One/Jboss/Oracle 9i AS
- Server Operating Systems –Linux
- Client Operating system-Windows/Linux
- MapServer: MapInfo® MapXtreme® Java Edition v4.7

**STATUS OF THE PROJECT:**

Completed & In Maintenance Phase

**BENEFITS OF THE PROJECT:**

- Web enabled Map based locating of positions of Vehicles with customized layer of other key locations
- Providing complete audit trail on the movement of Vehicles
- All the devices will communicate with central server directly through GPRS, making the system more secure while providing information in real time
- MIS Reports and Alerts which facilitate monitoring of drivers' behavior, unscheduled stops, long breaks, over-speed, non-stoppage of the truck at the scheduled stoppage point and route deviation, etc.
- Event logging (viz. start of journey, end of journey, emergency, breakdown, etc.) with time stamp and providing information about routes traversed by each Vehicle
- Data backup of at least six months historical data with maps
- Facility for management in offline mode of buses.
- Establishing text messaging with drivers of Vehicles issuing need based instructions.
- Collecting data that would provide detailed and exception reports in order to analyze and improve the system.
- Helping in route planning and Route programming.
- Two way communication between driver & control center.

## CASE STUDY 3



Date	Vehicle	Status	Address
22/04/2012 12:06:25 PM	MP-3054-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Adarsh Nagar, 191 106
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Baidary Nagar Colony, 191 107
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Baidary Nagar Colony, 191 108
22/04/2012 12:07:00 PM	MP-3054-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Galla, 191 109
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 110
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 111
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 112
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 113
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 114
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 115
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 116
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 117
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 118
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 119
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 120
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22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 122
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 123
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 124
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 125
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 126
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22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 128
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 129
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 130
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 131
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 132
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22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 134
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 135
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 136
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 137
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 138
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 139
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 140
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 141
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 142
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 143
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 144
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 145
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 146
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 147
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 148
22/04/2012 12:07:00 PM	MP-3056-461	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 149
22/04/2012 12:07:00 PM	MP-3055-518	Event Status: Event Table	Madhya Pradesh, Jabalpur, Ghant Ghar, 191 150

## Implementation of Vehicle Tracking and Management System for Jabalpur Municipal Corporation (JMC)

**CLIENT:** Jabalpur Municipal Corporation

**PROBLEM DOCUMENT:**

1. Facing challenges in the form of logistical problems.
2. Mismanagement of the drivers.
3. Manhandling of the GPS device.
4. Timely allotment of buses for installation of the GPS devices.

5. Timely allotment of Bus Queue Shelters for installation of PIS.
6. Getting timely approvals from different stakeholders.
7. Connectivity issue – Whenever bus goes on hilly terrain, there is a connectivity problem.

#### **BRIEF SCOPE OF WORK:**

To develop a web and GPS based VTMS (Vehicle Tracking & Management System) using state of the art information system for locating, monitoring and managing the 120 public utility vehicles of JMC with a view to improve their route and output monitoring, improving fuel efficiency and ensure that the quality and timeliness of municipal services is improved.

#### **TECHNOLOGY USED:**

- GPS based Vehicle Tracking system
- Open Source GIS-MIS based Vehicle Tracking System

#### **STATUS OF THE PROJECT:**

Completed & In Maintenance Phase

#### **BENEFITS OF THE PROJECT**

- Web enabled Map based locating of positions of Vehicles with customized layer of other key locations
- Providing complete audit trail on the movement of Vehicles
- All the devices will communicate with central server directly through GPRS, making the system more secure while providing information in real time
- MIS Reports and Alerts which facilitate monitoring of drivers' behavior, unscheduled stops, long breaks, over-speed, non-stoppage of the truck at the scheduled stoppage point and route deviation, etc.
- Event logging (viz. start of journey, end of journey, emergency, breakdown, etc.) with time stamp and providing information about routes traversed by each Vehicle
- Data backup of at least six months historical data with maps
- Facility for management in offline mode of buses
- Establishing text messaging with drivers of Vehicles issuing need based instructions
- Collecting data that would provide detailed and exception reports in order to analyze and improve the system
- Helping in route planning and Route programming
- Two way communication between driver & control center

## CASE STUDY 4



## Intelligent Transport System for Uttar Pradesh State Road Transport Corporation

**CLIENT:** Uttar Pradesh State Road Transport Corporation

### SCOPE OF WORK

Implementing Intelligent Transport (including Hardware & Software-cum-Annual Maintenance Contract on turnkey basis for the supply and installation of LED Destination Indicator panel, Audio Visual Passenger Information system, Vehicle Tracking System (GPRS), Electronic Ticket Machine compatible with GPRS supporting card on 1310 city buses in seven cities of Uttar Pradesh as per requirements of JnNURM scheme issued by Ministry of Urban Development.



## **SOLUTION BRIEF:**

### **Vehicle Tracking Unit:**

- The Intelligent Controller consists of a rugged system based on Intel Atom Architecture, Vehicle Tracking System and hardened embedded Linux software to enable the following activities:
- This System placed inside the bus drives various gadgets and serves as a Central control for the Entire Bus System
- Vehicle Tracking monitors the status of the vehicles and provides real time information to the control rooms.
- Passenger Information System – Provide real time information regarding vehicle movement, station/bus stops, expected time of arrival through LED's and automatic announcements in the vehicles.
- Enable communication both Video and Audio between the vehicle and the control centre.

