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ESSEN

CASE STUDY

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Reputed infrastructure giant implements RFID-enabled VEHICLE TRACKING SYSTEM

Real-time tracking system for security, parking and access control

Automated entry and exit logging

Accurate identification of authorized vehicles

Efficient peak-hour management of vehicular flow

INSIDE:

TECHNOLOGY

Solution:
EPC Gen2 compliant vehicle tracking solution

Tag Type:
Parka™ UHF Passive

Reader/Antenna:
Xtenna™
Xtenna Proximity™

Method:
Multiple Tracking via Integrated Reader/Antenna modules

Integration Platform:
RFID Middleware:
Xtenna™ WebToolkit
Xtenna™ Studio
Application: Essen RFID's Vehicle Tracking System
Database: SQL Server 2005 Exp. ed.

Tag Manufacturer/Supplier:
Essen RFID, with US based chip inlay

Reader/Antenna Manufacturer:
Essen RFID, with US based module

Systems Integrator:
Essen RFID

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Xtenna™ Integrated RFID Antenna/Reader

CASE STUDY

KEY REQUIREMENTS:

The company has around 200-250 vehicles entering their parking lot every day. It was previously using a manual system of checking at the gates, which was inefficient in terms of time and manpower utilization, not secure and was resulting in congestion at the gates during peak hours. The company needed an automated solution that would overcome these drawbacks.

Main challenges in implementation:

- Managing heavy traffic at the time of parking and while exiting.
- Preventing unauthorized vehicles from entering the company parking lot.
- Automated operation of boom barrier at the gates.
- Maintaining track records and entry/exit logs of all vehicles in the parking lot.
- Tracking and improved management of visitors' vehicles.

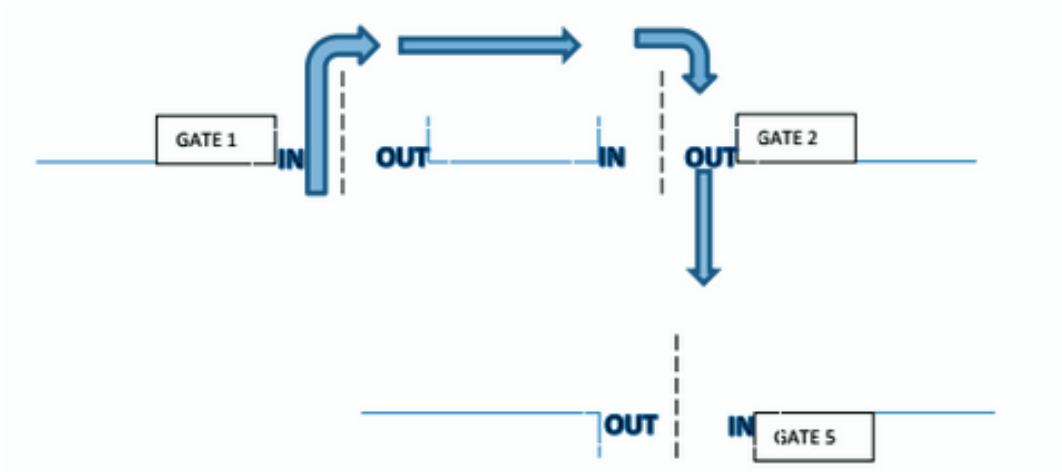
SOLUTION:

Essen RFID provided a comprehensive solution for efficiently tracking vehicles entering and exiting the parking lot, through its RFID-based Vehicle Tracking System.

IMPLEMENTATION:

Xtenna™ RFID Antenna-Readers are installed, one each for each of the 'Entry' and 'Exit' gates of the parking lot. A PARKA™ Tag is issued to each vehicle and affixed to its windshield. The tags are registered using an Xtenna Proximity™ Antenna-Reader.

The tracking system incorporates a signal light triggered through RFID at each gate that manages the flow of vehicles. The system also deploys a trigger switch and controller at each gate that automates the operation of a boom barrier for vehicle entry/exit.



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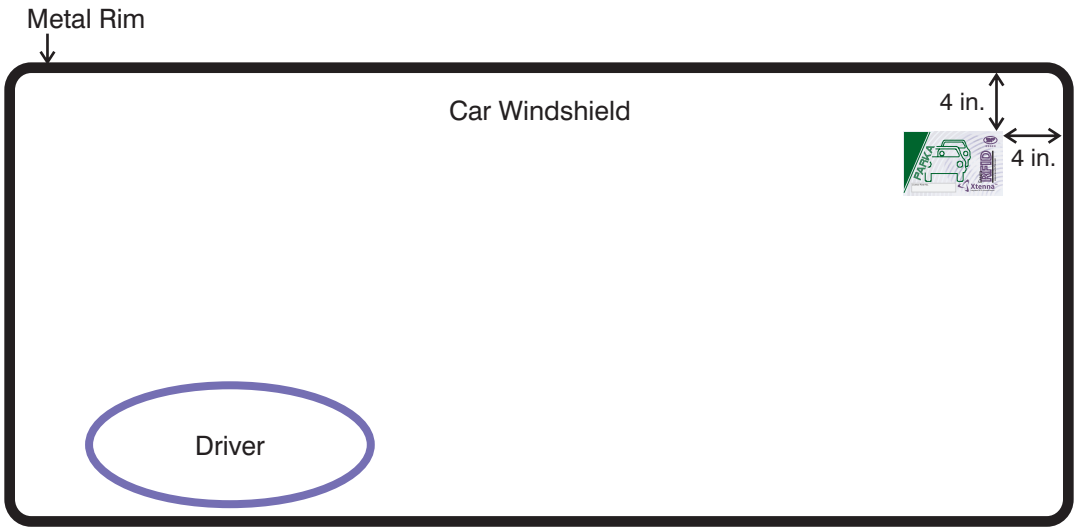

WORKING:

The vehicle tracking system allows entry only to those vehicles that are registered in the system, and also logs their 'In' and 'Out' times. It has 3 initial steps to set up the database:

- Creating master entry of vehicle owner details.
- Creating master entry of vehicle details.
- Assigning a tag to each vehicle.

