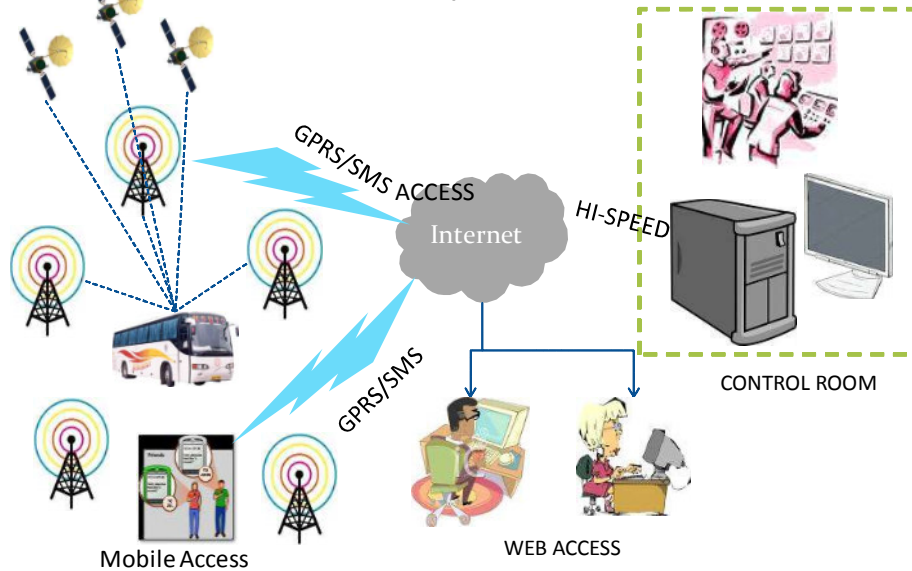




# Technology Overview



"Hybrid GPS-GSM" and low cost "GSM-only" devices with speed-distance sensor

Multiple alternate sensor interfaces for remote monitoring and control

Core server algorithms and IP which support GPS location with GSM N/w location calculation + sensor data as backup for Non-LOS scenarios.

Location and activities can thus be monitored and controlled in dense urban, shaded (bus stands, garage etc) and foliage cover areas

Location/arrival time and status/emergency queries and alerts over SMS

SD Memory for storing trip logs with Serial interface for downloading the same, plus Emergency Button and Optional Voice call interface.

Selectively web-enabled control room software with GIS maps

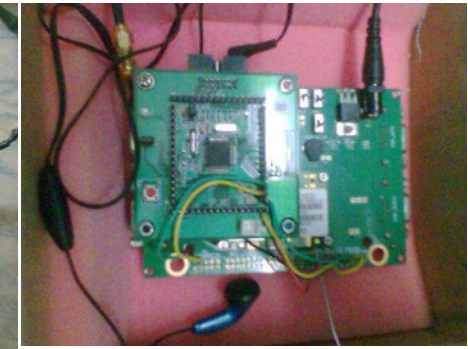
GPS: Helps in pin pointing the vehicle locations (positional accuracy will be 5-10 meters)

GSM + Sensors:

- ✓ It is used to obtain vehicle locations to support GPS in non-LoS areas
- ✓ Used for obtaining critical data from remote vehicle locations
- ✓ SMS/GPRS can be used to transmit vehicle data to the server
- ✓ Sensor Modules: These specialized sensors help in monitoring different parameters and activities.

GIS maps

- ✓ Monitoring vehicle location at real time
- ✓ Protect vehicles based geographical fencing



## Device Details

Vehicles will be fitted with a low cost "GSM/GPRS-only" or "Hybrid GPS/GSM/GPRS" GEON™ device

GPS position Calc. is backed up by GSM & Sensor based positions in non LoS areas

Tri-Band GSM/GPRS in GSM-only device

Quad-Band GSM/GPRS Engine plus 20

Channel GPS receiver in Hybrid device

Speed and distance monitoring sensors

Optional fuel level and engine RPM sensors

Configurable time intervals for GPS position grab.

SD-Memory for Trip logs and Serial interface for downloading.

Optional Voice Call Interface.

High sensitivity (Track: -159 dBm, Acquisition: -137 dBm), Low Power GPS receiver ( 160mA / 3.3 V)

GSM Phase 2/2+ (class 4 – 2W @ 900 MHz, class 1 – 1W @ 1800/1900Mhz)

Long Battery backup ( 1700 mA/ H rechargeable battery)

Speed and distance monitoring sensors. Two more sensor interfaces fuel level (Analog) and engine RPM sensors(Digital). Three extra ON/OFF digital sensor interfaces for additional parameters.

Special Emergency button and V\_out for remotely controlling external instruments/locks etc.

12 Months replacement warranty.

## Software Highlights

Basic

- Real time bus position on web/mobile for operations staff, parents etc.
- Speed monitoring (Over-speeding alerts etc)
- Stoppage & Route violation monitoring

Optional

- Preventive maintenance & TQM
- Performance monitoring & Pollution control
- Fuel monitoring & theft control

Vehicle utilization reports

Trip wise fuel consumption reports

Speed monitoring reports (Graphs)

Consolidated fleet reports.

Start and end time for each day/shift/trip.

Total time on route

Total idle time

Total distance traveled and route details

Stops totaled by category