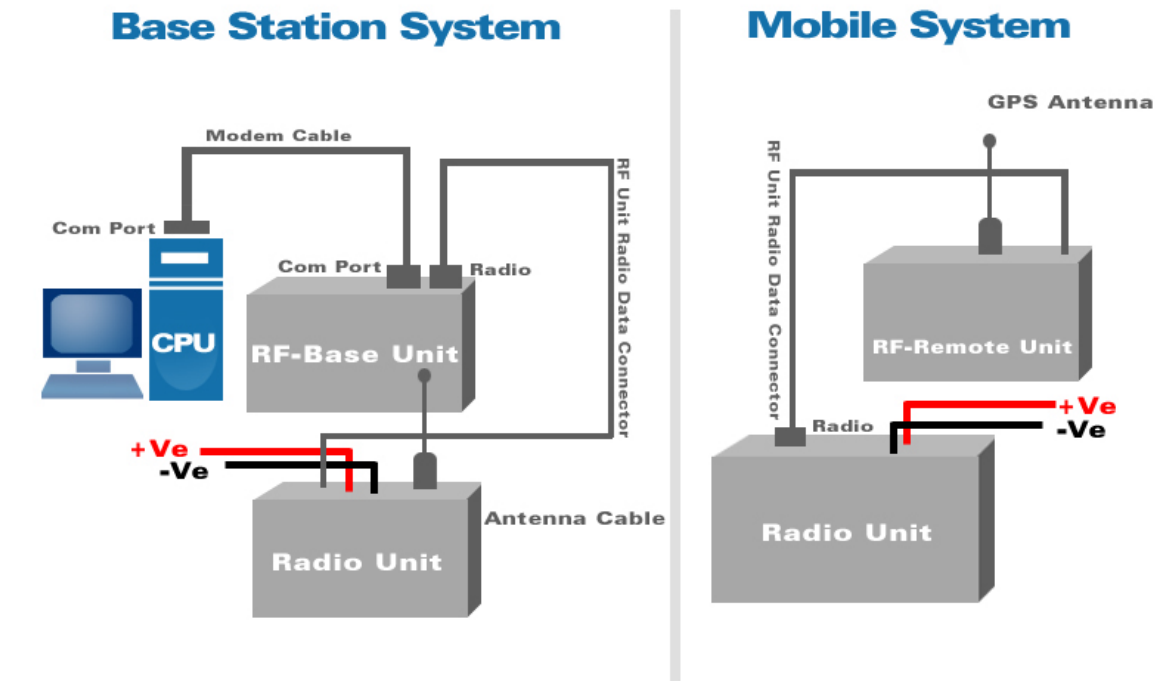


Hardware Block Diagram



How it works?

A GPS receiver of the unit fitted on a vehicle takes the lat/long, speed, heading etc. of the vehicle. The communication unit present (RF), transmits the data to Fleet control station. The same data is depicted on a digital map using a GIS server. The data is also stored in a database for future analysis or reference.

Different Components

GIS server

This is a control station component, mainly used to depict the position of vehicle on Map. Fleet Locator uses ESRI's Map Objects to show the vehicles on the map.

Map data

Depending on the requirement, the features, scale and the area may vary from installation to installation.

Communication server

This component is responsible for communication between control station and on-board unit.

The communication medium used is

- a) **VHF/UHF** – Mostly the government organizations like police do have the infrastructure already in use. The same can be used for vehicle tracking.

Database server

This component takes care of non-GIS data. like users, vehicles, position data, messages etc. Currently the solution supports MSSQL Server, Oracle, Interbase and MS Access.

On-board unit

This unit has to be fitted in a Vehicle to be tracked. Generally it requires a 12V supply, which can be obtained from a vehicle battery. On-board unit comes with various options.

- a) **Off-line unit** – This unit has a GPS receiver and a non-volatile memory to store the data. The data may not be transferred instantly since it does not have wireless transmission facility. The data can be downloaded from the unit through a serial connection to the PC and then can be analyzed.

- b) **On-line unit** – there are various on-line units available. Essentially it has a GPS receiver and a wireless transmission unit. Apart from this depending on the requirement a display unit and voice unit can be attached.

Details of the Hardware in the Mobile Unit

Sr. No	Hardware Name	Usage
1	RF Remote unit	For getting location data using GPS and transmitting to base station.
2	Radio Set	For communication

Details of the Hardware in the Control Station

Sr. No	Hardware Name	Usage
1	RF base unit	For communication between Control Station (PC) and RF remote unit.
2	Radio Set	For communication

Vehicle tracking software module consists of three modules

- (a) GIS
- (b) Database
- (c) Communication

(a) GIS

The GIS should be the following features.