### **PIS:**

- Multi-lingual route display
- Automatic Bus Stop display in internal LEDs and Announcement
- SMS based route change
- SMS based alert messages in internal display for select LED's available
- On board passenger count and Revenue collected for a particular bus available online via GPRS
- Real-time ticket data transfer over GPRS
- Automatic stage closing
- SMS based control command to swap btw automatic stage closing & manual stage closing.
- Notice messages on internal displays and announcement
- Two Cameras interface. Camera recording and upload via Wi-Fi hotspots @ depots and control centre.
- Ignition based ON / OFF control of system to reduce power consumption when vehicle is idle

### **ETM:**

- Supplied 550 ETM's enabled with Blue Tooth communication for ticketing operations.
- Training imparted to all the conductors at Gomati Nagar and Dubagga depots to handle ETM.
- Transition from operations using manual paper tickets to ETM tickets achieved.
- ETM is now being used for more than 3 months successfully.
- Running out/in shedding operation with ETM distribution on 3 shift.

- Revenue Management Reports based on daily collection is generated and submitted to UPSRTC management team.

#### **BENEFITS OF THE PROJECT:**

- Route Change can be done via SMS
- On board surveillance system. Cameras records the activities in the bus and transmits the recorded video files to storage server via Wi-Fi based station / hot Spots and erases the same in the local VMU memory
- Single GPRS connection for transmitting ETM data and Tracking data over GPRS to the centralized server
- Actual Trip Start and End time can be sent to server by merging the location of the bus based on GPS and interacting the same with ETM
- Multilingual route display on LED Display system
- Precise Announcement of approaching bus stop and next bus stops
- Automatic ETM stage closing (Through SMS ETM can be toggled btw Automatic and Manual Mode)
- Over-speeding, Non-Stoppage of bus at bus stop - Alerts to driver
- Vehicle health status display (For hi-tech buses with CAN interface)

#### **REPORTS:**

##### ➤ **Available Reports – Operation management:-**

- Operation Register
- Duty Slip
- Drive Diesel.CNG/AVG record
- Workshop record, Operation performance report
- Vehicle out shedding report
- Vehicles break down report.

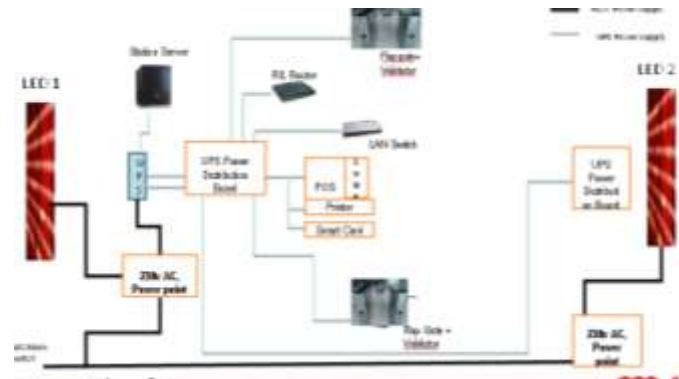
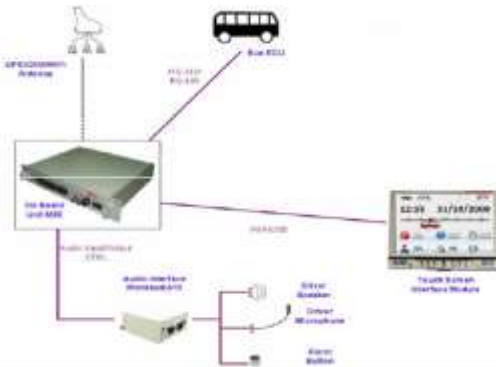
##### ➤ **Available Reports – Revenue management:-**

- Daily collection, Conductor revenue report, Waybill abstract, Trip wise report, route wise,; DVR and Bag room report, Operation analysis, Conductor/driver payment, Daily IPK record conductor/bus wise, D.S.A.,

##### ➤ **MIS Reports**

- DVR bus type wise, route wise
- Bag room report
- Daily income conductor wise, bus wise, route wise
- Cash room record
- Daily ticket sold position
- Daily Sale Account (DSA)

## CASE STUDY 5



### Development, Implementation, Operation & Maintenance of Integrated Transit Management System (ITMS) for **Ahmedabad Janmarg Limited**

**CLIENT:** Ahmedabad Janmarg Limited (AJL)

**BRIEF SCOPE OF WORK:**

AJL intends to implement the Integrated Transit Management System (ITMS) comprising Development, Implementation, Operation and Maintenance of the Integrated Transit

Management System (ITMS) for the prestigious BRTS project in Ahmedabad. The ITMS shall comprise, inter alia, Automated Fair Collection System (AFCS), Automated Vehicle Locating System (AVLS) and Passenger Information System (PIS), etc. for Bus Rapid Transit System (BRTS) in Ahmedabad City.

**STATUS OF THE PROJECT:**

Completed & In Maintenance Phase

**BENEFITS OF THE PROJECT:**

- AVLS application is used to ensure the smooth and efficient BRT operation
- AVL technology is allowing tracking the vehicles along the corridor
- With AVL the control center can direct vehicle movements so as to avoid vehicle bunching
- AVL helps to react swiftly to problems and emergencies, and allocate capacity resources in swift reply to change in demand
- GPS technology permits real -time information on vehicle location and status
- The buses are privately operated and paid as per the KMs covered, with AVLS application AJL knows the actual Kms traveled by the buses and this helps in revenue enhancement
- AFCS facilitates purchase of pre-paid tickets and their subsequent use through electronic systems to permit access to or from the transport mode. Like a credit card, it helps you to move cashless, by topping up once
- Ticketing is the main source of revenue earning for AJL, AFCS helps in easy accounting of revenue collection and generates rich information for MIS purposes
- It reduces the requirement of Bus conductor and escaping of revenues, due to non-issuance of tickets
- All the devices will communicate with central server directly through GPRS, making the system more secure while providing information in real time