

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

## Automotive Spyware Vehicle Tracking Systems

Sushant Tikone<sup>1</sup>, Tejas Muthal<sup>2</sup>, Nachiket Pote<sup>3</sup>, Prof. Mandar Kakade<sup>4</sup>

U.G. Student (B.E.), Department of Electronics and Telecommunication Engineering, Anantrao Pawar College  
of Engineering & Research, Pune, Maharashtra, India<sup>1,2,3</sup>

Assistant Professor, Department of Electronics and Telecommunication Engineering, Anantrao Pawar College  
of Engineering & Research, Pune, Maharashtra, India<sup>4</sup>

**ABSTRACT:** We are proposing web based GPS-GPRS vehicle tracking system. The current position of the vehicle is acquired by GPS device which is integrated to the target vehicle and the location coordinates, and then this data sent through GPRS service provided by the GSM network. The GPS receiver is used for data such as latitude and longitude of the current location. The proposed hardware system is built using the ARM microcontroller. This GPS receiver is interfaced with microcontroller through the serial port and used to obtain the current location. The GPS receiver acquires the present position of the location and sends the same acquired values to GPRS through another com port, to display the exact location on Google map.

**KEYWORDS:** Embedded based Vehicle Tracking System VTS GPS GSM Real Time Tracking.

### I. INTRODUCTION

The GPS-GPRS based tracking system is a system that makes use of the Global Positioning System GPS to determine and detect the precise location of a vehicle to which the device is attached. When a large number of vehicles were spread all over the ground, the owner needs to keep track for fuel saving, time is saving. A tracking system is required to determine the location of any object at any given time and the distance travelled. The need for a tracking system in user's vehicle is used to track reports to locate a stolen vehicle location. In our project we are adding features like ignition control and buzzer in case of vehicle robbery we can control our vehicle by turning off ignition and turning on buzzer to locate the vehicle by GPS and buzzer noise.

### II. LITERATURE SURVEY

#### 1) Real time Vehicle tracking system based on ARM7 GPS and GSM technology

(Pradip V Mistary, Student, Instrumentation Engineering, S.G.G.S Institute of Engineering & Technology, Nanded-431606, IEEE INDICON 2015 1570187057)

This Paper presents GPS based tracking system that has many application in today's world. For example Vehicle-tracking, children tracking, any equipment tracking, fleet management etc. An efficient vehicle tracking system is implemented for monitoring the movement of any equipped vehicle from any location at any time. With the help of Global Positioning System (GPS), Global System for Mobile communication (GSM) modem and Microcontroller are embedded with the aim of enabling users to locate their vehicles with ease and in a convenient manner. This system provides the facility to the user to track their vehicle remotely through the mobile network.

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

## 2) Advanced Vehicle Monitoring and Tracking System based on Raspberry Pi

(Prashant A. Shinde, Electronics Department Walchand College of Engineering Sangli, India (IEEE Sponsored 9th International Conference on Intelligent Systems and Control (ISCO)2015)

An advanced vehicle monitoring and tracking system is designed for monitoring the school vehicle from any location A to location B at real time and provide safety environment to the traveller. The proposed system would make good use of new technology that based on Embedded Linux board namely Raspberry Pi and its advanced feature of storing database at real time. The proposed system works on Global Positioning System (GPS) and Global System for Mobile Communication (GSM) which is used for vehicle tracking and monitoring mechanism.

### III. BLOCK DIAGRAM

#### a. LPC 2138

In this project LPC2138 microcontroller is used for interfacing to various hardware peripherals like in our project we are interfacing GPS and GSM to the controller. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on relative display or website. For doing so an LPC2138 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 is read and displayed on to the LCD. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded. An EEPROM is used to store the mobile number.

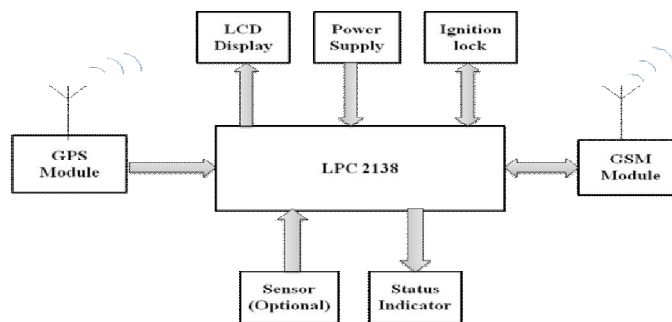


Fig 1: Block diagram

#### b. GPS

**GPS**, in full Global Positioning System, space-based radio-navigation system that broadcasts highly accurate navigation pulses to users on or near the Earth. In the United States' Navstar GPS, 24 main satellites in 6 orbits circle the Earth every 12 hours. In addition, Russia maintains a constellation called GLONASS (Global Navigation Satellite System).