Process Flow:

1. All relevant owner details are obtained for the system database.
2. Details of each vehicle are also entered into the system database.

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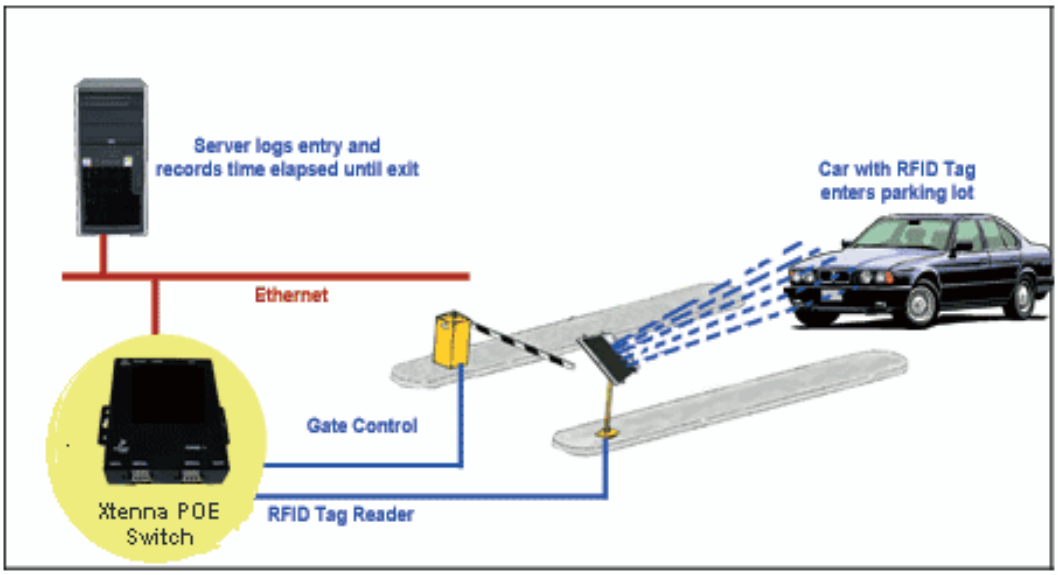
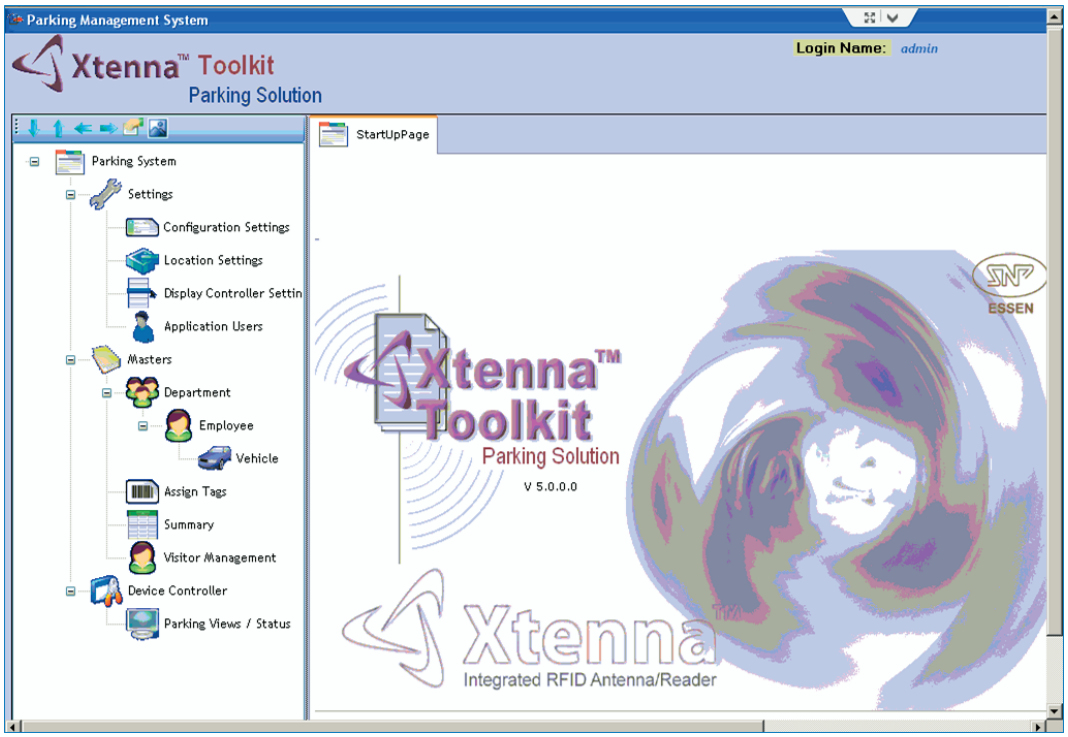


3. A permanent RFID tag is assigned to each vehicle. Essen RFID's PARKA™ Tag is used for this purpose. The tag is read by the Xtenna Proximity™ Antenna-Reader and is registered in the database as assigned to the particular vehicle. The tag is affixed on the vehicle's windshield.
4. When a vehicle enters the company's parking lot, its tag is detected at the 'Entry' gate by the Xtenna™ Antenna-Reader that has been mounted at the gate. Xtenna™ reads the tag, and verifies that it is a registered tag that has been assigned to an authorized vehicle. It then logs the entry time and transmits this data back to the server.

5. The server then triggers the switch controlling the signal light at the gate. The signal light which by default is 'red', now turns 'green', the boom barrier opens and the car is allowed inside. Once the car has passed through the detection area and its tag detection has ceased, the green signal light turns off and the boom barrier closes till it has detected another registered tag.
6. As the car's tag gets read at the Entry gate its time log gets stored in the database. Similarly, the Xtenna™ mounted at the Exit gate detects the tag of the exiting car and its departing time gets logged in the server database.
7. The system has report generation functions that provide details of vehicles and their owners, tags, entry and exit times, and the vehicles present in the parking lot at any given time, thus providing a complete record of vehicular movement for the administrator.