- (i) Ability to draw points on a blank white board subject to receipt of Latitude/ Longitude manually (through GARMIN GPS) or via mobile GPS unit in real time.
- (ii) Mimic diagram of pre-defined points of site. The mimic diagram (on paper) will be supplied to the party.
- (iii) Real time movement of the vehicle on screen. Moving vehicle green, stationary vehicle RED.
- (iv) Edit map utility – The ability should be able to add, delete, modify map points in the existing map. Besides, the map utility should be able to create a new point based map. Also, the mobile unit name/ID to be displayed on map.
- (v) Replay mode of vehicle movement from stored data.

(b) Database

- (i) The software should be able to identify & analyse the following points.
 - (a) Trip start point to destination 1 and back
 - (b) Trip start point to destination 2 and back
 - (c) Trip start point to destination 3 and back
 - (d) Trip start point to destination 4 and back
 - (e) Trip start point to destination 5 and back

In all case, the trip start point remains the same but the destination changes.

- (ii) The software should provide station wise analysis. The format should be

Sl. No.	Date/Time		Station 1		Stoppage	Unit ID 001(ladle 25)
	From	To	In time	Out time		
1	12.00 1-4-03	12.00 2-4-03	9.15	9.25	10 min	
			14.20	14.40	20 min	
			21.00	22.15	1 hr 5 min	

More than scheduled stoppage, should be denoted in **RED**.

- (iii) Trip Time

The trip time should be give the total time and distance covered (approx) from any given point to another point/ same point e. g. the format can be stri A-stri B – stri A or sti A- stri B.

- (iv) Erase facility of old records to prevent harddisk full phenomena.

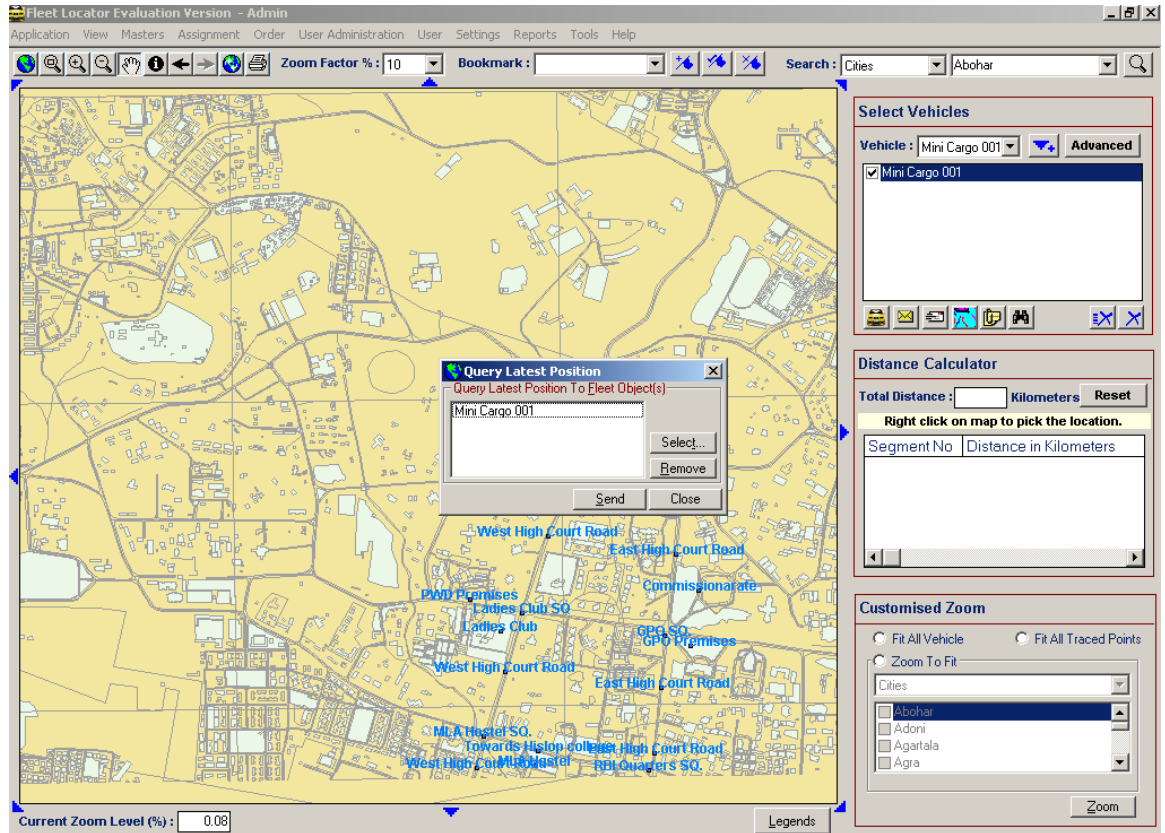
(c) Communication module

The communication module should be able to communicate with the mobile units. The mode of communication will be polling from the control station to mobile units. It should have a **“PROCESS Monitor Window”** for showing real time stations of communication. Other features should include user settable polling interval and baudrate.

