Vehicle Tracking System for Security and Analyzing Transportation Vehicle Information

A Complete Documentation on Vehicle Tracking System

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Table of Contents: Page No

Foreword

Welcome to VTS 2015, that focus on innovation in the field of testing of integrated circuits and systems.

The core of VTS 2015, responds to the many trends and challenges in the semiconductor design and manufacturing industries, with papers covering a diverse and seminal set of topics including: analog, mixed-signal & RF test; ATPG and compression; BIST; delay and performance test; diagnosis & debug; design for testability; defect, fault and error tolerance; power issues & noise; design verification & security; memory test & repair; on-line test, diagnosis & characterization test of high-speed I/Os; and 3D ICs.

VTS 2015 continues the tradition of featuring the Innovative Practices track. The sessions that make up this track highlight cutting-edge challenges faced by test practitioners, and innovative solutions employed to address them.

The social program at VTS provides an opportunity for informal technical discussions among participants.

VTS is the result of the work of many dedicated volunteers: the reviewers, the best paper award judges, the Program Committee, the Organizing Committee, and the Steering Committee. We whole heartedly thank them all. We also wish to thank all the authors who submitted their works to VTS 2015.

We hope that you will find VTS 2015 enlightening, thought-provoking, rewarding, and enjoyable and hope that you will keep making VTS a success by actively participating in it, assisting in its organization, and letting us always know when we can do something better.

Chief Operation Officer   **VTS TEAM**

(Mr.Indrajeet Chaudhary)   **1) Mr.UDHAM SINGH**

                                      2) Mr. RASHID CHAUDHARY

                                      3) Mr. KUMAR ANUBHAV

ABSTRACT

A vehicle tracking system is an electronic device installed in a vehicle to enable the owner or a third party to track the vehicle's location. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology, which would be the cheapest source of vehicle tracking and it would work as anti-theft system. It is an embedded system which is used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This design will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the vehicle. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded.

Keywords – GPS, GSM, Vehicle tracking, Microcontroller

ABOUT WHITE PAPER

A white paper is a document that describes a given problem and proposes a specific solution to the problem. A typical white paper might list ways to meet a client's marketing needs, suggest the use of a certain product for a technical process, or identify ways to streamline internal communication.
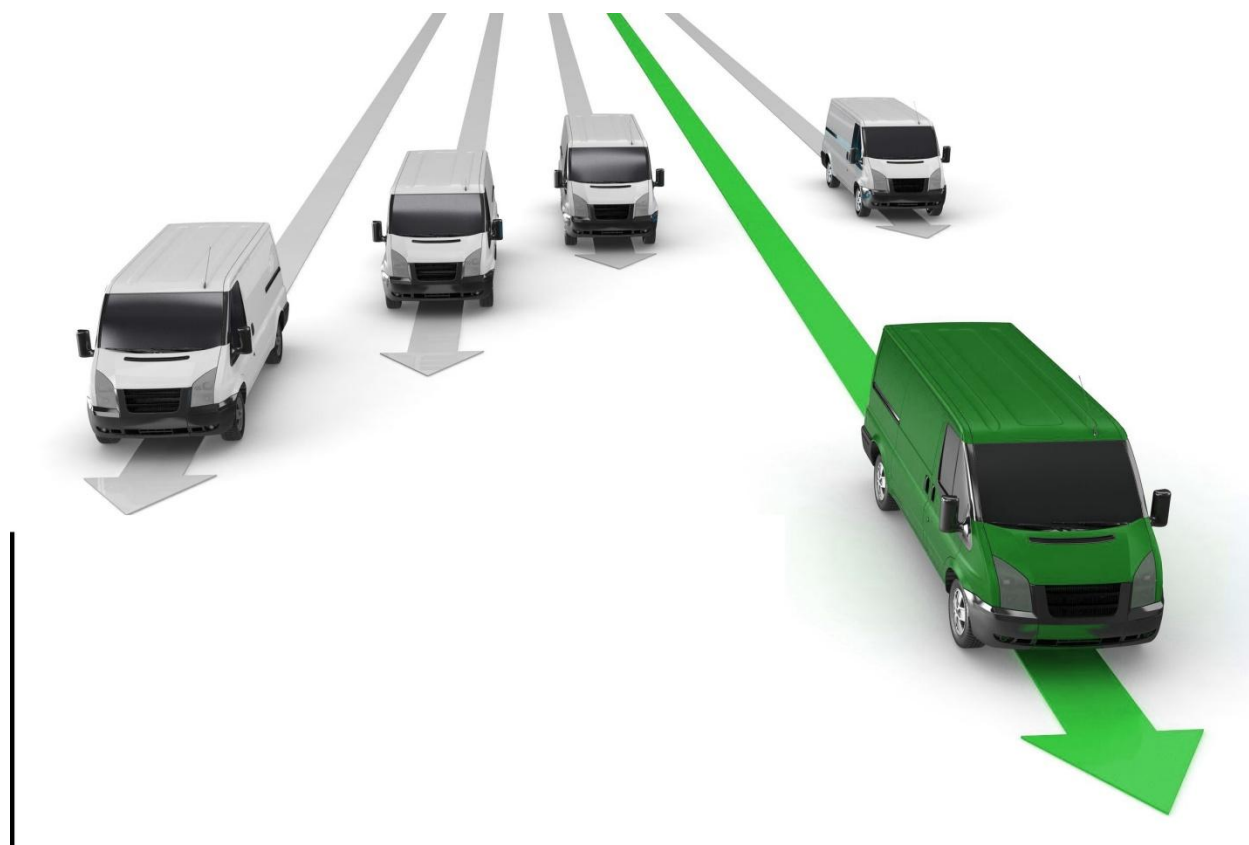
ABOUT VEHICLE TRACKING SYSTEM

