Tracking Genie Training Module

What is Tracking Genie?

- Tracking Genie is an innovative and cost-effective provider of world-class vehicle tracking solutions. Established in the year 2007, we are an ISO 9001:2008 certified company. We provide robust hardware along with cutting-edge web and mobile applications to help our customers manage their single or an entire fleet of vehicles.
- With our well-defined processes that support and deliver world-class services, we also have a flexible model for the design, development, deployment and maintenance of customized vehicle tracking solutions, based on our customers' precise needs and expectations.

Contd… What is Tracking Genie?

- Our passion lies in helping businesses find new ways to grow, increase their everyday efficiency and delight their customers with much-improved services. Using our innovative and intelligent vehicle tracking solutions, their management can now have a complete picture of what's happening out there in the field and use that knowledge to further improve their operations. We transform the complex and ever-growing piles of paper with raw data into simple, easy-to-understand information.

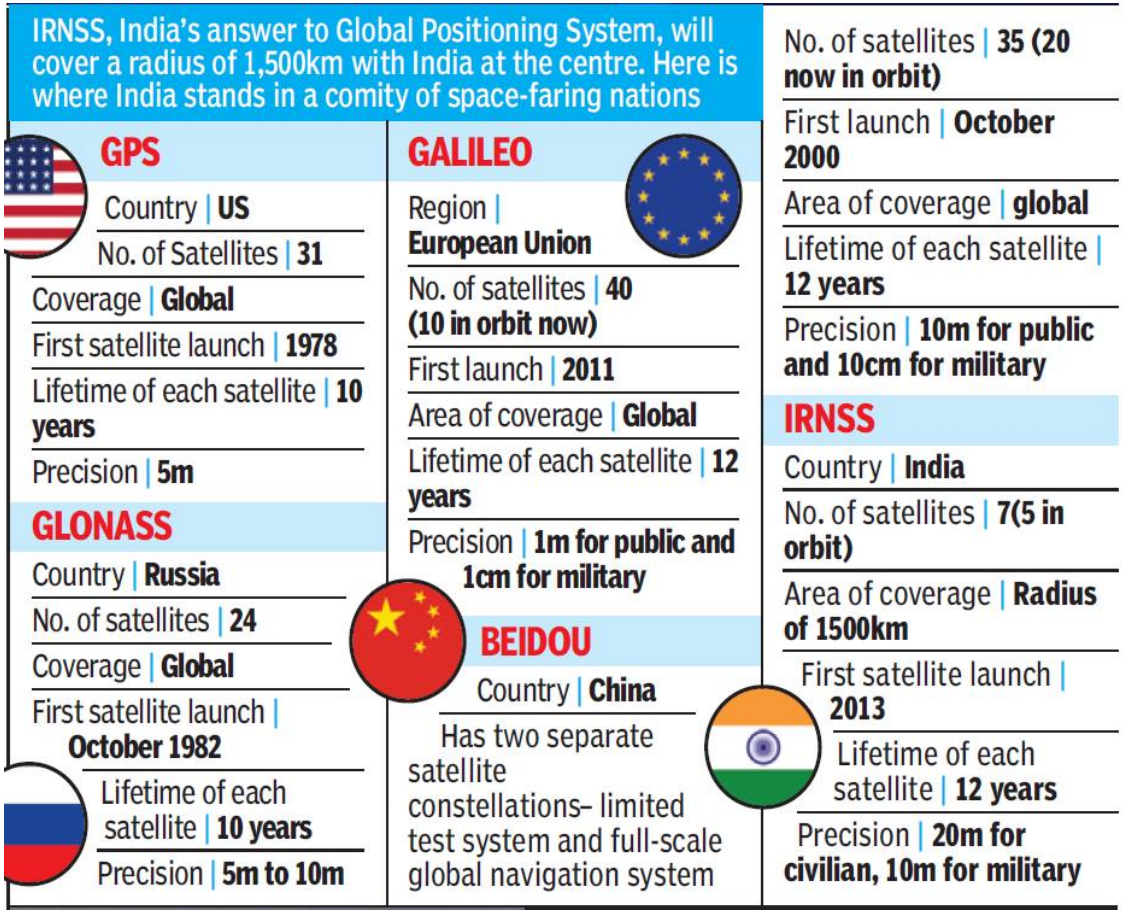
Need of Tracking Genie

- Maximise Return of investment on commercial vehicles by tracking and properly controlling operations.
- Driver behaviour analysis and management.
  - Overspeeding
  - Halts
  - Ideling
  - Night driving
- Protects Vehicle theft
- Live tracking
- Vehicle Maintenance Alerts
- Increased Productivity by avoiding unauthorised stops and breaks, timely delivery

Positioning Systems

The GPS (Global Positioning System) is a "constellation" of approximately 30 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers (like tracking genie) to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 meters for most equipment. Accuracy can be pinpointed to within one (1) meter with special military-approved equipment. GPS equipment is widely used in science and has now become sufficiently low-cost so that almost anyone can own a GPS receiver.