Operational Flow:

Essen RFID's Vehicle Tracking Solution is used for maintaining details of all authorized vehicles as well as keeping track of each vehicle trip. After logging in to the system, a tree-format Menu panel is displayed on the left part of the screen, for navigating across its various modules.



Location Settings: These settings contain information about the various locations within the premises where RFID devices have been installed. The settings consist of Location Name, RFID Reader IP Address and Device Relation. The three values for Device Relation are 'In' (for the IN Gates), 'Out' (for the OUT Gates), and 'None' (for registration and tag assignment).

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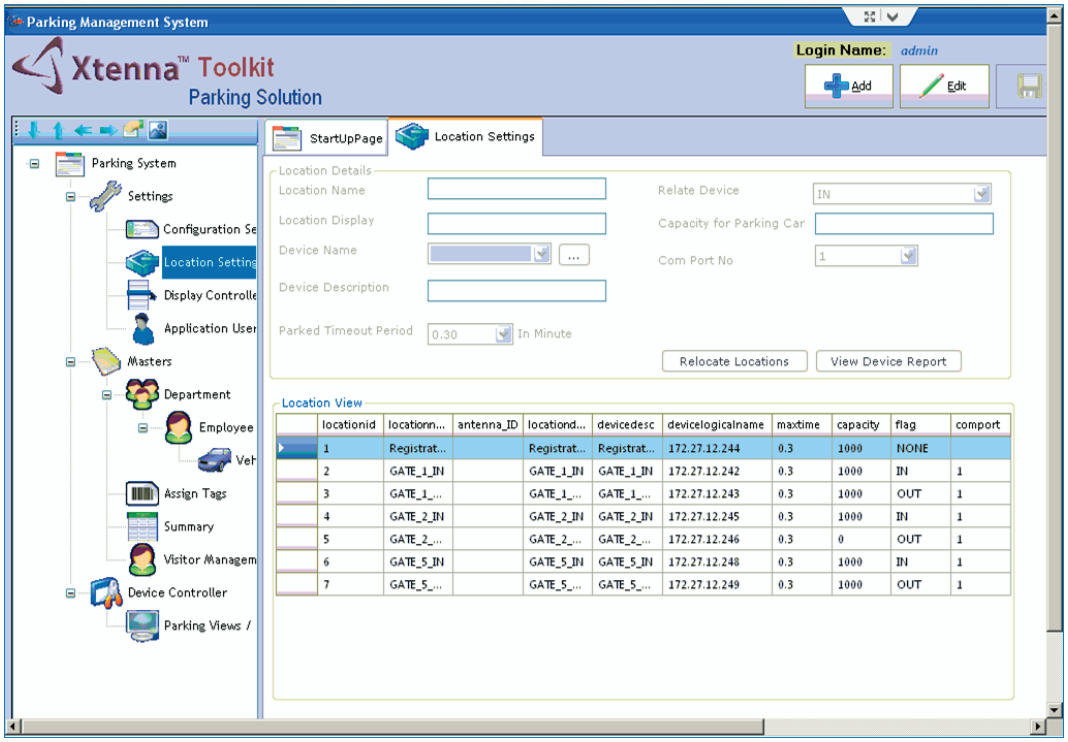
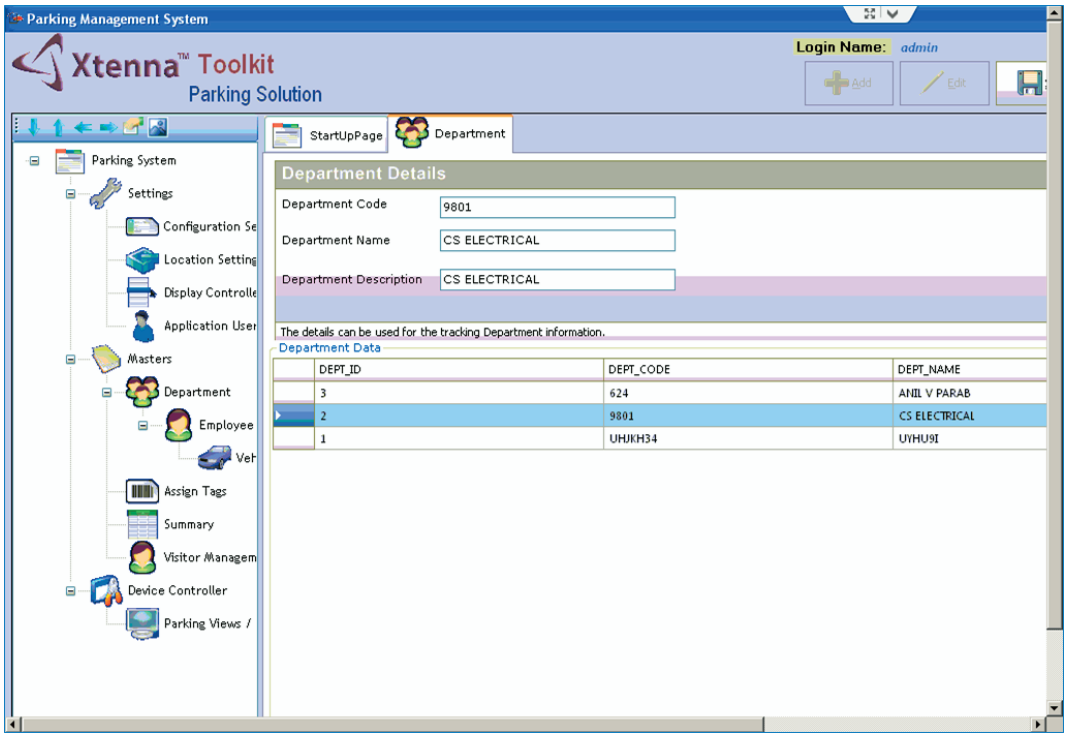
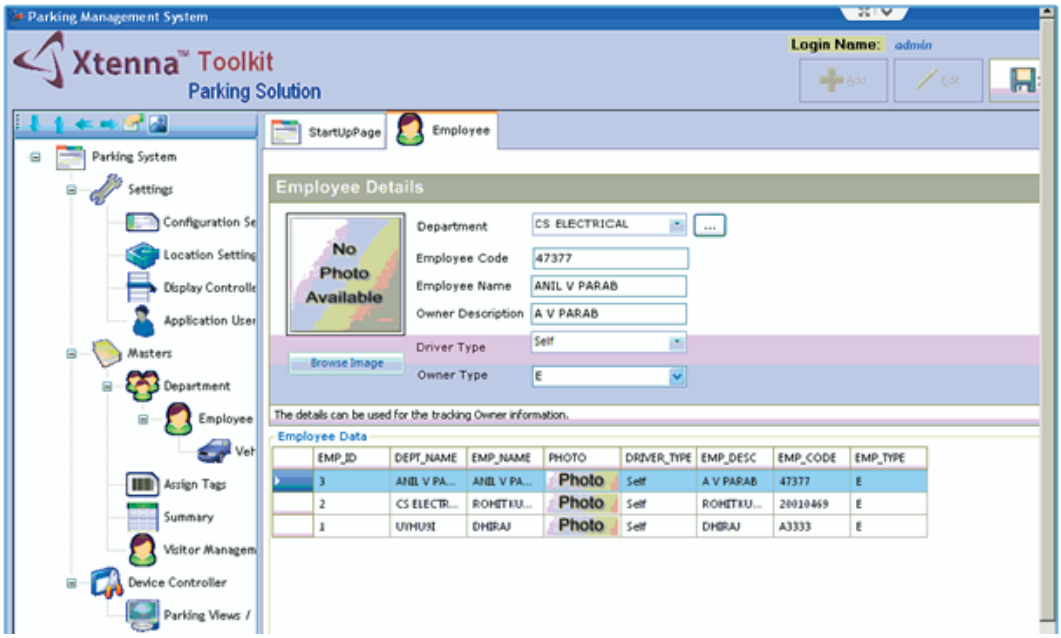