Global Positioning System (GPS) vehicle tracking has rapidly gained popularity among fleet owners as the technology becomes more affordable and easier to access.

In general, GPS vehicle tracking utilizes a space-based global navigation satellite system to track time and location information of fleet vehicles. This information is then transmitted to a remote user who can monitor vehicle location, speed, routing, idle time, engine start up and shut down, and much more.

This information can be used to improve a host of fleet management operations including the reduction of fuel costs. According to a study by the Aberdeen Groups (a research firm that studies the effects of technology) on business, fleets with GPS tracking installed experience a 13 percent reduction in fuel costs on average.

Vehicles maintenance is an important but also challenging task, especially if you do not have a complete maintenance solution. The first step to taking control over your fleet maintenance is to look at your options. You can choose to go with either a maintenance-focused software or GPS tracking software that includes a maintenance module. GPS tracking is a better option because not only do you get the ability to monitor maintenance, you will also have complete insight to your fleet with location intelligence for all your vehicles and heavy equipment. With custom maintenance platforms, such as the GPS Insight Maintenance Module, you can enter in any type of service based on mileage, run time hours, or dates. Maintenance reminders will be sent straight to your team or can be displayed on the tracking software's dashboard. This can be any preventative maintenance needed

for your fleet - such as transmission flushes, fluid checks, brake checks, and other services

REALTIME PROBLEMS AND SOLUTION WITH VTS

Here I will discuss some points below that tells, what problems and its solution too that clients are facing while using the VTS.

1) Fleet Operator often think that someone may steal their car, if driver leave the car for some time.

   Solution: Our VTS team Tracks the Vehicles 24*7 i:e if someone steal the cab then with the help of VTS device we can easily find the cab.

Views - Vehicle Status Panel

Search by Vehicle Reg No.

Track All   Total Vehicles 30   Running 8   Stopped 15   No GPS 0   No Network 7   Overspeed 0