1. GPS-USA (Global Positioning System)
2. GLONASS-Russia
3. Galileo- European Union
4. Beidou-China
5. INRSS- INDIA

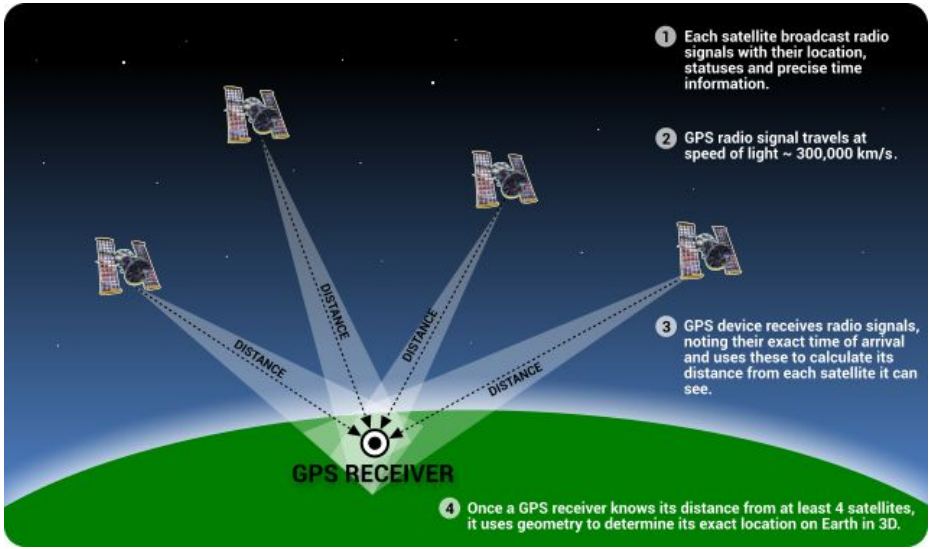


What is GPS

GPS or Global Positioning System is a network of orbiting satellites that send precise details of their position in space back to earth. The signals are obtained by GPS receivers, such as navigation devices and are used to calculate the exact position, speed and time at the vehicle's location.

GPS is well-known for its military uses and was first developed by the US to aid in its global intelligence efforts at the height of the Cold War.

Ever since the early 1980s, however, the GPS has been freely available to anyone with a GPS receiver. Airlines, shipping companies, trucking firms, and drivers everywhere use the GPS system to track vehicles, follow the best route to get them from A to B in the shortest possible time.



HOW GPS WORKS

GPS

IS A CONSTELLATION OF 24 OR MORE SATELLITES FLYING 20,350 KM ABOVE THE SURFACE OF THE EARTH. EACH ONE CIRCLES THE PLANET TWICE A DAY IN ONE OF SIX ORBITS TO PROVIDE CONTINUOUS, WORLDWIDE COVERAGE.

{t_1}

1 GPS satellites broadcast radio signals providing their locations, status, and precise time {t_1} from on-board atomic clocks.

{c}

2 The GPS radio signals travel through space at the speed of light {c}, more than 299,792 km/second.

{t_2}

3 A GPS device receives the radio signals, noting their exact time of arrival {t_2}, and uses these to calculate its distance from each satellite in view.

To calculate its distance from a satellite, a GPS device applies this formula to the satellite's signal:

distance = rate x time

where **rate** is {c} and **time** is how long the signal traveled through space.

The signal's travel **time** is the difference between the time broadcast by the satellite {t_1} and the time the signal is received {t_2}.

The GPS Master Control Station tracks the satellites via a global monitoring network and manages their health on a daily basis.

Ground antennas around the world send data updates and operational commands to the satellites.

4 Once a GPS device knows its distance from at least four satellites, it can use geometry to determine its location on Earth in three dimensions.

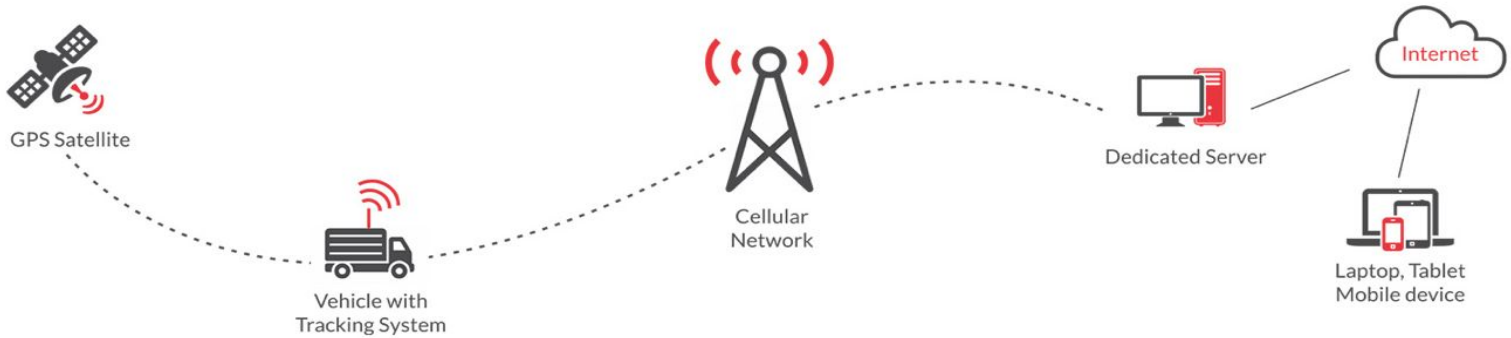
The Air Force launches new satellites to replace aging ones when needed. The new satellites offer upgraded accuracy and reliability.

How does GPS help farmers? Learn more about the Global Positioning System and its many applications at

WWW.GPS.GOV

This poster is a product of the National Coordination Office for Space-Based Positioning, Navigation, and Timing, an official body of the United States Government. Rocket image courtesy of ULA.

How Tracking Genie Works



VTS- Vehicle Tracking System

- A vehicle tracking system combines the use of automatic vehicle location in individual vehicles with software that collects these fleet data for a comprehensive picture of vehicle locations.
- Modern vehicle tracking systems commonly use GPS or GLONASS technology for locating the vehicle.
- Vehicle information can be viewed on electronic maps via the Internet or specialized software.
- Types Of VTS:
  - Active VTS
  - Passive VTS

Active and Passive VTS

- Passive devices store GPS location, speed, heading and sometimes a trigger event such as key on/off, door open/closed. Once the vehicle returns to a predetermined point, the device is removed and the data is downloaded to a computer for evaluation. Passive systems include auto download type that transfer data via wireless download.
- Active" devices also collect the same information but usually transmit the data in near-real-time via cellular or satellite networks to a computer or data center for evaluation.

Contd… Active and Passive VTS

- Many modern vehicle tracking devices combine both active and passive tracking abilities: when a cellular network is available and a tracking device is connected it transmits data to a server; when a network is not available the device stores data in internal memory and will transmit stored data to the server later when the network becomes available again.