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 AT89S52, where these are processed and forwarded to GSM. At the time of processing GPS receives only \$GPRMC values only. From these values microcontroller takes only latitude and

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

longitude values excluding time, altitude, name of the satellite, authentication etc. E.g. LAT: 1728:2470 LOG: 7843.3089 GSM modem with a baud rate 57600.

- **Triangulation**

The principle behind the unprecedented navigational capabilities of GPS is triangulation. To triangulate, a GPS receiver precisely measures the time it takes for a satellite signal to make its brief journey to Earth—less than a tenth of a second. Then it multiplies that time by the speed of a radio wave—300,000 km (186,000 miles) per second—to obtain the corresponding distance between it and the satellite. This puts the receiver somewhere on the surface of an imaginary sphere with a radius equal to its distance from the satellite.

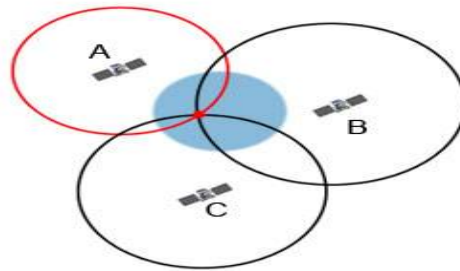


Fig 2: Triangulation/Trilateration method

When signals from three other satellites are similarly processed, the receiver's built-in computer calculates the point at which all four spheres intersect, effectively determining the user's current longitude, latitude, and altitude. (In theory, three satellites would normally provide an unambiguous three-dimensional fix, but in practice at least four are used to offset inaccuracy in the receiver's clock.) In addition, the receiver calculates current velocity (speed and direction) by measuring the instantaneous Doppler Effect shifts created by the combined motion of the same four satellites.

- c. **GSM**

GSM that we have selected for our project is SIM 900. Maximum 160 characters per SMS are available. GSM uses 900 or 1800 MHz frequency Global System for Mobile Communication is the world's most popular standard for mobile telephony system The GSM Association estimates that 80% of the global mobile market uses the standard.



Fig 3: GSM Module

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

This ubiquity means that subscribers can use their phones throughout the world, enabled by international roaming arrangements between mobile network operators. GSM differs from its predecessor technologies in that both signaling and speech channels are digital, and thus GSM is considered a second generation mobile phone system. This also facilitates the wide-spread implementation of data communication applications into the system.

### d. RS232 INTERFACE

In telecommunications serial single-ended data control Data Terminal Equipment Data Circuit-terminating Equipment computer serial ports, RS-232 is the traditional name for a series of standards for binary and signals connecting between a DTE ( ) and a DCE ( ). It is commonly used in. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pin out of connectors. The current version of the standard is TIA-232-F Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange, issued in 1997.

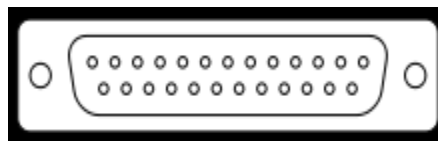


Fig 4: 25 pin connector as described in the RS-232 standard

An RS-232 port was once a standard feature of a personal computer modems, printers, and mice, universal, serial bus for connections to data storage, un-interruptible power supplies, and other peripheral devices. However, the limited transmission speed, relatively large voltage swing, and large standard connectors motivated development of the which has displaced RS-232 from most of its peripheral interface roles. Many modern personal computers have no RS-232 ports and must use an external converter to connect to older peripherals. Some RS-232 devices are still found especially in industrial machines or scientific instruments.

### e. MAX232 IC

The integrated circuit RS-232 TTL MAX232 is an that converts signals from an serial port to signals suitable for use in compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers provide RS-232 voltage level outputs (approx.  $\pm 7.5$  V) from a single + 5 V supply via on-chip charge pumps power supply and external capacitors. This makes it useful for implementing RS-232 in devices that otherwise do not need any voltages outside the 0 V to + 5 V range, as design does not need to be made more complicated just for driving the RS-232 in this case.

The receivers reduce RS-232 inputs (which may be as high as  $\pm 25$  V), to standard 5 V TTL hysteresis levels. These receivers have a typical threshold of 1.3 V, and a typical of 0.5 V. The later MAX232A is backwards compatible with the original MAX232 but may operate at higher baud  $\mu$ F rates and can use smaller external capacitors – 0.1 in place of the 1.0  $\mu$ F capacitors used with the original device.

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017



Fig 5: MAX232 chip

- **Voltage Levels**

It is helpful to understand what occurs to the voltage levels. When a MAX232 IC receives a TTL level to convert, it changes a TTL Logic 0 to between +3 and +15 V, and changes TTL Logic 1 to between -3 to -15 V, and vice versa for converting from RS232 to TTL. This can be confusing when you realize that the RS232 Data Transmission voltages at a certain logic state are opposite from the RS232 Control Line voltages at the same logic state.

