

Vehicle Tracking System Through the Satellite Communication

S. Visalatchi

UG scholar

Dept. of Aeronautical
Engineering

Parisutham Institute of Technology and Science,
Thanjavur, Tamilnadu-India

N. Vairamuthu

Assistant professor

Dept. of Aeronautical
Engineering

Parisutham Institute of Technology and Science,
Thanjavur, Tamilnadu-India

Abstract: The project consists of a microcontroller which is interfaced with the Gps module, gsm modem and a vibration sensor for fetching the data from the Gps module. Once the microcontroller senses the strong vibration, it assumes an accident. From the instance of vibration it starts an alarm. For a time period say approx 15 to 25 seconds. If the peoples are safe they should press a emergency switch to stop the alarm. If none of the people fails to press the switch within the specified time. The controller assumes it as an emergency and starts the gsm modem sending the latitude and longitude information to the specified mobile number, by fetching the information from the Gps. The data from the Gps module is obtained at a baud rate of 19200 BPS. With a specified format with various unwanted and mixed strings of data. The microcontroller reads the required data and eliminates the unwanted data. Thus the data fetched is only the latitude, longitude and is displayed in LCD for our reference.

Key words: Vehicle tracking, GPS, GMS, Emergency cases, satellite communication.

I. INTRODUCTION

This project describes the concept of the alert the other people to protect the affected people by the accident. The high sophisticated sensors are used in this project to predict the current scenario on the accident place. The sensors will predict the value of the human pressure, blood flowing, heart beats and other parameters and by using of GPS can able to detect the location of the accident place and by using of the GSM can able to send the hospitals located near to the emergency place and relatives through the satellite communication. GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received.

The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.

GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. A GSM (Global System for Mobile Communication) modem is a wireless modem that

works with a GSM wireless network. A wireless modem sends and receives data through radio waves.

II. SOME APPLICATION AREAS

Vehicle tracking system can be used in many fields. such as

1. Online Fleet Management
2. Fuel and Heat Level Monitoring
3. Order and Cargo Tracking
4. Fleet Performance Analysis
5. Security, Road Assistance
6. Emergency Help

III. THE NEED OF VEHICLE TRACKING SYSTEM

- Fuel and Power Saving
- Effective Fleet Control
- Instantaneous Fuel Level Monitoring
- Decreasing the Accident Risk
- Driver and Load Security
- Evaluation of Drivers Performance
- Monitoring the Delivery Time
- Safer Vehicle Renting



Fig.1 Various vehicle system

III. REASONS OF USING VTS FOR LOGISTIC COMPANIES

- Prevent smuggling
- Knowing the exact location of the cargo
- Storing data about routes of trucks
- Providing information to customer

A.Reasons of Using GPS Tracking Systems for Insurance Companies

- Security for theft

With variations of vehicle tracking system insurance companies can locate the stolen vehicle and stop its engine. To make this system common Insurance companies offer discount for the insurance of cars.

Ex: Genel Sigorta provides 15% discount for the customers who are agree to apply UND vehicle tracking system (UND is a product of UND Teknolojileri, which has a agreement with Genel Sigorta.)

B.Reasons of Using GPS Tracking Systems for Automotive Producers

To provide emergency service to customers

Ex: Porsche offers a GPS tracking system for its customers. With pushing on a single button called S.O.S on the middle console Porsche customer can get road service. (Only in Europe)

To keep track of the products against auto theft

C.Technology Used for VTS

- Instantaneous Location Targeting
 - Positioning 2-3 metres with GPS Satellite Help
- Acknowledging the Position
 - via GSM, SMS or Data Line
- Monitoring the Vehicle Online
 - Tracking the position of the vehicle on digital maps via an online monitoring program

IV. VEHICLE KIT COMPONENTS

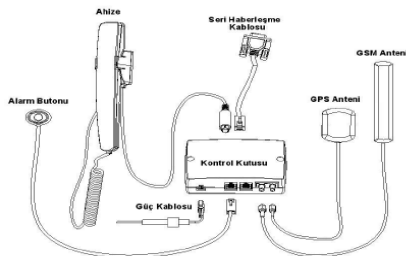


Fig.2 vehicle tracking system components

A.requirements of vts



Fig.3 Vehicle KIT



Fig.4 Gsm SIM Card



Fig.5 OnLine Software

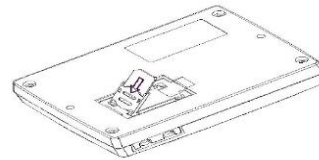


Fig.6 KIT GSM CARD PLACE

V. WOKİNG PRİNCİPLE OF VEHICLE TRACKİNG SYSTEM

procedure of VTS

Detections of train collision and location using GPS and send SMS through GSM to a mobile consists of the following parts.