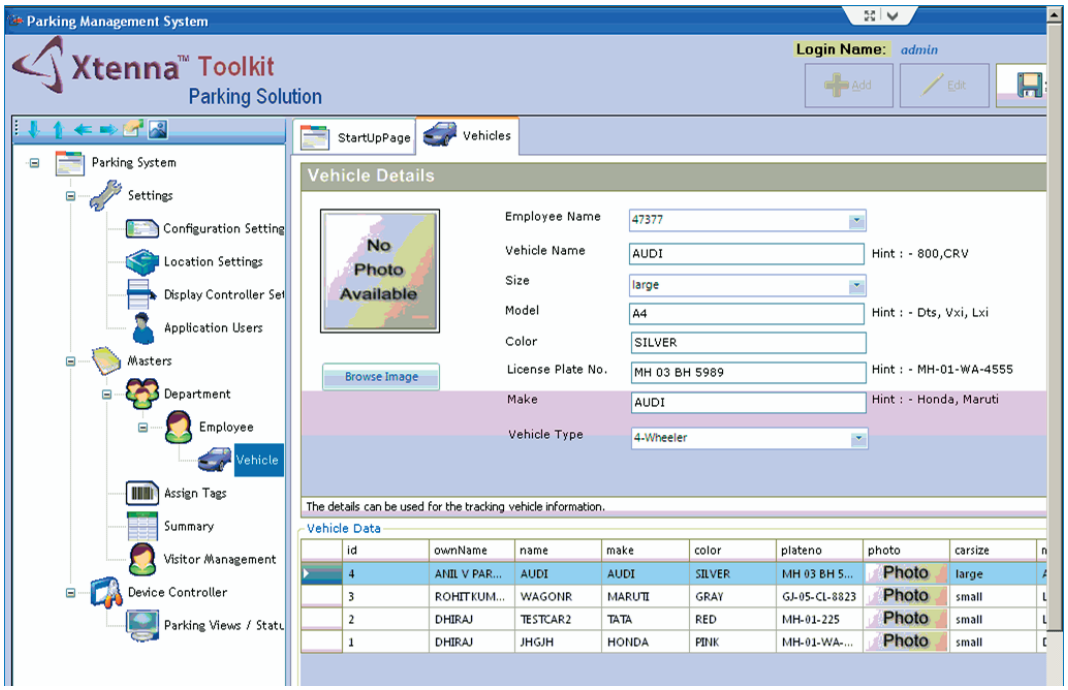
Department: This screen allows the user to enter Department information, such as Department Code, Department Name (e.g. Stores, Personnel, Finance, etc.) and Description, which is saved into the database.



Employee: Here information about the Employee (vehicle owner) is entered, such as the employee's Department, Employee Name, Employee Code, etc., as also a photograph of the employee is uploaded and saved into the database.



Vehicle: In this screen, information about the vehicle is entered into the database, such as Vehicle Name, License Plate No., Vehicle Model, Colour, etc. for the Employee (vehicle owner) already recorded in the previous screen. This maps the vehicle to the employee in the database. Multiple vehicles can thus be added for a single owner.