VTS usage (Industry Wise)

VTS usage (Industry Wise)

- **Logistics, Courier & Rent-A-Car Services:**
  - Every minute of an hour is valuable for these industries; quickly dispatching the closest driver to the delivery location can make all the difference.
  - Through 2-way communication, a GPS tracking system allows both dispatchers and drivers to see which vehicle is closest to the next pick-up/drop location.
- **Emergency Services:**
  - Emergency services including police, ambulance, fire engines etc take the help of GPS tracking to reach the destination point as soon as possible.
  - Through the most feasible route by avoiding all unwanted stops/deviations/traffic blocks with help of a control center at the headquarters.
- **Educational Institutions:**
  - Who’s not worried about their kids till they reach back at home from school?
  - School authorities found a flawless answer through GPS tracking; parents can now receive location updates of kids through text messages/SMS.

Contd… VTS usage (Industry Wise)

- **Construction:**
  - Infrastructure companies make use of GPS tracking to track & monitor gigantic trailers & heavy equipment so as to know where all the assets are, all the time.
  - Detailed information on idled engine times make it easy for the site managers to take decisions wisely on overtime claims.
- **Restaurants, Catering Services & Product Distribution:**
  - Restaurants keep more accurate delivery times and offer the food as hot as it is.
  - With real-time GPS route planning and dispatching, product distribution is done more easily and quickly.
- **Personal Tracking:**
  - User can use this device for personally tracking their vehicles.
  - User can keep a check on the paths/routes driver has taken, can check fuel consumption, how many time a driver fill fuel in the vehicle etc.
  - If vehicle is stolen, one can track the vehicle.

Latitude & Longitude

- Latitude and longitude are angles that uniquely define points on a sphere.
- Together, the angles comprise a coordinate scheme that can locate or identify geographic positions on the surfaces of the earth.

System Design and Implementation

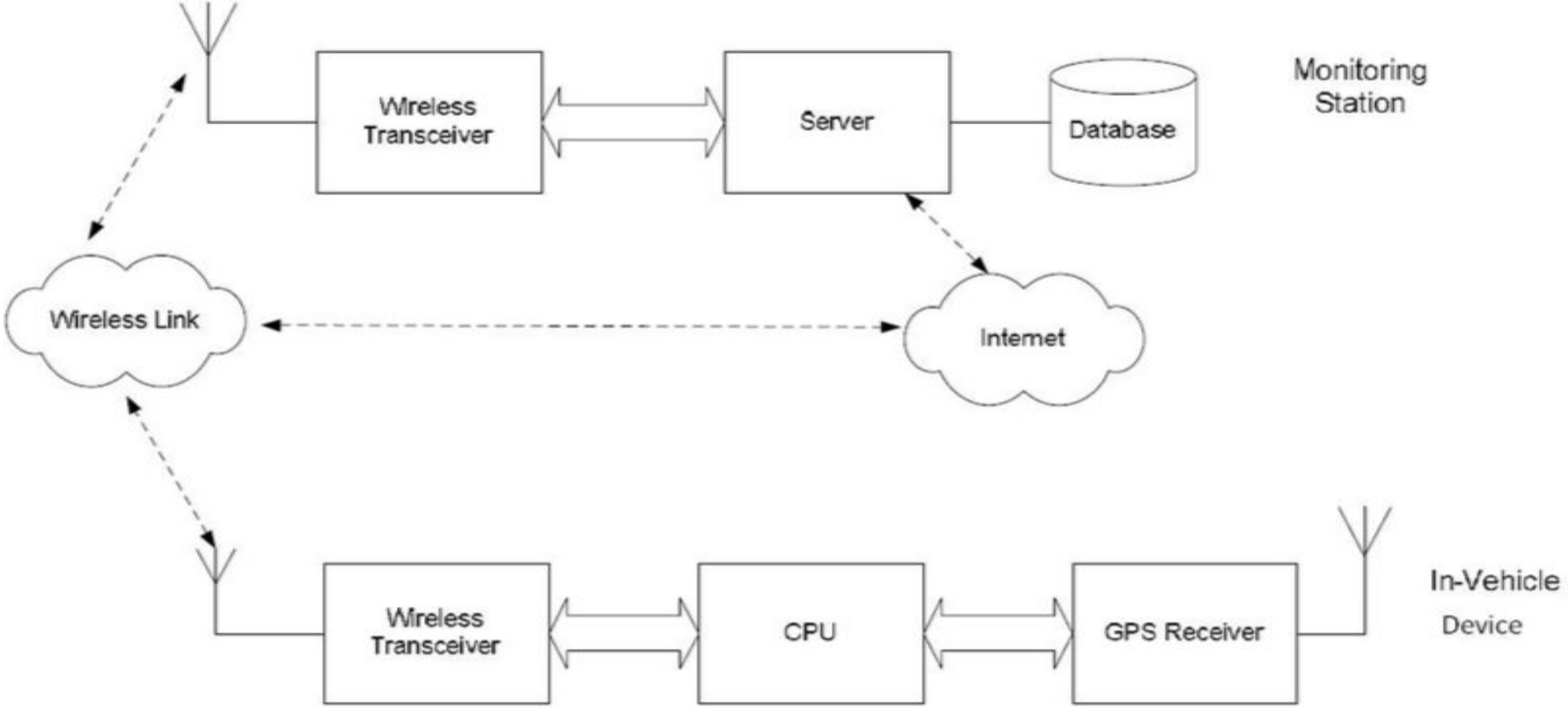
Architecture Overview

- Major constituents of the GPS-based tracking are:
  - **GPS tracking:**
    - The device fits into the vehicle and captures & send the GPS location information apart from other vehicle information at regular intervals to a central server.
    - Other vehicle information can include fuel amount, engine temperature, altitude, reverse geocoding, door open/close, tire pressure, cut off fuel, turn off ignition, turn on headlight, turn on tail light, battery status, GSM area code/cell code decoded, number of GPS satellites in view, glass open/close, fuel amount, emergency button status, cumulative idling, computed odometer, engine RPM, throttle position, GPRS status and a lot more.
    - Capability of these devices actually decide the final capability of the whole tracking system.
    - Most vehicle tracking systems, in addition to providing the vehicle's location data, feature a wide range of communication ports that can be used to integrate other on board systems, allowing to check their status and control or automate their operation.

