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ESSEN

CASE STUDY

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Prominent school in Oman pilots a RFID-based SCHOOL BUS STUDENT TRACKING SYSTEM

Automated tracking of students boarding and disembarking from the school bus

Safe and secure transportation of children

Live data transmission through GPRS

Immediate SMS alerts to parents

INSIDE:

TECHNOLOGY

Solution:
EPC Gen2 compliant personnel tracking solution

Tag Type:
Personna™ 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 School Bus Student 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

Xtenna™ Integrated RFID Antenna/Reader

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CASE STUDY

KEY REQUIREMENTS:

At Suleiman School, due to increased safety concerns for their children amongst working parents, it was essential for them to have a system in place that gave them live information about whether their children had reached school safely and whether they had returned home safely.

Main challenges in implementation:

- Locating through RFID and verifying the boarding time and place of each student into the bus.
- Locating through RFID and verifying the disembarking point and time for each student.
- Sending information alerts to parents that their children have safely reached school or home.
- Alerting the bus driver if any student tries to board the wrong school bus.
- Alerting the bus driver if any student is left behind in the bus.

SOLUTION:

Essen RFID suggested RFID technology as suitable for tracking students entering or exiting the school bus. For this purpose Xtenna™ integrated twin antenna-readers were deployed, while SQL Server was used as the backend database.

IMPLEMENTATION:

Xtenna™ antenna-readers configured to be remotely programmable through Wi-Fi were mounted at the door of each school bus. Each student was issued a PERSONNA™ RFID tag. Controllers with attached GPS devices were installed in each bus, which interfaced with the RFID reader and communicated with the central server located at the school.

WORKING:

Essen RFID's School Bus Student Tracking software was developed for tracking students as they entered and exited the school bus.

Process Flow:

1. Registering students:
   Information required of each student is entered into the database and in the master record of the school. This consists of data such as student's address, age, class year, parents' details, etc. Similarly, data of new students is collected and entered into the school master and database, as and when a new student takes admission in the school.

2. Registering parents:
   This includes information regarding parents, consisting of linking with their children's data and entering their own contact details and mobile phone numbers.

3. Assigning school bus:
   School buses are provided to students based on their address locations appearing along the bus route. Based on its route, the bus is assigned to each student for traveling from home to school and back home. Each student's PERSONNA™ tag is assigned in the database to the Xtenna™ mounted on the relevant bus.

4. Uploading data from server through Wi-Fi network:
   The school premises have Wi-Fi connectivity. When the school bus enters the Wi-Fi network area, data from the server gets uploaded. The updated data is available at the local database.

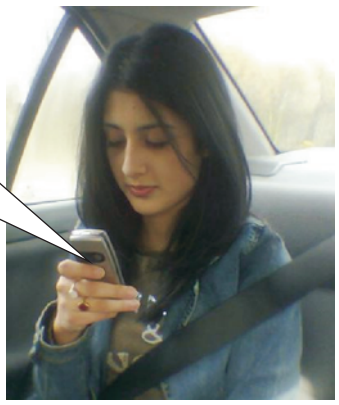
5. Tracking the student entering/exiting the bus:
   Each student wears a RFID-enabled ID card containing a PERSONNA™ tag. When a student's tag ID is read by the twin antennas of Xtenna™, if the tag is detected first by antenna A and then by antenna B, this indicates that the student has entered the bus. If the tag is detected first by antenna B and then by antenna A, then the student is exiting from the bus.

6. **Tracking the student with SMS alerts:**

The Xtenna™ twin antennas read the student's tag and check if he is registered for the particular bus. If the tag ID is not found then a pop-up alert is displayed on the screen. If the student is registered, then the date and time entry for the pickup point is automatically made and a SMS sent to the student's parent.

SMS

Respected Sir/Madam,
Your son Samir has reached school safely at 8:00 am.
Thanks and regards,
School Administrator



When the bus reaches school and the student exits from the bus, the Xtenna™ on the bus door detects the tag ID and sends a SMS to the parent with the location and out time. Similarly, when a student reaches home after school, the tag ID is detected as he exits the bus and a confirmation SMS is sent to the parent.

In case a student is dropped at the wrong location, this is detected by the GPS device installed on the bus and an alert is sent to the parent through SMS that the child has alighted at the wrong location. If a student tries to board the wrong bus after school then the tag ID detected by the Xtenna™ on that bus causes a pop-up display to appear on the screen. This alerts the bus driver that a student not assigned to his bus is getting on board and he then takes the child to the correct bus for his destination.

STUDENT BUS ENTRY / EXIT LOG

ROUTE : ROUTE 1
STOPS : 12

LOG DATE : 12 - OCT-2011

DRIVER : Al Masood
ID No : DRV00123

Sr No	Student Name	Class	Date	Bus In Time	Bus Stop Drop Time
1	Rafi	I	12-Oct-11	9:12	3:10
2	Massood	I	12-Oct-11	10:21	3:01
3	Arif	II	12-Oct-11	11:12	2:52
4	Al Majood	I	12-Oct-11	9:12	2:43
5	Furqan	III	12-Oct-11	11:12	2:34
6	George	IV	12-Oct-11	9:12	2:25
7	Sergio	I	12-Oct-11	11:12	2:16
8	Abu Marwan	I	12-Oct-11	9:12	2:07
9	Moodi	II	12-Oct-11	11:12	1:58
10	Raghav	I	12-Oct-11	9:12	1:49
11	Saif Mamed	III	12-Oct-11	11:12	1:40
12	Aseel	IV	12-Oct-11	9:12	1:31
13	Najjar	I	12-Oct-11	11:12	1:22
14	Nassra	I	12-Oct-11	9:12	1:13
15	Mizna	II	12-Oct-11	11:12	1:04

Tracking Powered by : Xtenna™

BENEFITS:

- Data transmission in real-time through GPRS technology.
- Safe and secure transportation of the child.
- No child is left unattended on the school bus.
- Eliminates chances of student getting on the wrong bus, getting off at the wrong stop or being left behind after the route has been completed.
- Ensures that the child is not left behind sleeping in the bus.

LINKS:

Hardware:

Xtenna Proximity™

Xtenna™

Tags:

PERSONNA™

Software:

Xtenna WebToolkit™

Xtenna Studio™

Reference Example:

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