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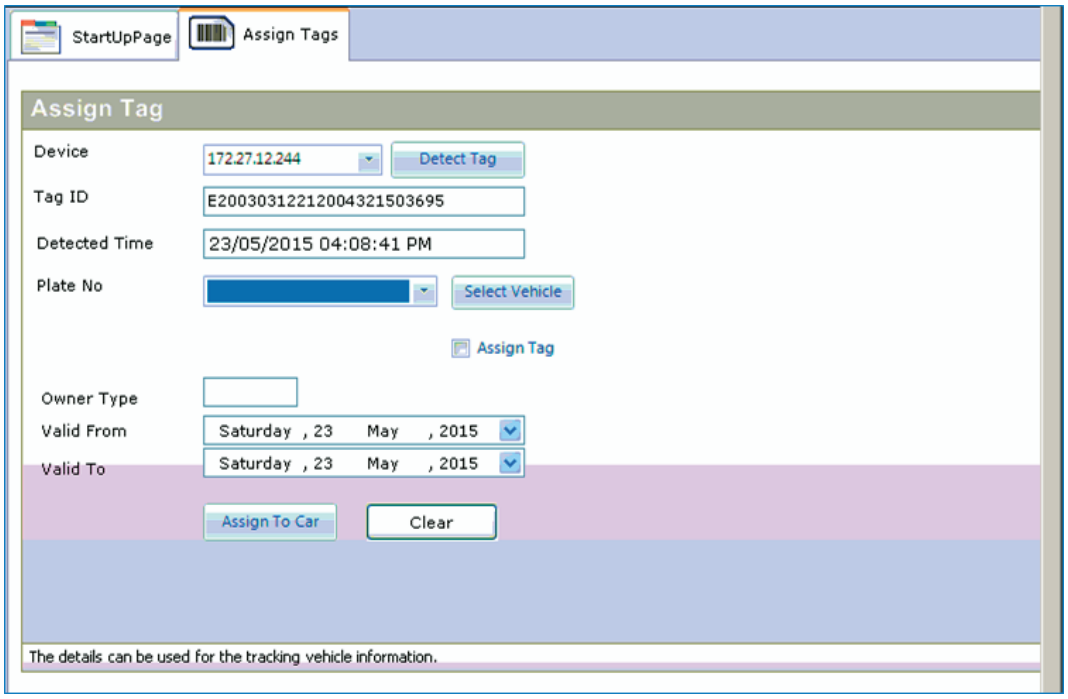
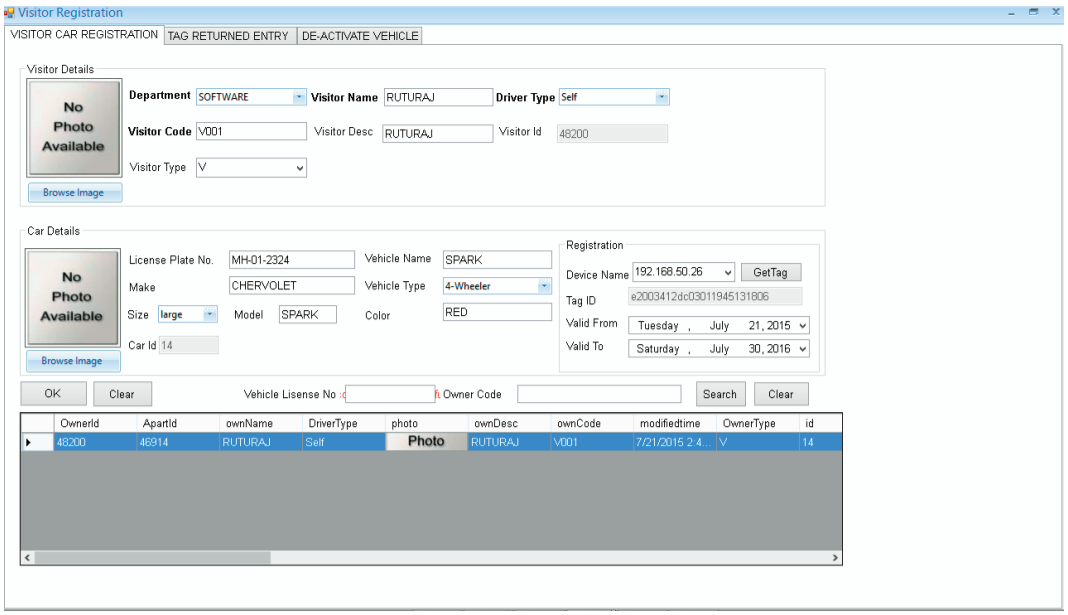
Assign Tag: This module is used for assigning the PARKA™ RFID tag to the vehicle. The tag is read by the Xtenna Proximity™ reader device and assigned to the particular vehicle in the database along with the validity period. The tag is then affixed to the car's windshield, enabling the registered vehicle to be tracked at the IN and OUT gates.



Visitor Management: In this module, the operator enters the visitor's details and that of his vehicle, and assigns a temporary RFID card to the vehicle along with its validity period. The boom barrier at the gates will open for this vehicle only during the allowed validity dates.