Contd… Architecture Overview

- Major constituents of the GPS-based tracking are (Continue....):
  - **GPS tracking server:** The tracking server has three responsibilities:
    - Receiving data from the GPS tracking unit.
    - Securely storing it.
    - Serving this information on demand to the user.
  - **User interface:**
    - The UI determines how one will be able to access information, view vehicle data, and elicit important details from it.

System Design and Implementation



System Design and Implementation

- Overall system is partitioned into two major design units: In Vehicle-Unit (IVU) and Tracking Server/Monitoring Station (TS).
- IVU is installed into the vehicle. It is responsible for capturing current location of vehicle, speed of vehicle, ignition status, GPS antenna status, total kilometer run, fuel status, input power and vehicle main battery status.
- IVU is also responsible for transmitting this information to TS located anywhere in the world.

System Design and Implementation

- **GPS Receiver IVU:**
  - IVU uses GPS receiver to capture the live parameters of the vehicle.
  - This data provided by GPS is not in human understandable format.
  - This raw data needs to be processed so that it can be converted into useful information.
  - Algorithm in the device is required to perform necessary calculations to achieve this goal.

System Design and Implementation

- **Algorithm in device :**
  - The raw data provided by GPS receiver is captured by the Algorithm in the device and processed to extract the required information.
  - Algorithm in the device is also responsible for monitoring other customized parameters of the vehicle.
  - Algorithm holds all the required information that is to be transmitted to remote TS.
  - It also controls data transmission module to exchange information with remote TS.
  - It actually acts as a bridge between GPS receiver, vehicle, and remote TS.

System Design and Implementation

- **Data Transceiver:**
  - When all required information is extracted and processed, it needs to be transmitted to remote TS.
  - TS is responsible for providing this information to the end user or application.
  - Wireless network is used to transmit vehicle's information to remote TS.
  - Existing GSM network is selected to transmit vehicle's information to remote TS, since it has wide coverage.
  - It is also less expensive approach as compared to deploying our own network for transmission of vehicle's information.

System Design and Implementation

- **Server**:
  - Server is responsible for all the backend processing.
  - Information received using the transceiver is processed by server.
  - Administrator interacts with servers to fetch the information.

Devices

Devices

- There are four devices available:
  - TG Ultra
  - TG Ultra Plus
  - TG Lite Plus
  - TG Super

Contd… Devices

- **TG ULTRA:** TG Ultra is designed for customers who simply need 24X7 location information (Tracking) of their fleet or vehicle.

Hardware Specification	Software Specification
Internal GPS & GSM antenna	30 days historic data
Battery Backup	Multi-Vehicle view on map
Current Location	Live Tracking
Geo Face Alerts	

Contd… Devices

- **TG ULTRA PLUS:** TG Ultra+ comes with all the features of TG Ultra in addition capability of remotely stopping the vehicle with a simple SMS command or by pressing a button from the Tracking Genie mobile app.

Hardware Specification	Software Specification
Internal GPS & GSM antenna	30 days historic data
Battery Backup	Multi-Vehicle view on map
Current Location	Live Tracking
Remote Shutdown	Geo Face Alerts

Contd… Devices

- **TG LITE PLUS:** TG LITE Plus is designed for customers with advanced features of Tracking and Remote Immobilization that keeps track of various features of vehicles like ignition, air condition etc.

Hardware Specification	Software Specification
Internal GPS & GSM antenna	30 days historic data
Battery Backup	Multi-Vehicle view on map
Current Location	Live Tracking
3 Digital input	Remote Shutdown

Contd… Devices

- **TG LITE PLUS (Continue…):**

Hardware Specification	Software Specification
Inbuilt Memory	Ignition ON/OFF Alerts
SOS Alert	Geo Fence Alert
Overspeed Alert	

Contd… Devices

- **TG SUPER:** TG Super is designed and well suited for customers who need additional features other than of TG Ultra and TG Lite like Fuel Monitoring, Camera or RFID based access and more.

Hardware Specification	Software Specification
External GPS & GSM antenna.	30 days historic data
Current Location	Multi-Vehicle view on map
5 Digital Input	Fuel Monitoring Support
2 Digital Output	Camera Support

Contd… Devices

- **TG SUPER (Continue…):**

Hardware Specification	Software Specification
SOS	Remote Shutdown
Battery Back-up	Ignition ON/OFF Alerts
Inbuilt Memory	Geo Fence Alerts
Overspeed alerts	

Comparison Between Devices

http://www.trackinggenie.com/product/compare

Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
GENERAL				
Subscription To Online Software	1 Year	1 Year	1 Year	1 Year
GPS & GSM Antenna	Internal	Internal	Internal	External
Historical Data	30 Days	30 Days	30 Days	30 Days
Digital Input	0	0	3	5
Analog Input	0	0	0	1
Digital Output	0	0	0	2
Current Location	Yes	Yes	Yes	Yes

Contd… Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
GENERAL				
Remote Shutdown	No	Yes	Yes	Yes
Replay Tracking	Yes	Yes	Yes	Yes
User Log	Yes	Yes	Yes	Yes
Sub User Creation	Yes	Yes	Yes	Yes
Live Tracking	Yes	Yes	Yes	Yes
Fuel Monitoring	No	No	No	Yes
Multi-Vehicle View On Map	Yes	Yes	Yes	Yes

Contd… Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
Harsh Breaking	No	No	No	Yes
Sudden Acceleration	No	No	No	Yes
ALERT				
Battery Disconnect	SMS/EMail	SMS/EMail	SMS/EMail	SMS/EMail
SOS	No	No	SMS/EMail	SMS/EMail
No Data transmission from 24 hours	SMS/EMail	SMS/EMail	SMS/EMail	SMS/EMail
Overspeed Alert	No	No	SMS/EMail	SMS/EMail
Ignition ON/OFF Alerts	No	No	SMS/EMail	SMS/EMail