- Microcontroller unit
- GPS module
- GSM modem
- Vibration sensor
- LCD display
- Power supply
- Max 232

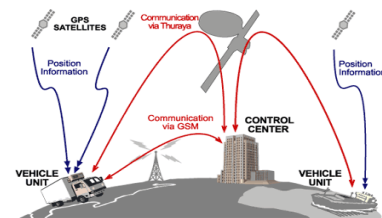


Fig.7 working principle of VTS

A.Micro controller

- The AT89C51 is a low-power, high-performance CMOS 8-bit Microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM).
- The device is manufactured using Atmel’s high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out.
- The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer.
- By combining a versatile 8-bit CPU with Flash on a monolithic chip the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

B.GSM modem:

- A GSM modem is connected to each Tele control unit. The central server calls up each of the Tele control units in samples homes to pick up the data stored therein.
- aMap's technology architecture enables instant data collection from the samples homes as often as desired.
- Its also enables conducting of instant opinion polls about the programs being telecast. by the problems with cellular connection, the data can be collected later at any time over next seven days.

C.GPS module

- ProGin SR-92 is a low-power, ultra-high performance, easy touse GPS smart antenna module based on SiRF's third generation single chip.Its low power consumption and high performance enables the adoption of handheld applications.
- The slim design allows SR-92 to be placed on top side of the housing to have best GPS signal reception. The 5-pin I/O interface is then connected to the main board with either connector or wire soldering.
- The power control feature is very convenient to turn on/off power via GPIO control pin. It's especially useful in cases such as to turn off power as the user just wants to watch a movie and GPS function is not needed in the PMP case.

D.Vibration sensor

- One of the best tests for quality when dealing with important equipment is the use of vibration, which includes shaking, shocking, or rocking certain components to ascertain how well they stand up during distressing conditions.
- Vibration test labs exist as a helpful measurement tool that provides proof of component quality, according to national and international standards, in a variety of application.
- Hydraulic vibration, typically used for larger loads and lower frequency testing (1-500 Hz).Electro-dynamic vibration, typically used for higher frequency testing (20-10,000Hz).

E.LCD display

- A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector.
- It is utilized in battery-powered electronic devices as it uses very small amounts of electric power.
- LCDs with a small number of segments, such as those used in digital watches and pocket calculators have individual electrical contacts for each segment. An external dedicated circuit supplies an electric charge to control each Segment.

F.Power supply

- A power supply (sometimes known as a power supply unit or PSU) is a device or system that supplies electrical or other types of energy to an output load or group of loads. The term is most commonly applied to electrical energy

supplies, less often to mechanical ones, and rarely to others.

- The transformer steps up or steps down the input line voltage and isolates the power supply from the power line. Rectifier section converts the alternating current input signal to a pulsating direct current. However, as you proceed in this chapter you will learn that pulsating dc is not desirable. For this reason a filter section is used to convert pulsating dc to a purer.

G.Max 232

- The MAX220–MAX249 contain four sections: dualcharge-pump DC-DC voltage converters, RS-232 driversRS-232 receivers, and receiver and transmitter enable control inputs.
- The typical driver output voltage swing is $\pm 8V$ when Loaded with a nominal $5k\Omega$ RS-232 receiver and $VCC +5V$.Output swing is guaranteed to meet the EIA/TIA-232E and V.28 specification, which calls for $\pm 5V$ minimum driver output levels under worst-case conditions.
- These include a minimum $3k\Omega$ load, $VCC = +4.5V$, and maximum operating temperature. Unloaded driver output voltage ranges from $(V+ -1.3V)$ to $(V- +0.5V)$.Input thresholds are both TTL and CMOS compatible.

VI. SVTS SOFTWARE

- SVTS is the software which is located at the control center and it forms the brain of the system.
- It contacts with the vehicle kits, gathers information from them and processes this info.
- Information coming from the vehicle is viewed over a GIS (Geographical Information System) system which is integrated to the SVTS software.
- This system enables users to see which route the vehicle uses over digital maps.

5.1Appearance of SVTS

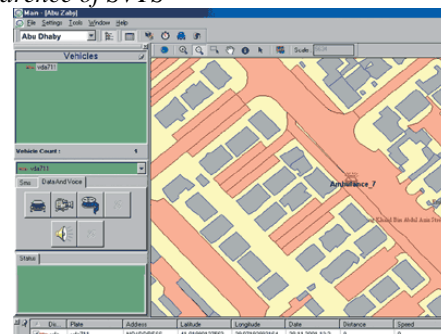


Fig.8 appearance of VTS

VII. COST OF VTS (standart)

- One vehicle
 - Setup cost: \$280 / minimum requirements
 - Variable cost
 - For internet application: \$ 10-15 / month
 - For GSM Service
 - 1-2 YTL / month (5 minutes update)

VIII. CONCLUSION

In this project we have designed to find the detection of train collision using GSM and GPS. In these circuits, the microcontroller plays a vital role in sensing the transition from a high to low signal i.e. the condition for tampering. The GSM modem is connected to the microcontroller via MAX -232 which helps in serial communication. Thus sensor vibrated means , the GSM modem sends an SMS to the master mobile computer placed at the EB premises. Each GSM modem will have a SIM number which uniquely identifies a fraudulent customer.

The prototype developed has been found to perform well for the three different tampering conditions. This, when implemented in reality will definitely help the EB to cut down the revenue losses.

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