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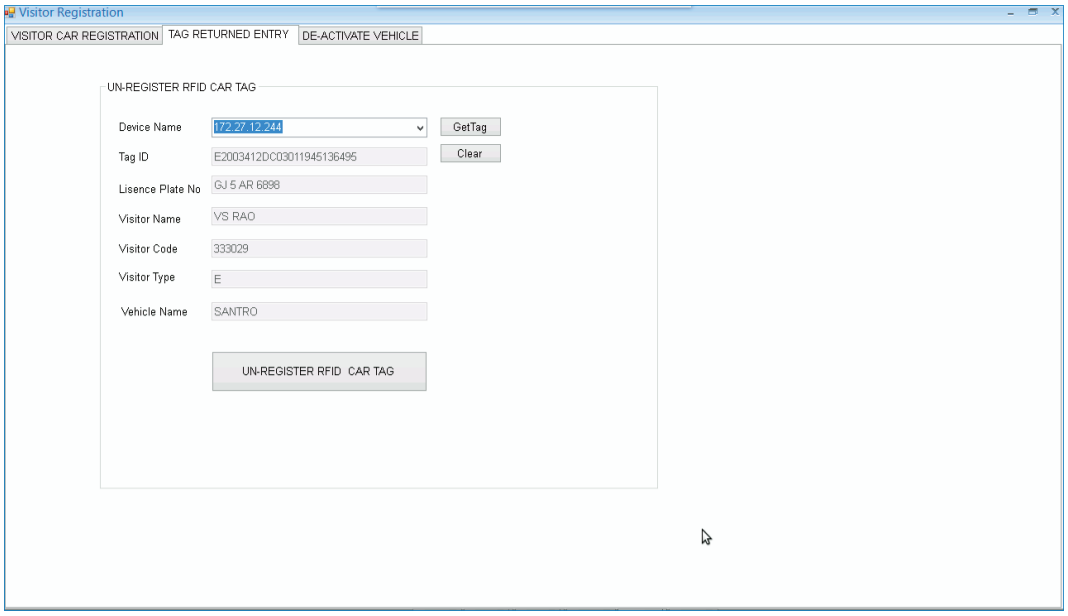
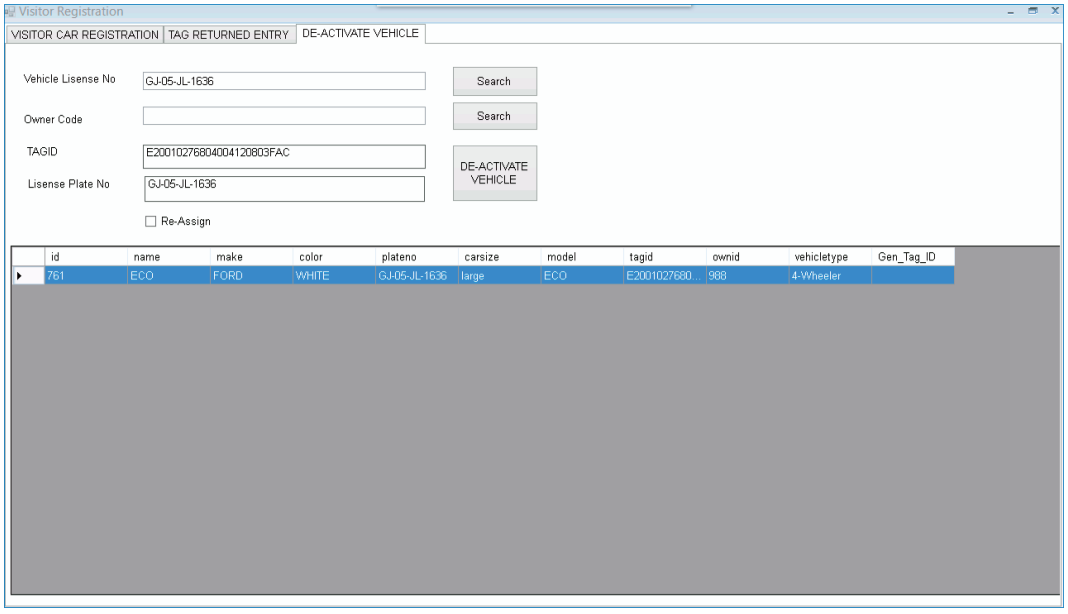
Tag Return: When the visitor returns the vehicle tag at the OUT gate, the operator makes the return entry in this module. The tag gets disassociated from the visitor's vehicle in the database and can now be reused for tracking another vehicle.



De-Activate Vehicle: Through this module, a vehicle's tag can be deactivated by an authorized person if the visitor's vehicle leaves the gate without returning the tag, or for other disciplinary reasons. The authorized supervisor can search the vehicle in the database using the Vehicle License Plate No. or the Employee/ Visitor Code and deactivate the vehicle in the database. After tag deactivation, the vehicle becomes an unregistered vehicle and the system will not open the boom barrier for this vehicle.



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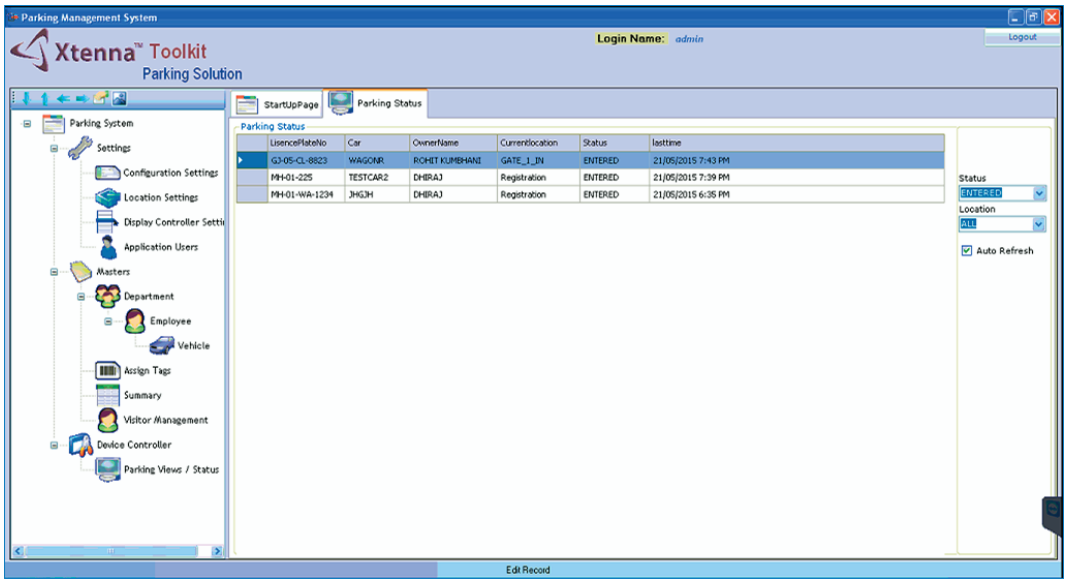
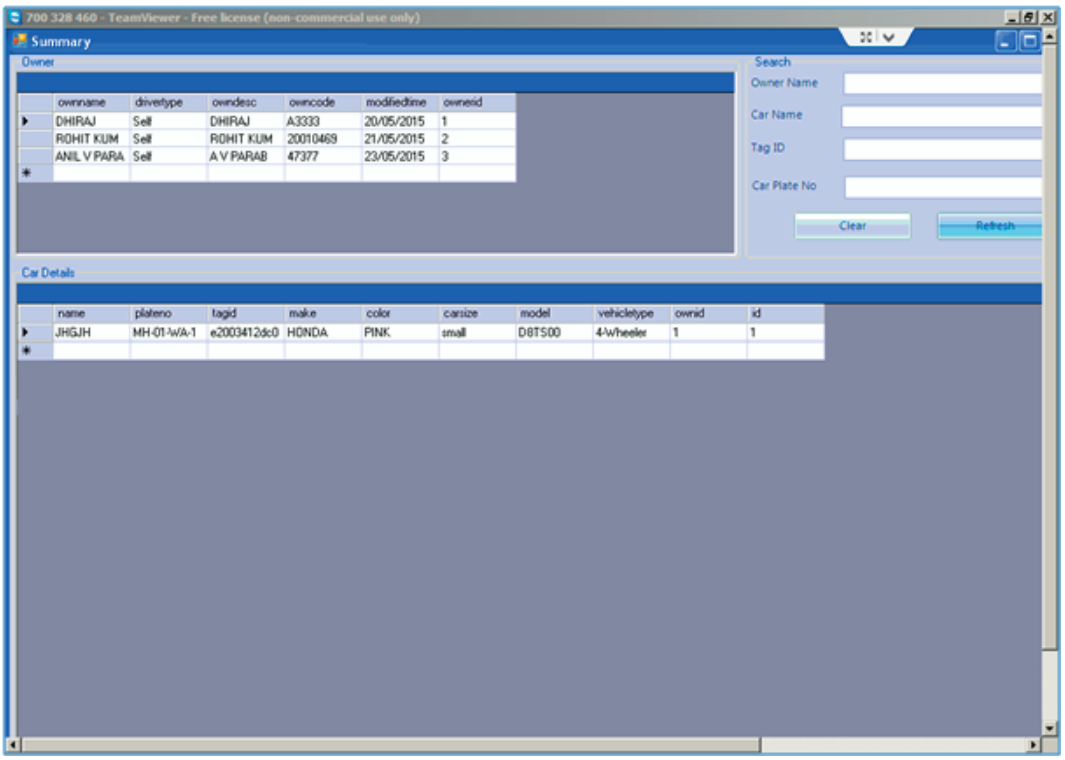
Parking Status View: This screen displays a live view of entered and exited vehicles. The screen can be set to auto-refresh to enable live status view. It also displays the last tag detection time of the vehicle.