Contd… Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
Geo Fence In	SMS/EMail	SMS/EMail	SMS/EMail	SMS/EMail
Geo Fence Out	SMS/EMail	SMS/EMail	SMS/EMail	SMS/EMail
Vehicle Maintenance	SMS/EMail	SMS/EMail	SMS/EMail	SMS/EMail
REPORT				
Graphical Fleet / Vehicle Status	Yes	Yes	Yes	Yes
Raw Data	Yes	Yes	Yes	Yes
Overspeed	Yes	Yes	Yes	Yes
SOS Alarm Report	No	No	Yes	Yes

Contd… Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
History Report	Yes	Yes	Yes	Yes
Digital Input Report	No	No	Yes	Yes
Log Report	Yes	Yes	Yes	Yes
Device Battery Drain Report	No	No	Yes	Yes
Low Battery Report	Yes	Yes	Yes	Yes
Photo Gallery Report	No	No	No	Yes

Contd… Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
Fleet Summary	Yes	Yes	Yes	Yes
Geo Fencing IN/OUT Report	Yes	Yes	Yes	Yes
Halt Report	Yes	Yes	Yes	Yes
SMS Utilization Report	Yes	Yes	Yes	Yes
Fuel Consumption Chart	No	No	No	Yes
History Report Station Wise	Yes	Yes	Yes	Yes
Station Entry/Exit Report	Yes	Yes	Yes	Yes

Contd… Comparison Devices

Name	TG Ultra	TG Ultra Plus	TG Lite Plus	TG Super
Fuel Filling Report	No	No	No	Yes
Route Deviation Report	No	No	Yes	Yes
SPECIAL FEATURE				
Camera	No	No	No	Yes
Headphone/ Microphone	No	No	No	Yes
Smart Card	No	No	No	Yes

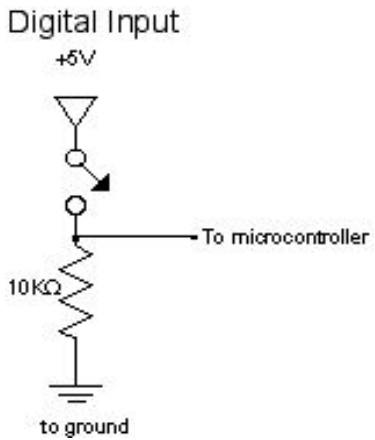
Usage of Input, Output and Other ports

Usage of Input, Output and Other ports

- There are two input types as follow:
  - Digital I/P
  - Analog I/P
- There are two output types as follow:
  - Digital O/P
  - Analog O/P

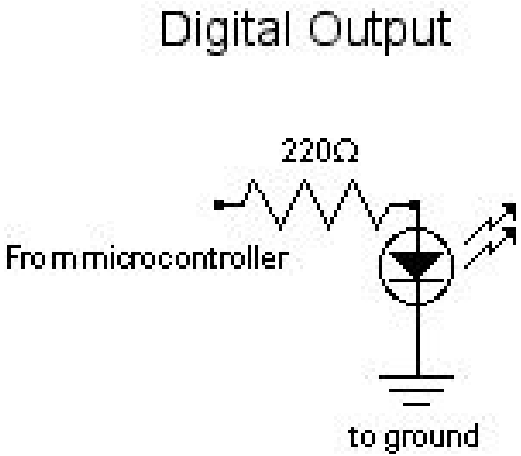
Contd... Usage of I/P, O/P and Other ports

- Digital Input:
  - Digital inputs have two states: off and on.
  - If voltage is flowing, the circuit is on.
  - If it's not flowing, the circuit is off.
  - To make a digital circuit, you need a circuit, and a movable conductor which can either complete the circuit, or not.



Contd... Usage of I/P, O/P and Other ports

- Digital Output:
  - The simplest control you can use over an electrical device is digital output.
  - In this case, you would either turn something off, or on.
  - Digital outputs are often used to control other electrical devices, through transistors or relays.
  - The diagram below is of a digital output controlling an LED.



Contd... Usage of I/P, O/P and Other ports

- **Analog I/P:**
- Digital input signals are used to represent items which only have two (2) states, such as... ON (binary 1) or OFF (binary 0) states.
- Similarly, Digital output signals are used to control items which again only have two states, such as.. START or STOP a device.
- So, a digital signal is something like telling if a door is open or not.
- But, **Analog signals** are variable, they have multiple states. Analog input signals can represent such items as temperature or level or rate of flow.
- Analog output signals are also variable and can be used for such things as opening a valve to a desired position.
- Then, an analog signal is something like telling how much the door is open (or closed).

Contd... Usage of I/P, O/P and Other ports

- Usage of different I/P and O/P in tracking genie devices:
  - **Digital Input** Usage:
    - To check if ignition is ON/OFF.
    - A/C is ON/OFF.
    - Headlight is ON/OFF.
    - Wearing a seatbelt or not.
    - Window Open/Close
    - Trunk Open/Close.
    - SOS button pressed or not.
  - **Digital Output** Usage:
    - To start/stop a vehicle
  - **Analog Input** Usage:
    - Fuel level information (for older vehicle).
  - **Analog Output** is not used in Tracking Genie devices.

Relay

- 12v/24v relays are widely used in automobiles. Also they are much useful in GPS tracking system.
- In most cases relays are connected in GPS tracking system to control the car engine on or off.
- A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically.
- Relays are used where it is necessary to control a circuit by a low-power signal, or where several circuits must be controlled by one signal.

Contd… Relay

- The device is connected to the electromechanical relay. When the relay is excited by applying the voltage the relay gets activated and in the process turns ON the engine and when the excited voltage is stopped, the relay gets deactivated and in the process turns OFF the engine.

Application Program Interface (API)

- **A**pplication **p**rogram **i**nterface (**API**) is a set of routines, protocols, and tools for building software applications.
- An API specifies how software components should interact.
- A good API makes it easier to develop a program by providing all the building blocks. A programmer then puts the blocks together.
- There are many different types of APIs for operating systems, applications or websites. Windows, for example, has many API sets that are used by system hardware and applications

Some Popular API

- The following list contains several examples of popular APIs:
- **Google Maps API:** Google Maps APIs lets developers embed Google Maps on web pages using a JavaScript or Flash interface. The Google Maps API is designed to work on mobile devices and desktop browsers.
- **YouTube APIs:** YouTube API: Google's APIs lets developers integrate YouTube videos and functionality into websites or applications. YouTube APIs include the YouTube Analytics API, YouTube Data API, YouTube Live Streaming API, YouTube Player APIs and others.
- **Flickr API:** The Flickr API is used by developers to access the Flick photo sharing community data. The Flickr API consists of a set of callable methods, and some API endpoints.