#### IV. HARDWARE COMPONENTS

- LPC 2138
- GPS MODULE
- GSM MODULE
- RS232
- MAX 232
- RELAY
- LCD

In this project LPC2138 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 a LPC2138 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 same data is sent to the webpage at the other end from where the position of the vehicle is demanded. An EEPROM is used to store the mobile number.

The hardware interfaces to microcontroller are LCD display, GSM modem and GPS Receiver. The design uses RS-232 protocol for serial communication between the modems and the microcontroller. A serial driver IC is used for converting TTL voltage levels to RS-232 voltage levels. 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.

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

### V. SYSTEM DEVELOPMENT WEBPAGE

#### o LOGIN ID PROCEDURE

- o Above figure shows login ID of user. Above webpage made in visual studio using C#.net for coding.
- o We designed user interface of above webpage using inbuilt toolbox in visual studio we have used free domain of somee.com for our webpage.
- o When we enter user name, password then it will get redirected to tracking page.
- o After entering username and password then its shows default latitude, longitude values and after few seconds page will get refreshed it shows current location of vehicle.



Fig.6 Login ID Procedure

#### o VEHICLE TRACKING PROCEDURE

- o Above figure shows final tracking page which contains latitude and longitude values and current position of vehicle on Google map. It also contains ignition control option for turning OFF the ignition of vehicle.
- o The map shows real time location of vehicle.
- o Ignition control gets consists of microcontroller continually data giving to the relay (cmd=1) i.e. ON condition, but when user click ignition control option then microcontroller will send (cmd=0) to relay then ignition of the vehicle OFF condition.

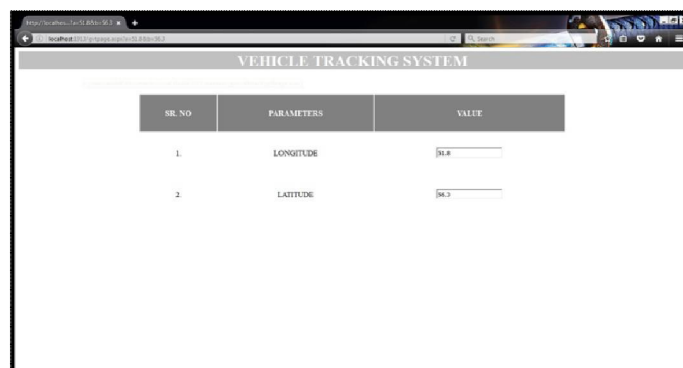


Fig.7 Location details on webpage



# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

## VI. SIMULATION & RESULTS

### a. Current Longitude value:

It shows current longitude values on LCD display from GPS module. When the GPS module takes this data from the satellite and this given to the microcontroller and microcontroller will send the command to the LCD display to the current longitude values.

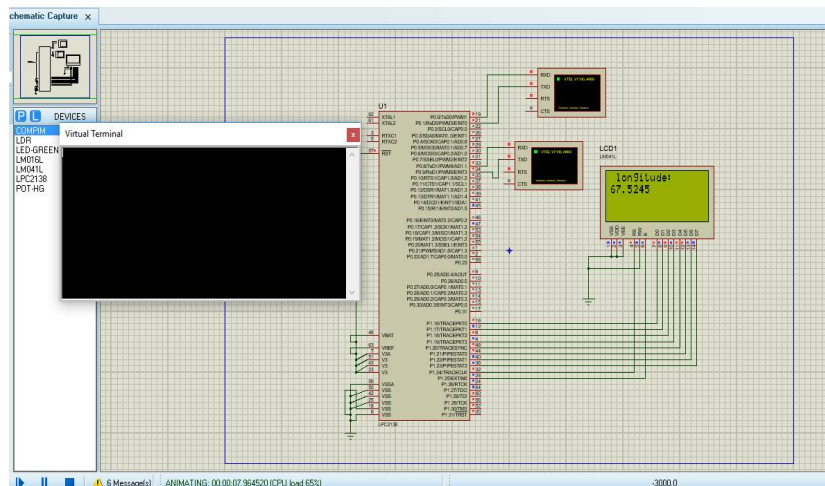


Fig.8 Current Longitude value:

### b. Current Latitude value:

It shows current latitude values on LCD display from GPS module. When the GPS module takes this data from the satellite and this given to the microcontroller and microcontroller will send the command to the LCD display to the current latitude values.