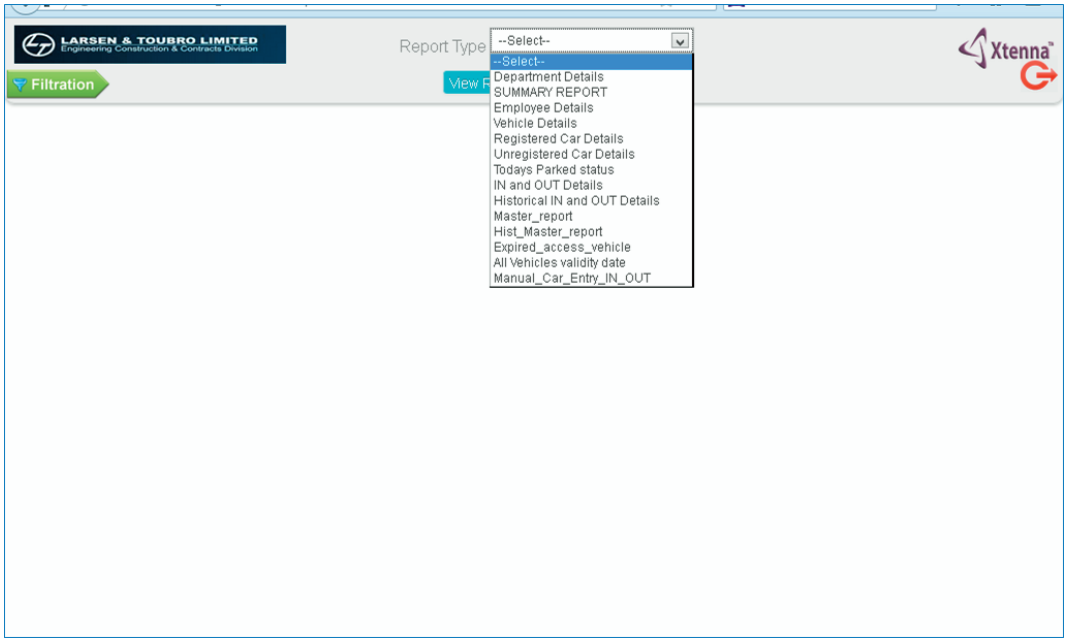


Summary View: This screen displays the vehicle and owner (employee/visitor) details. It also has a Search function through which the user can look for a particular owner or vehicle in the database.