Contd… Some Popular API

- The following list contains several examples of popular APIs (continue...):
- **Amazon Product Advertising API:** Amazon's Product Advertising API gives developers access to Amazon's product selection and discovery functionality to advertise Amazon products to monetize a website.
- **Twitter APIs:** Twitter offers two APIs. The REST API allows developers to access core Twitter data and the Search API provides methods for developers to interact with Twitter Search and trends data.

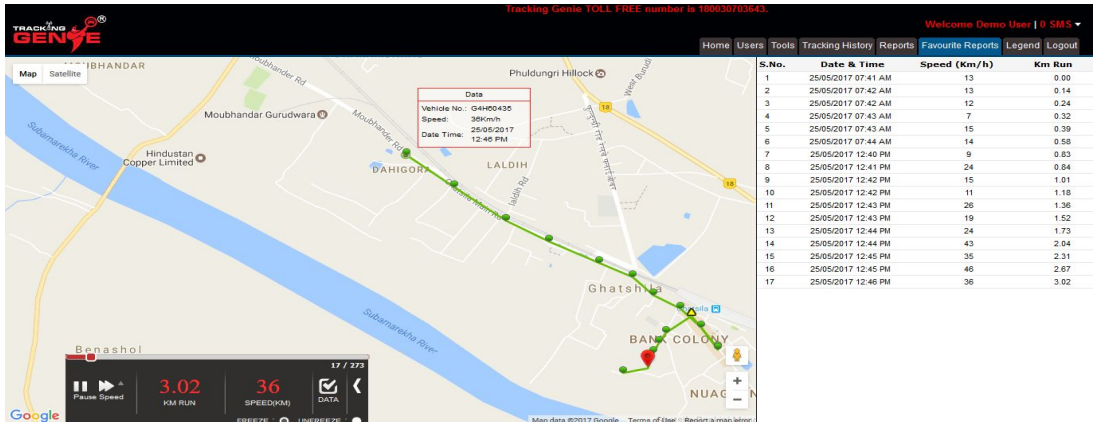
Important Reports

Important Reports

- Our software has the following main reports:
  - Replay Tracking
  - History Report
  - Tracking History
  - Distance Travelled
  - Activity Report
- A brief description of these reports is given on next slides.

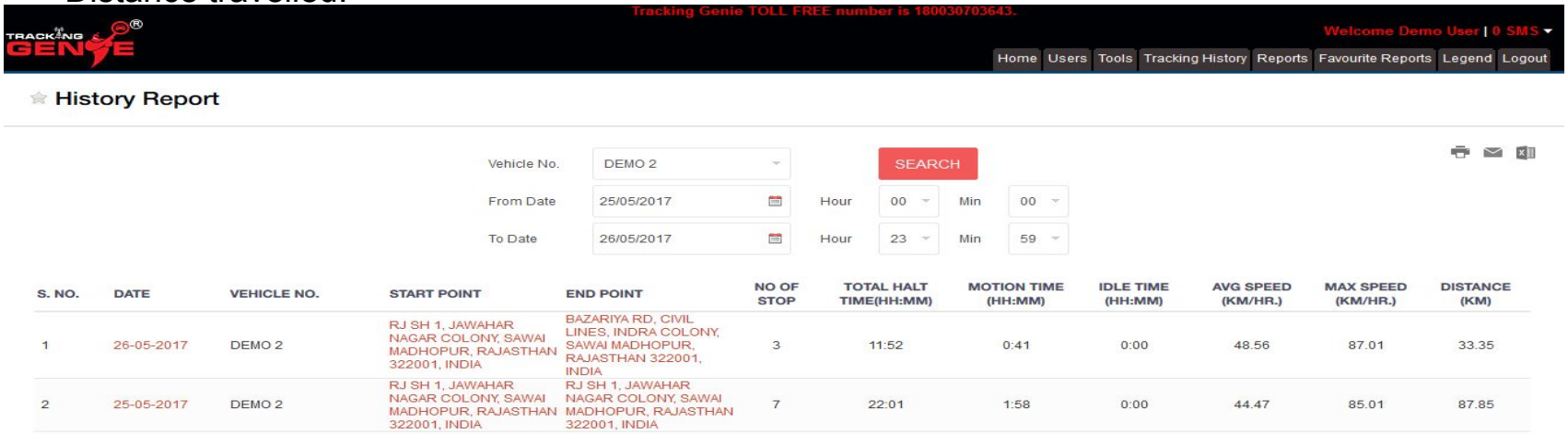
Contd… Important Reports

- **Replay Tracking:** Use this feature to check movement of a vehicle during a particular time period. To use this feature follow the following steps:
  - Click on Tools menu and select Replay Tracking. This will open a popup to choose dates for which you want to see the vehicle movement.
  - To choose any particular time, click on advance search and choose required time range and click show track and then click play. This report looks like the image given here:



Contd… Important Reports

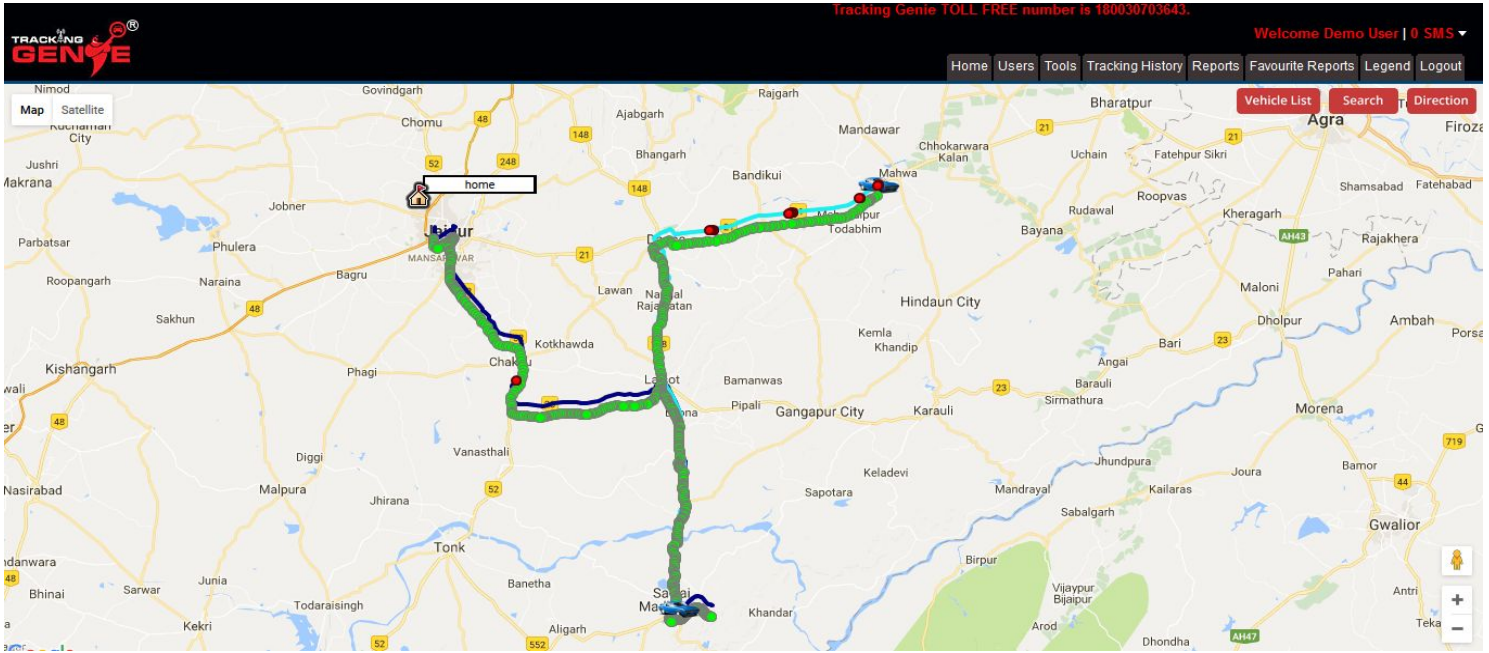
- **History report:** This is the most important report. When you select report, you can select either one vehicle or can select all vehicles and can set a fix period in calendar. When you will press search icon, this report will show date wise data of the vehicle. Starting from the latest date it will gradually go to the oldest date entered. The data it shows, include: Date, Vehicle Number, Start Point, End Point, Number of Stops, Motion Time, Idle Time, Average Speed, Maximum Speed and Distance travelled.



S. NO.	DATE	VEHICLE NO.	START POINT	END POINT	NO OF STOP	TOTAL HALT TIME(HH:MM)	MOTION TIME (HH:MM)	IDLE TIME (HH:MM)	AVG SPEED (KM/HR.)	MAX SPEED (KM/HR.)	DISTANCE (KM)
1	26-05-2017	DEMO 2	RJ SH 1, JAWAHAR NAGAR COLONY, SAWAI MADHOPUR, RAJASTHAN 322001, INDIA	BAZARIYA RD, CIVIL LINES, INDRA COLONY, SAWAI MADHOPUR, RAJASTHAN 322001, INDIA	3	11:52	0:41	0:00	48.56	87.01	33.35
2	25-05-2017	DEMO 2	RJ SH 1, JAWAHAR NAGAR COLONY, SAWAI MADHOPUR, RAJASTHAN 322001, INDIA	RJ SH 1, JAWAHAR NAGAR COLONY, SAWAI MADHOPUR, RAJASTHAN 322001, INDIA	7	22:01	1:58	0:00	44.47	85.01	87.85

Contd… Important Reports

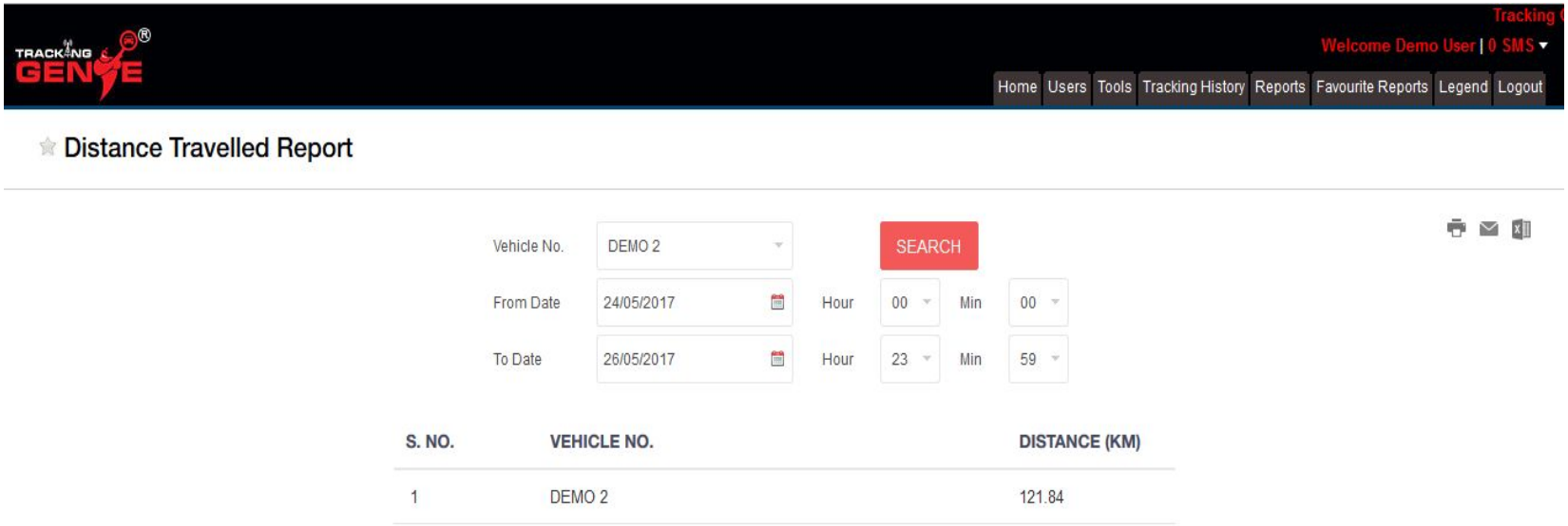
- **Tracking History:** Use this feature to see tracking history of any vehicle of your choice. It gives information on Google Map.