Fleet Locator Functionality

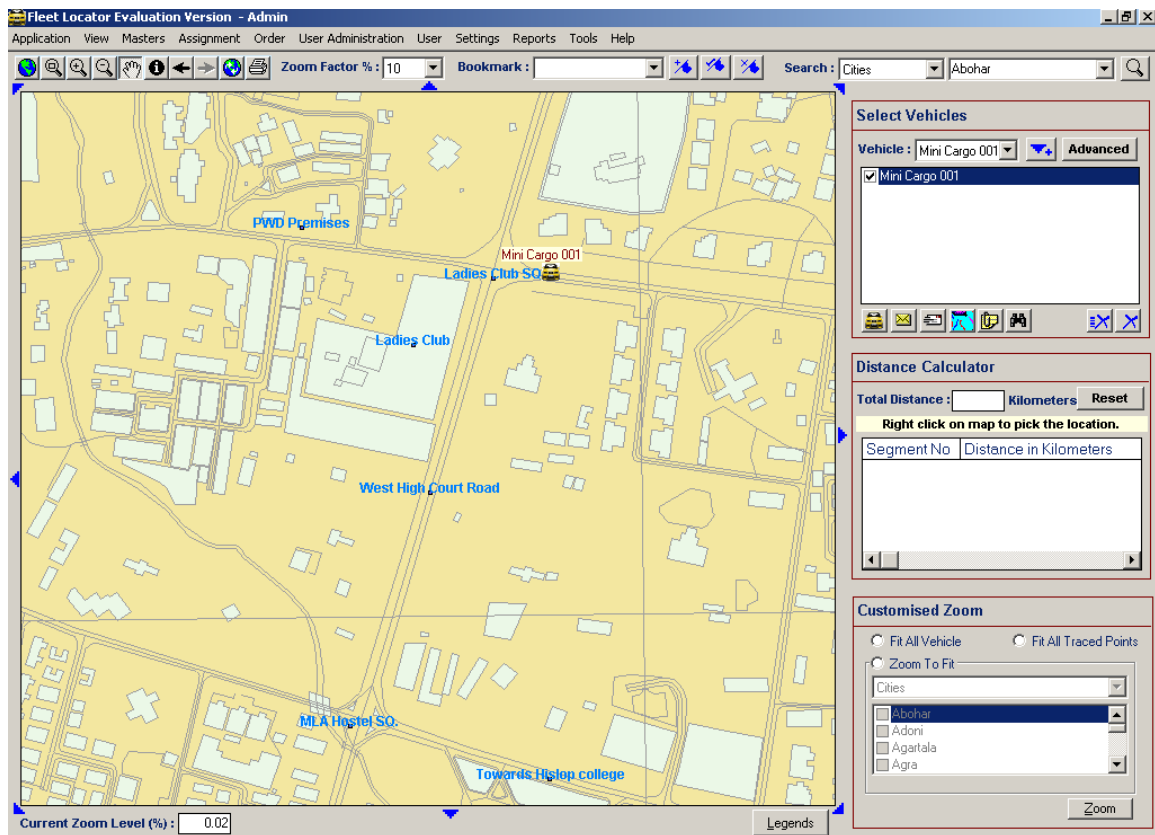
1) Get Latest Position

Get the latest position of the vehicle and show the vehicle on map



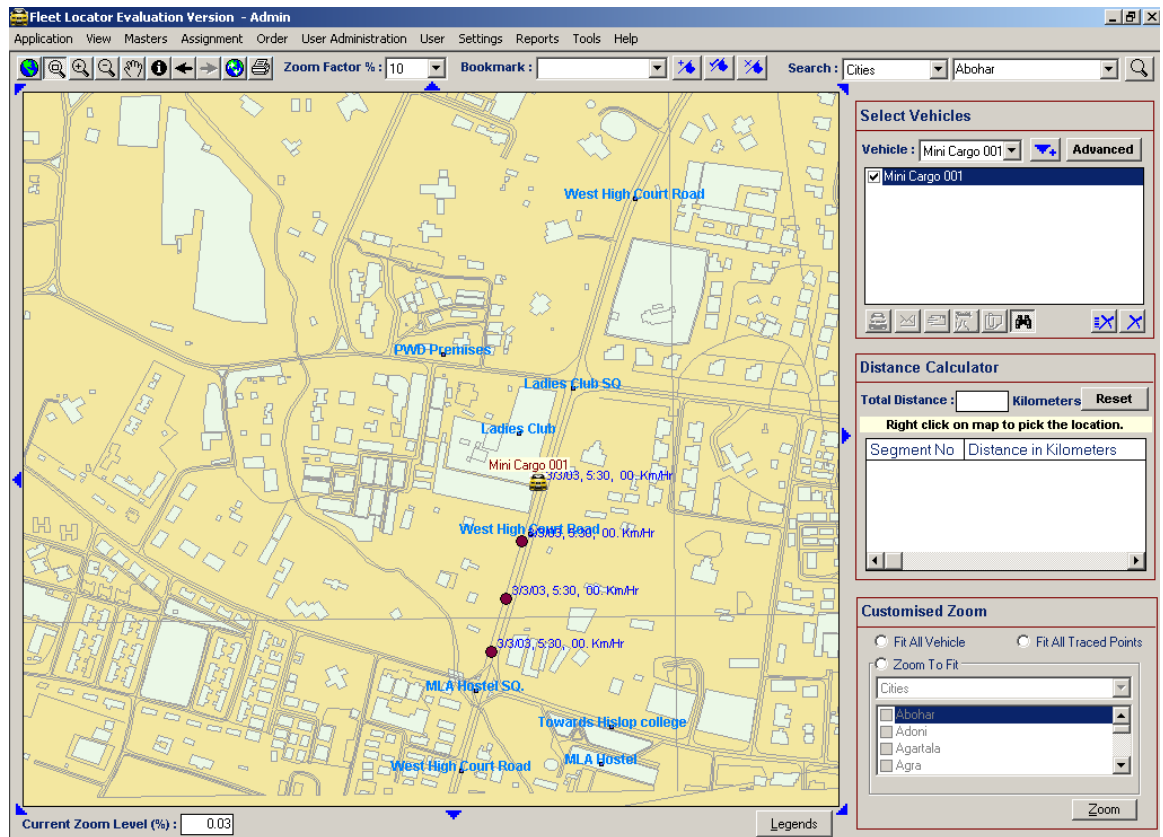
2) Show Vehicle on Map

Show the vehicles last position on the map



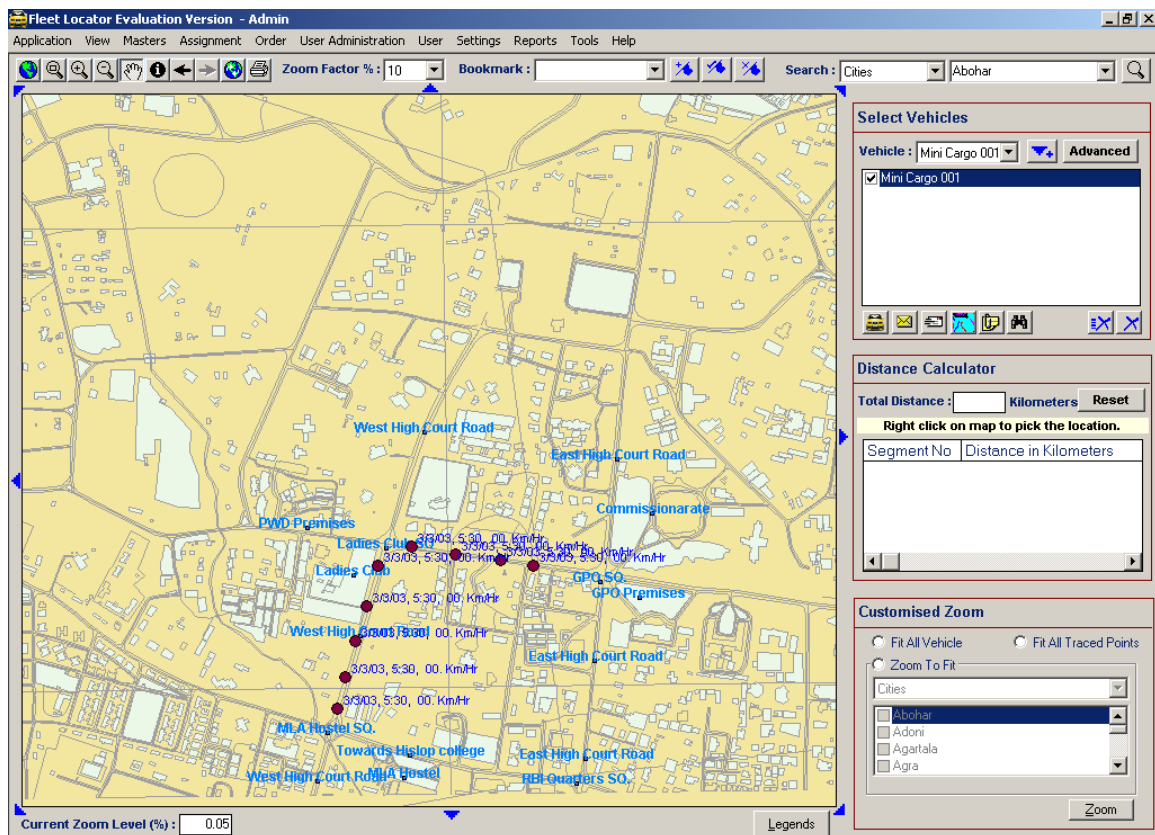
3) Continuous Monitoring Vehicle

Used to Auto Track vehicle continuously.



4) Trace Path

Used to trace path of vehicle along with Date, Time Stamp and Speed



5) Reports

a) Stoppage Report

Used to find stoppages taken by Fleet(s)

Stoppage Report

6/02/2003 3:11:04 PM

Stop Time	Start Time	Vehicle	Mobile Number	StoppageTime(hh:mm)
03/02/2003 2:03:04 AM	05/02/2003 4:05:06 AM	Mini Cargo 001	1000	50:02
03/01/2003 5:03:04 AM	06/01/2003 4:05:06 AM	Mini Cargo 001	1000	71:02
15/01/2003 11:03:04 AM	15/01/2003 4:05:06 PM	Mini Cargo 001	1000	05:02
25/01/2003 7:03:04 AM	25/01/2003 8:05:06 AM	Mini Cargo 001	1000	01:02
