GPS - GPRS BASED VEHICLE TRACKING SYSTEM

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SYSTEM REQUIREMENT

A pioneering commercial service

- GPS and GIS based tracking system
- Uses GSM / GPRS network for communication
- Web based presentation of data on digital maps
- Subscription based service
  - ASP model of service delivery
SYSTEM REQUIREMENT

- Components
  - ON BOARD DEVICE
  - GSM / GPRS NETWORK
  - BASE STATION / DATA CENTER
  - GPS MODULE =GT-714HC
  - GPRS MODULE=P5186D
  - MICRO CONTROLLER-P89V51RD2
  - MULTIPLEXER-74HC157
  - VEHICLE TRACKING SOFTWARE
  - SIM CARD
WHAT IS GPS?

- **GLOBAL POSITIONING SYSTEM**

“A network of satellites that continuously transmit coded information, which makes it possible to precisely identify locations on earth by measuring distance from satellites.

*By having received the almanac and ephemeris data, the GPS receiver knows the position (location) of the satellites at all times*
APPLICATION OF GPS

Science and research
Commerce and industry
Agriculture and forestry
Communications technology
Tourism/sport  Military
Time measurement
Tracking of any object
Survey of land
WHAT IS GPRS?

- It is a mode in which resources are assigned to user only when data needs to be sent or received.

- Data is sent in packets, which are routed across the network along with other user traffic.

- GPRS provides the transmission of IP packets over existing cellular networks.
APPLICATIONS OF GPRS

- Navigation
- Traffic conditions
- Airline/Rail schedules
- Location finder
LEADING COMPANIES WHO USES GPS

GARMIN corporation: www.garmin.com
VISIONTEK: www.visiontek.co.in
WHAT IS VEHICLE TRACKING SYSTEM?

“Vehicle Tracking Service “ means an Electronics device that reports its location by using Global Positioning system (GPS), data receive from GPS satellites.

This device is installed in car/vehicle with antenna and tracking the vehicle. GPS controlled and handled by computer system.

Thus there is a continuous track of the vehicle which can be stored in a database and can be retrieved later.
APPLICATIONS

Fleet management
Security purpose
Anti-theft system in vehicle
Geo-fencing
Geographical survey
BLOCK DIAGRAM OF PROJECT

- MMC CARD
- GPS MODULE
- MULTIPLEXER
- GPRS MODULE
- P89V51RD2
- KEYPAD
- LCD
- In-vehicle Unit
- Base station
- COMMUNICATION LINK

Connections:
- P1.4-P1.7
- P3.0-P3.1
- PORT 0
- PORT 1
The device consists of a micro-controller interfaced with a GPS and a GPRS module.

The GPS module receives the information of the vehicle and passes it to the controller.

The controller extracts the required information and makes a packet out of it that consists of geographical data and other information.
This packet is passed to the GPRS device that is configured for point to point service.

The remote receiver consists of a GPRS module interfaced with pc.

A software will display the current position of the vehicle on the map.
How system works?

Customer tracks vehicles on the Web Anytime anywhere

GPS Receiver

GPRS/GSM Modem

Remote Vehicle

GPRS Network

GPRSS

GSM Modem

GIS Data Base

Transtrack Data Center

Internet

GIS Web Server
GPS MODULE (GT-714FS)

Fast-acquisition high-sensitivity 44-channel SMD GPS receiver module.

It is optimized for high-performance, ease-of-use, flexibility, and low-cost. The GPS receiver is suitable for a wide range of navigation and tracking applications.
NMEA PROTOCOL

GPS module follows NMEA protocol to interface with microcontroller.

It helps to send different frames received from the satellites.