Contd… Important Reports

- **Distance travelled report:** This report shows the data of total distance travelled by the selected vehicle. You have to select vehicle from drop down menu (one vehicle or option All), set date (from and to) set Time (hour, min, AM/PM). When you presses search icon, it will show distance report data including vehicle name and distance travelled in km.
- Trackinggenie helps you in superior route planning, with the help of Tracking genie, you can identify routes that save both time and money. Smart route planning will reduce unproductive work and eliminate unnecessary fuel expenses.

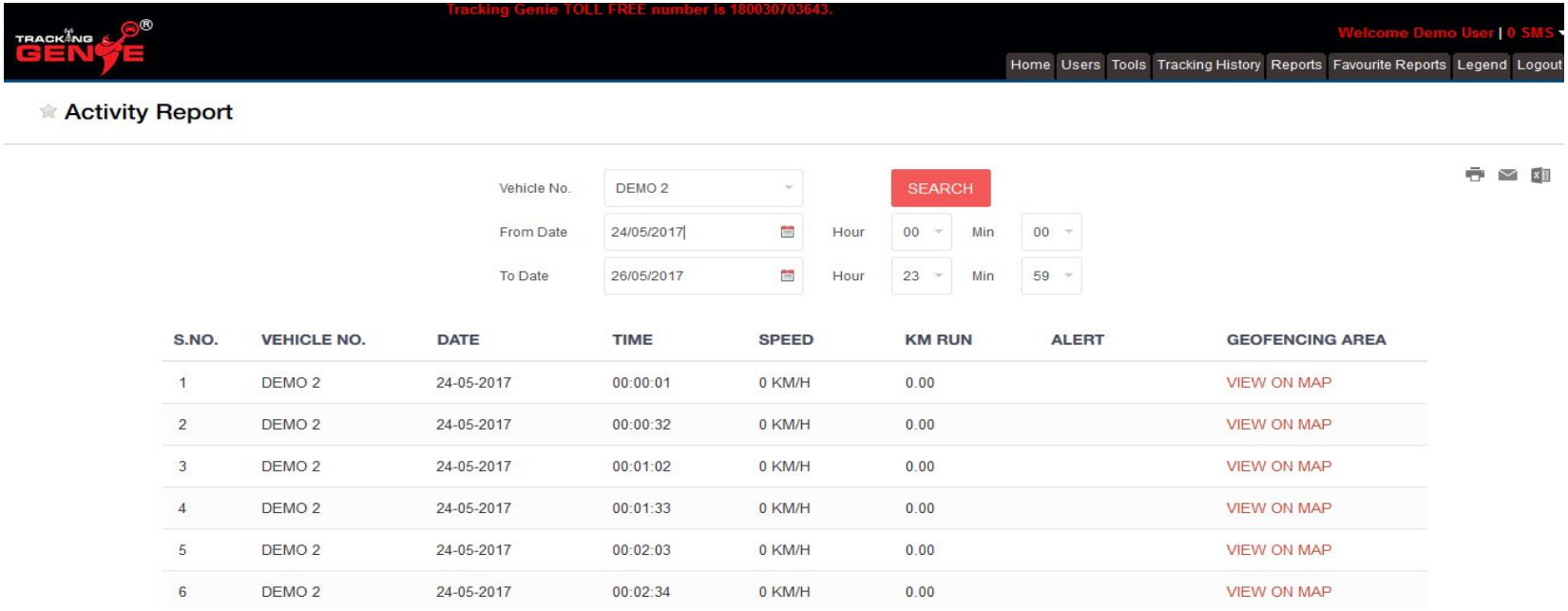
Contd… Important Reports



Contd… Important Reports

- **Activity Report:** This report gives time Wise report of the Vehicle, which means that on which date and what timing your vehicle was on which location. You can check the location of the vehicle for a particular date and timing and can check the same on map view.
- Tracking genie can help the fleet managers in managing their drivers effectively. They can pull up the data obtained from GPS tracking system, analyze it and take corrective actions whenever necessary.

Contd… Important Reports



S.NO.	VEHICLE NO.	DATE	TIME	SPEED	KM RUN	ALERT	GEOFENCING AREA
1	DEMO 2	24-05-2017	00:00:01	0 KM/H	0.00		VIEW ON MAP
2	DEMO 2	24-05-2017	00:00:32	0 KM/H	0.00		VIEW ON MAP
3	DEMO 2	24-05-2017	00:01:02	0 KM/H	0.00		VIEW ON MAP
4	DEMO 2	24-05-2017	00:01:33	0 KM/H	0.00		VIEW ON MAP
5	DEMO 2	24-05-2017	00:02:03	0 KM/H	0.00		VIEW ON MAP
6	DEMO 2	24-05-2017	00:02:34	0 KM/H	0.00		VIEW ON MAP

Top 20 Complaints

- Unable to login in android app.
- Login details request.
- Not receiving overspeed alerts.
- Not receiving daily emails.
- Received no data sms.
- No current location.
- Incorrect location.
- Difference in KM run.
- Not receiving images from camera.
- Incorrect fuel consumption report.
- Required VC password /SMS formats.

Contd… Top 20 Complaints

- VTS reflecting future data on map.
- Client visited for VTS physical inspection/ renewal.
- Receiving battery disconnection alerts.
- Geofence and route deviation.
- Notification and alert settings.
- Data skipping in replay and tracking History.
- How to do SMS recharge.
- VTS reflecting old location which is updating slowly on map.(old data or past data issue)
- Warranty inquiries, Renewal inquiries.

Thank You