31/01/2003 3:03:04 AM	31/01/2003 4:05:06 AM	Mini Cargo 001	1000	01:02
01/02/2003 12:03:04 PM	02/02/2003 4:05:06 PM	Mini Cargo 001	1000	28:02

b) Message History

Used to find Sent/Received Messages to/from On Board Unit and Positions

Message History

Fleet Objects

Mini Cargo 001

Select Remove

Show

☒ Sent Messages ☒ Received Messages

☒ Positions ☒ Telemetry Details

Period

Period From Date/Time To Date/Time

Any 26/02/2007 2:13:38 PM 26/02/2007 3:13:38 PM

Show Close

Sent Messages Received Messages **Positions** Telemetry Details

Time	Latitude	Longitude	Precision	Velocity	Heading
37.9339599609...	0	19.1799983978...		Towards 67° N...	
47.7923583984...	0	16.9600009918...		Towards 76° N...	
12.7166748046...	0	15.4100008010...		Towards 88° N...	
48.4222412109...	0	10.6799993515...		Towards 53° N...	
19.7882080078...	0	19.9800014495...		Towards 65° N...	
4.26818847656...	0	8.66999912261...		Towards 74° N...	
0.325927734375	0	23.8799991607...		Towards 12° S...	
33.4094238281...	0	24.2899990081...		Towards 16° S...	
2.80334472656...	0	27.0500011444...		Towards 43° S...	

- c) **Trip Report**
Used to make trip analysis

Trip Report

03/03/2003 02:04:56 PM

Serial_No	Trip Date	Location	Status
1	3/3/03 09:00:00 AM	Scrap	Started
2	3/3/03 09:05:00 AM	Basic Oxygen Furnance	Reached
3	3/3/03 09:25:00 AM	Basic Oxygen Furnance	Started
4	3/3/03 09:35:00 AM	Ingot	Reached
5	3/3/03 11:25:00 AM	Ingot	Started
6	3/3/03 11:50:00 AM	Rolling Mill	Reached
7	3/3/03 10:30:00 AM	Scrap	Started
8	3/3/03 10:40:00 AM	Electric Arc Furnance	Reached
9	3/3/03 11:20:00 AM	Electric Arc Furnance	Started
10	3/3/03 11:20:00 AM	Contineous Casting	Reached
11	3/3/03 12:20:00 PM	Contineous Casting	Started
12	3/3/03 12:40:00 PM	Rolling Mill	Reached
13	3/3/03 11:00:00 AM	Scrap	Started
14	3/3/03 11:05:00 AM	Basic Oxygen Furnance	Reached