S.No.	Reg No.	Date Time	Location	Speed(km/h)	Status	SpeedLimit	Today Travel(Kms)		
1	RJ-34-PA 1261	5/23/2015 11:59:15 PM	Mahaveerji Mohacha Station Road, Mohacha, Rajasthan 322220, India	0	No Network	60	0	Track Me	History
2	RJ-34 PA 1612	5/28/2015 11:29:34 AM	National Highway 11B, Gulab Bagh, Karauli, Rajasthan 322241, India	0	Stopped	60	0	Track Me	History
3	RJ-34 PA 1549	5/28/2015 11:29:26 AM	Unnamed Road, Manoharpura, Rajasthan 322243, India	38	Running	60	72.95	Track Me	History
4	RJ-34 PA 1506	5/28/2015 11:29:30 AM	Sapotra kurgaon via Siwar Bagina Sawai Madhopur Shyampura Bhureri Phari., Major District Road 111, Sapotara, Rajasthan 322218, India	0	Stopped	60	122.57	Track Me	History
5	RJ-34 PA 1505	5/26/2015 4:22:28 AM	Police Station Road, Ibrahimpur, Rajasthan 322204, India	0	No Network	60	0	Track Me	History
6	RJ-34 PA 1504	5/28/2015 11:29:34 AM	Barauni to Sapotra kurgaon via Siwar Bagina Sawai Madhopur Shyampura Bhureri Phari., Major District Road 111, Kurgaon, Rajasthan 322255, India	0	Stopped	60	0	Track Me	History
7	RJ-34 PA 1503	5/28/2015 11:29:27 AM	Unnamed Road, Khidarpur, Rajasthan 322218, India	20	Running	60	71.35	Track Me	History
8	RJ-34 PA 1476	5/28/2015 11:29:36 AM	Sapotra kurgaon via Siwar Bagina Sawai Madhopur Shyampura Bhureri Phari., Major District Road 111, Sapotara, Rajasthan 322218, India	0	Stopped	60	15.07	Track Me	History
9	RJ-34 PA 1347	5/28/2015 11:29:24 AM	National Highway 11B, Bari, Rajasthan 328021, India	0	Stopped	60	97.56	Track Me	History
10	RJ-34 PA 1324	5/6/2015 7:31:33 PM	NA	16	No Network	60		Track Me	History
11	RJ-34 PA 1322	5/28/2015 11:29:36 AM	Rajasthan State Highway 1, Adarsh Nagar, Gangapur City, Rajasthan 322201, India	18	Running	60	75.75	Track Me	History
12	RJ-34 PA 1301	5/28/2015 11:28:10 AM	MDR 3A, Karanpur, Rajasthan 322243, India	0	Stopped	60	0	Track Me	History
13	RJ-34 PA 1300	5/28/2015 11:29:34 AM	National Highway 11B, Binega, Rajasthan 322241, India	28	Running	60	61.69	Track Me	History
14	RJ-34 PA 1299	5/28/2015 11:29:32 AM	Rajasthan State Highway 1, Gau Shala, Hindaun City, Rajasthan 322230, India	0	Stopped	60	3.8	Track Me	History

2) Client are getting problem that they were not able to see the total distance travelled by their particular vehicle.

   Solution: To solve this problem we have added a column in vehicle status panel of "Today Travel (KM)".In this we have shown how much distance is covered by a vehicle.
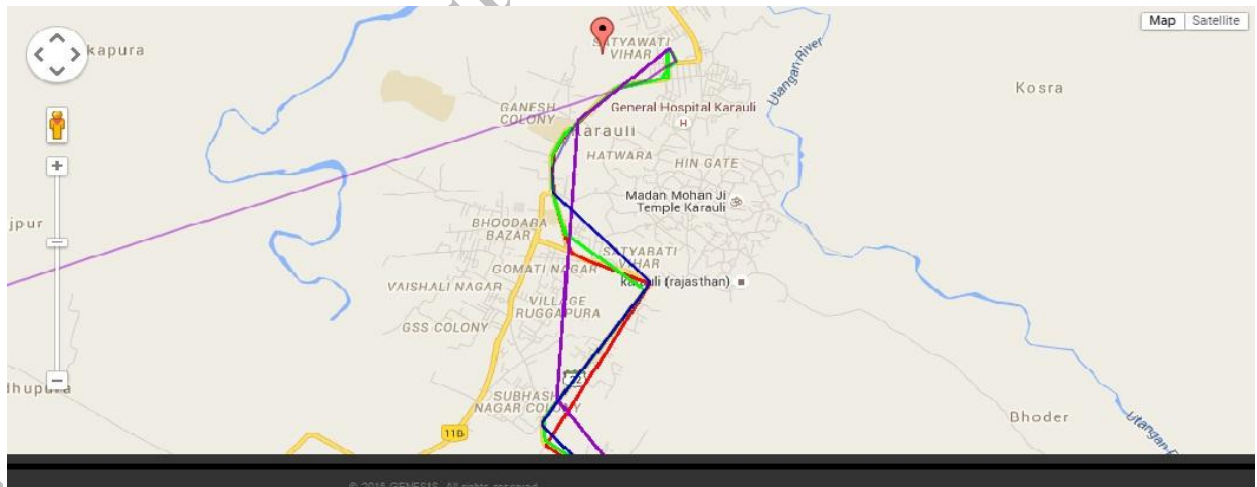
3) Clients are getting problem that their vehicle is not giving mileage.