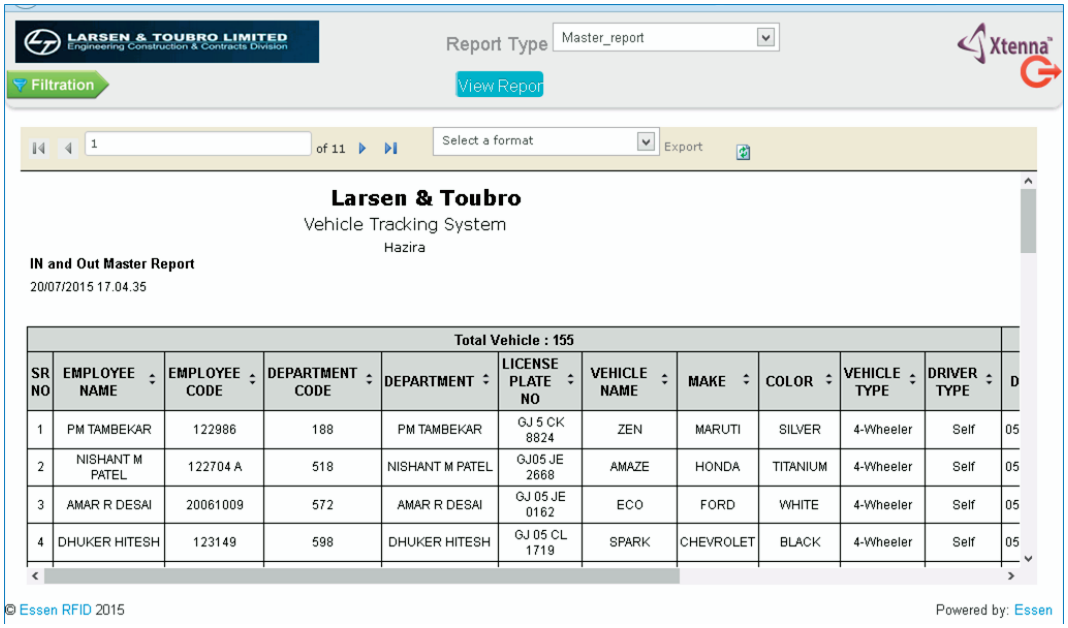


Reports:

The Vehicle Tracking System has reporting functions through which various status and periodic reports can be generated by authorized personnel and also exported to an Excel sheet.



After successful login, the user can select the required report from a drop-down combo list. Clicking on 'View Report' will display the selected report on the screen. The Reports module displays record data of all the master screens such as Department, Employee, Vehicle, etc. and also provides summary data such as Currently Parked Vehicles, Number of Vehicles In/Out, Total Vehicle Movement, etc.



Total Vehicle : 155

SR NO	EMPLOYEE NAME	EMPLOYEE CODE	DEPARTMENT CODE	DEPARTMENT	LICENSE PLATE NO	VEHICLE NAME	MAKE	COLOR	VEHICLE TYPE	DRIVER TYPE	D
1	PM TAMBEKAR	122986	188	PM TAMBEKAR	GJ 5 CK 8824	ZEN	MARUTI	SILVER	4-Wheeler	Self	05
2	NISHANT M PATEL	122704 A	518	NISHANT M PATEL	GJ05 JE 2668	AMAZE	HONDA	TITANIUM	4-Wheeler	Self	05
3	AMAR R DESAI	20061009	572	AMAR R DESAI	GJ 05 JE 0162	ECO	FORD	WHITE	4-Wheeler	Self	05
4	DHUKER HITESH	123149	598	DHUKER HITESH	GJ 05 CL 1719	SPARK	CHEVROLET	BLACK	4-Wheeler	Self	05

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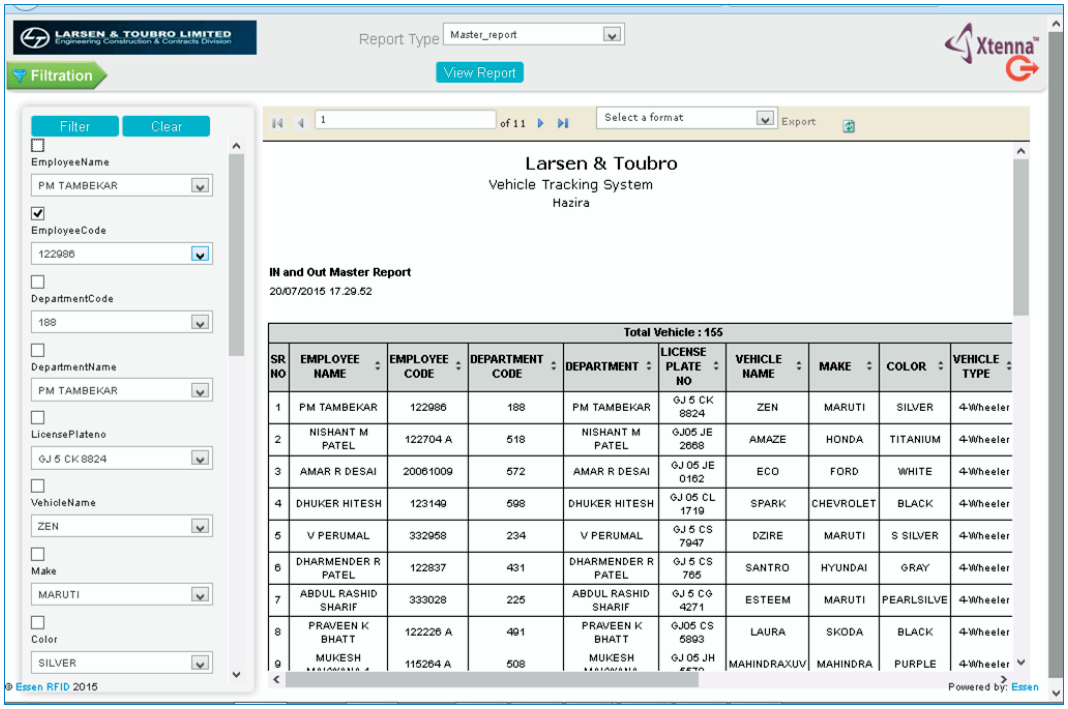
The reports can further be filtered on a required column field to display a sorted view based on the selected column.



BENEFITS:

- Increased security.
- Accurate identification and access for authorized vehicles.
- Real-time tracking of all vehicles entering and exiting the gates.
- Efficient tracking across multiple entry/exit gates.
- Automated boom barrier operations at the gates through trigger switch, requiring no manual operator for lifting the barriers.
- Default 'no entry' for unregistered vehicles.
- Automated entry and exit logging into server.
- Quick movement of vehicles, preventing congestion and time wastage at the entry and exit gates.
- Easy peak hour vehicle management at the gates.
- Improved management of visitors' vehicles.
- Vehicle/owner mapping in database provides instant search function.
- Automated report generation enables ready record reference.
- Live status reports for vehicles.

LINKS:

Hardware:

Xtenna™

Xtenna Proximity™

Tags:

PARKA™

Software:

Xtenna WebToolkit™

Xtenna Studio™

Reference Example:

http://www.essenrfid.com/Mailer/accessparking-flash-demo.pdf