These frames contain parameters of vehicle like longitude, latitude, date, time, speed etc.
NMEA0183 PROTOCOL

- National Marine Electronics Association 0183 (NMEA-0183)
  - (Inter)National standard for navigation data exchange among marine electronics (GPS, LORAN, wind/water speed sensors, autopilot, etc)
  - Adopted by GPS community as defacto standard for simple output-only Position-Velocity-Time reporting
  - Available on nearly every commercial GPS with a serial port
  - Uses standard serial port (RS-232C) at 4800,8,N,1 default
  - Output-only ASCII-only comma-delimited string-based protocol
- NMEA strings:
  - $GPGGA – GPS fix data message (lat, lon, time, #SVs, etc)
  - $GPGGGL – Geographic position (lat, lon, time)
  - $GPGSA – GPS DOP and active satellites (SVs, P,H,VDOP)
  - $GPGSV – GPS satellites in view (SV elevation/azimuth, SNR, etc)
  - $GPVTG – GPS velocity and heading
  - $GPZDA – Time & Date message
FRAMES FROM SATELLITES

$GPGGA,hhmmss.sss,ddmm,mmmm,a,ddmm.mmmm,a,x,xx,x.x,M,x.x
M,x.x,xxxx*hh<CR><LF>

$GPGLL,ddmm.mmmm,a,ddmm.mmmm,a,hhmmss.sss,A,a*hh<CR><LF>

$GPGSA,A,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x*hh<CR>,<LF>

$GPGSV,x,x,xx,xx,xx,xxx,xx,...,xx,xx,xxx,xx*hh<>CR3<LF>

$GPRMC,hhmmss.sss,a,ddmm.mmmm,a,ddmm.mmmm,a,x.x,x.x,ddmmyy,x
.x,a.a*<CR><LF>

$GPRMC,092204.999,A,4250.5589,S,14718.5084,E,0.00,89.68,211200,,A*25<CR><LF>

$GPVTG,x.x,t,x.x,m,x.x,n,x.x,k,a*hh<CR><LF>
**GPRS MODULE**
*(WISMO Quik Q2400 series)*

- **WISMO Quik Q2403 Series has two external connections**
- **RF connection pads (to the antenna)**
- **General Purpose Connector (GPC) to Digital, Keyboard, Audio and Supply**
GENERAL INFORMATION

- Serial link
- SIM card
- Antenna switch
- Keyboard
- Complete interfacing
- 2 watts EGSM radio section running under 3.6 Volts
- 1 watts GSM1800 radio section running under 3.6 Volts
- Subscription model ensures low investments & fast roll out
AT COMMANDS FOR GPRS

- AT commands is use for GPRS module to pass the information from in -vehicle unit to base station GPRS module

- There are many types of AT commands:
  1. GPRS COMMAMND
  2. SIM TOOLKIT COMMAMND
  3. DATA COMMANDS
  4. SMS COMMANND
UNIQUE FEATURES OF PROJECT

🔹 If a vehicle is outside the range of the GPRS service, it is possible that a remote device may not be able to know the position of the vehicle in that time gap.

🔹 For that purpose, there is MMC card which stores the data even when the vehicle is out of range and this data can be retrieved later.

🔹 The locking of a vehicle from the remote PC.
Application

**Usage** - Generalized applications for Logistics, cargo, personnel transportation, Call Center/ BPO proliferation requirements for both in-city and inter state movements. Used by modern metro police control rooms for dynamic deployment and close monitoring of petrol vans, mobile personnel and espionage.

**Application** - Standard features of fleet databases, planning and monitoring, post-mortem analysis, route planning and fleet optimization, interfacing with legacy systems, direct access and CRM features for end customer & timely authentication.


**Segments** - Automobile Manufacturers, White goods, Freight Forwarding, Inter state Bus services, Cargo couriers, Petro-distribution, FMCG, Pharma, Corporate Personnel Movements, Luxury Taxis, Call Centers, BPO, City and Metro Police forces, Para-military etc.
FUTURE ASPECTS

This project can be designed for the purpose of pet tracking.

It can also be extended to the level of human tracking.
Thank you