Solution: To solve this problem we have set a speed limit of 60km/hr and if the vehicle crosses above 60km/hr then a alert message will generate to the client.

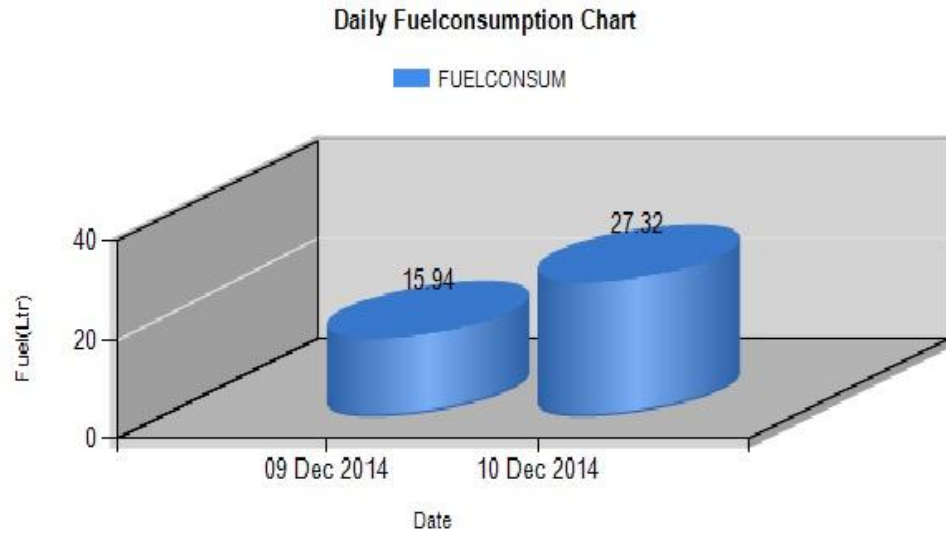| Reg. No	Time	Description	
RJ-34 PA 1300	5/28/2015 11:34:14 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1300	5/28/2015 11:34:03 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1300	5/28/2015 11:33:52 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1300	5/28/2015 11:33:41 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1300	5/28/2015 11:33:30 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1300	5/28/2015 11:33:19 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1259	5/28/2015 11:13:50 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1296	5/28/2015 10:58:30 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1296	5/28/2015 10:58:19 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1296	5/28/2015 10:56:51 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1296	5/28/2015 10:56:40 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1296	5/28/2015 10:46:35 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1296	5/28/2015 10:46:14 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1262	5/28/2015 10:40:54 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1262	5/28/2015 10:40:43 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:29:35 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:26:28 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:26:17 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:26:06 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:25:55 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:25:44 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1347	5/28/2015 10:25:33 AM	SPEED VIOLATION DETECTED	Track Me
RJ-34 PA 1259	5/28/2015 10:25:07 AM	SPEED VIOLATION DETECTED	Track Me

4) Client are getting problem that the total trip covered by vehicle is not showing complete i:e driver is telling that total trip covered was 6 and online its showing 4.

Solution: So to solve this problem we have made geofences and we have added different colored lines on the MAP. A line will draw with different color on MAP as it completes its trip.

5) Clients are always worried about the fuel theft.

   Solution: In order to solve this issue we have added a fuel management report which tells us the Total Fuel Consumption, Total Fuel Filling and Total Fuel Theft.

Daily Fuelconsumption Chart

FUELCONSUM

15.94

27.32

Fuel(Ltr)