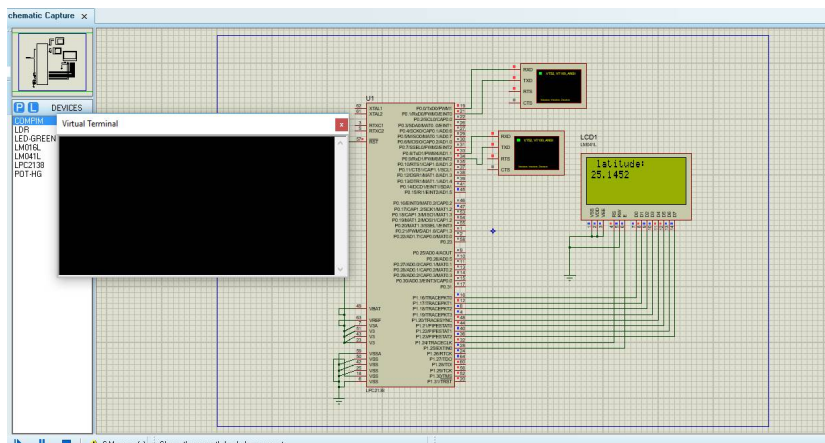


Fig.9 Current Latitude value:

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 5, May 2017

## VII. ADVANTAGES

- For real time tracking the vehicle
  - It gives the location of the vehicle time to time.
- Gives accurate location and distance travelled by vehicle
  - We can track vehicle position as accurate as possible upto 5 meters close.
- Less power requirements
  - This system requires very less amount of power for the operation.
- We can implement this product in all type of Vehicles
  - We can place this product in two wheelers, four wheelers and all other type of vehicles.

## VIII. APPLICATIONS

- Automotive and transport vehicle
- Security transportation
- When the vehicle is robbed we can switch off ignition from any place
- For tracking School Bus

## IX. CONCLUSION

We developed and tested a vehicle tracking system to track the exact location of a moving or stationary vehicle in real time. This system has described the designed and development of the system in real time successfully. The system consists of hardware module as well as software part. The system provides positioning and navigational information in terms of no. of parameters. The developed system is compact and reliable. Using the same system internet based applications and mobile based messaging applications. And main application of this project is that we can turn off the ignition of vehicle if in case theft a vehicle.

This system can be further extended for multiple applications as follows

- Anti-theft system for cars and bikes.
- Managing of public transports like buses and trains.
- Tracking of valuable assets.

## REFERENCES

- [1] S.Sahitya, N.Swetha "International Journal of Research in Computer and Communication Technology (IJRCCT)" Vol 3, Issue 10, October - 2014
- [2] B.Praveen kumar, V.Anuragh, NLP Raju "International Journal of Science and Research(IJSR)" DEPT of ECE, BVC ENGG COLLEGE, Odalarevu, vol-1 Nov-15
- [3] Kiran Kumar, A. Mallikarjuna Prasad, "Public Transportation Management Service using GPS-GSM", International Journal of Research in Computer and Communication Technology, IJRCCT, ISSN-2278-5841, Vol-1, Issue-3, Aug-2012.
- [4] Ambade Shruti Dinker and S. A Shaikh, "Design and Implementation Of vehicle Tracking System Using GPS", Journal of Information Engineering and Applications, Vol 1, No.3, 2011
- [5] Pradip V Mistary "Real time Vehicle tracking system based on ARM7 GPS and GSM technology" Instrumentation Engineering, S.G.G.S Institute of Engineering & Technology, Nanded-431606 India, vol-4 Feb-13
- [6] Prashant A. Shinde "Advanced Vehicle Monitoring and Tracking System based on Raspberry Pi" Electronics Department Walchand College of Engineering Sangli, India vol-3 Dec-10
- [7] Eddie Chi-Wah Lau, "Simple Bus Tracking System", Journal of Advanced Computer Science and Technology Research, Vol-3, No.1, 2013





ISSN(Online) : 2319-8753  
ISSN (Print) : 2347-6710

## International Journal of Innovative Research in Science, Engineering and Technology

*(An ISO 3297: 2007 Certified Organization)*

Website: [www.ijirset.com](http://www.ijirset.com)

**Vol. 6, Issue 5, May 2017**

- [8] Montaser N. Ramadan, Mohammad A. Al-Khedher, and Sharaf A. Al-Kheder, "Intelligent Anti-Theft and Tracking System for Automobiles", International Journal of Machine Learning and Computing Vol.2 No. 1, February 2012.
- [9] Tracy M. L. Brown, Steven A. McCabe and Charles Wellford, "Global Positioning System (GPS) Technology for Community Supervision: Lessons Learned", US Department of Justice, document No. 219376, vol 2. April 2007..
- [10] S. Hoff, M. Meyer, and A. Schieder, "A performance evaluation of Internet access via the general packet radio service of GSM", in Proc. 48th IEEE Vehicular Technol. Conf., Ottawa, vol. 3, pp. 1760–1764, 1998.