40

20

0

09 Dec 2014   10 Dec 2014

Date

DESIGN OF TRACKING SYSTEM

In this Paper it is proposed to design an embedded system which is used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). In this Device AT89C51 microcontroller is used for interfacing to various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so an AT89C51 microcontroller is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the vehicle. The GPS modem gives many parameters as the output, but only the NMEA data coming out and sent to the mobile at the other end from where the position of the vehicle is demanded. When the request by user is sent to the number at the modem, the system automatically sends a return reply to that mobile indicating the position of the vehicle in terms of latitude and longitude.
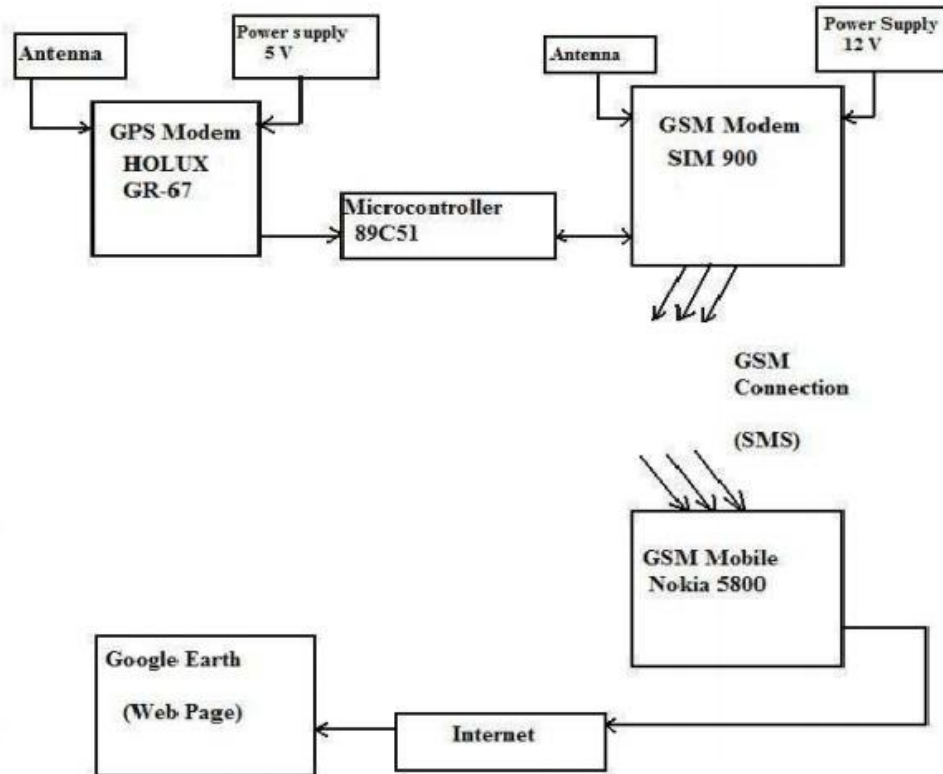
BLOCK DIAGRAM OF TRACKING SYSTEM

Figure: 3   Block diagram illustrating the concept of system

The block diagram of tracking system using GPS and GSM technology is presented in figure 3. The project is vehicle positioning and navigation system we can locate the vehicle around the globe with micro controller, GPS receiver, GSM modem. Microcontroller used is AT89C51. The code is written in the internal memory of Microcontroller i.e. ROM. With help of instruction set it processes the instructions and it acts as interface between GSM and GPS with help. GPS pin TX is connected to microcontroller and GSM pins TX and RX are connected to microcontroller serial ports. Microcontroller communicates with the help of serial communication. First it takes the data from the GPS receiver and then sends the information to the owner in the form of SMS with help of GSM modem. GPS receiver works on 9600 baud rate is used to receive the data from space Segment (from Satellites), the GPS values of different Satellites are sent to microcontroller AT89C51, where these are processed and forwarded to GSM. At the time of processing GPS receives only $GPRMC values only.

<u>Conclusion:</u>

In this paper we have proposed an anti theft system which can be used to track a vehicle fitted with the proposed device in it. It can also be used in wildlife tracking, asset tracking and in stolen vehicle recovery. In the future we may integrate other related devices in a vehicle such as sensors. We can create a server to see the vehicle route and other information on our computer and we can save the trajectory of it. The sensors installed in our vehicle can report the vehicle information to our server and it can form an intelligent tracking system. There are various reasons why car owners and public vehicle operators prefer to have a GPS. You can determine your location, whether you are travelling locally or in a foreign land, having a GPS is truly an advantage. If you think you are lost, you can use your GPS receiver to know your exact location. Vehicle tracking systems are commonly used by fleet operators for fleet management functions such as routing, dispatch, on-board information and security. Other applications include monitoring driving behavior, such as an employer of an employee, or a parent with a teen driver.