

## Fuel Usage and Fuel Consumption Monitoring

### 1. Introduction

Fuel (Gas) pricing growing and growing and reaching record levels.

Your vehicle fleet (special machinery) require more and more money on fuel costs. Your earnings slowly, but steadily declining.

You do not have the opportunity to influence the growth of fuel prices, but to reduce the cost of fuel is in your best.

This decision is quite simple: full control over the use of your fuel and lower transaction costs than the rational use of fuels.

*"GuardMagic fuel saving system" is recompensed in 3-6 weeks, primarily due to fuel theft (drain) and fuel fraud decrease.*

*In real practice, that means:*

*For example, vehicle fleet consist of 200 trucks.*

*Using "GuardMagic fuel control system" will allow you for the period 2-3 month increase your fleet at one "Actros".*

*The possibility of such truck fleet increasing will happen only by termination of fuel fraud.*

*Think. Do you want every three month to lose or present to anybody a one new "Actros"?*



The main types of losses your money:

- **fuel drain** from the transport (special machinery) fuel tank. Fuel fraud, fuel theft;
- **partial fuelling** - in fueling station. One part of fuel volume - in to the tank of your vehicle, other - to the other car. Fuel fraud, fuel theft;
- **use your transport for private purposes** (not on your target). Trip fraud;
- not the best **traffic parameters**;
- not the best **movement route**.

It means that in general you will need to have the information about fuel drain, partial fuelling, real fuel consumption and real trip of your vehicle and movement parameters.

In general Fuel Monitoring System consist of the next three main components:

- fuel level sensor (special analog or digital fuel level sensor);
- special device for storing data from fuel level sensor (fuel data logger);
- Personal Computer with special fuel monitoring software for storing all data and analyzing it.





**GuardMagic** fuel monitoring and analyzing system in a full automatically mode, "day & night" collects and stores detailed information about fuel tank contents and fuel usage.

**GuardMagic mTF** "Fuel & GPS Data Logger" collecting data about vehicle, vehicle trip for future analyzes:

- trip of vehicle (GPS track; geographic coordinates);
- traffic parameters (speed, time);
- fuel level in fuel tanks (mTF1, mTF2 up to TWO Fuel Tanks; mTF3 up to SIX fuel tanks);
- data from digital temperature sensors (mTF3 - up to **SEVEN** sensors);
- status of ignition circuit (engine On-Off);
- active driver identification code (driver ID code);
- fact of engine overheat;
- event button pressing;
- condition of external logic sensors (up to THREE sensors);
- condition of engine starting;
- etc.

In additional **GuardMagic mTF** allow:

- collect information about active driver;
- prevent unauthorized use of transport;
- prevent steal of transport.

The special monitoring software collect all this data from your vehicle fleet and generate the series of special reports that allow you to see the real detailed pictures of your vehicle activity and fuel usage.

## 2. General Structure of System





### 3. Vehicle modules connection

#### 3.1 GuardMagic mTF1 connection (more simple version)



#### 3.2 GuardMagic mTF3 connection (most advanced version)





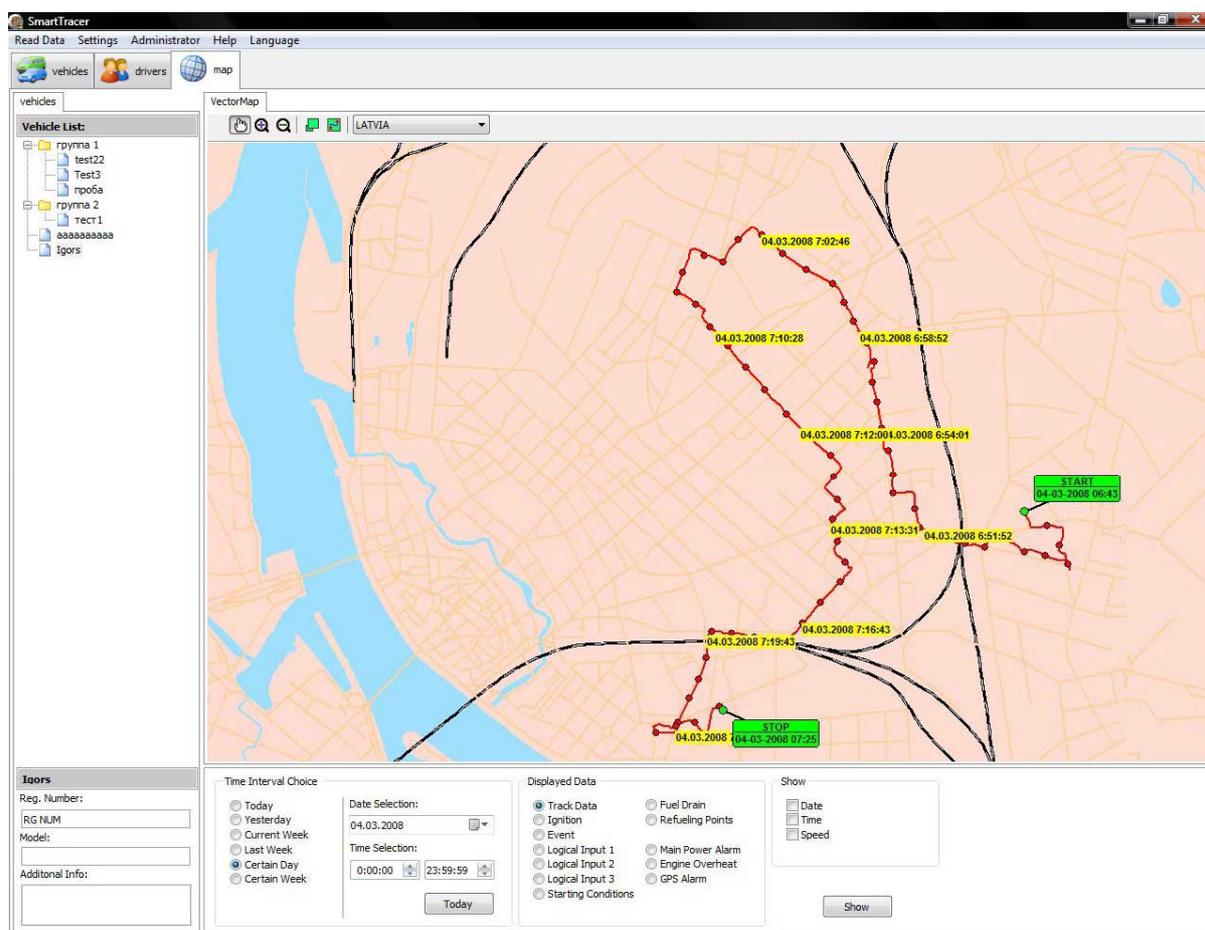
## 4. Monitoring software – SmartTracer

**SmartTracer 50 (SmartTracer 150)** is a program that is intended for the vehicle “Off-Line” monitoring, fuel consumption monitoring, analysis of vehicle utilization.

Program **SmartTracer 50** supports up to 50 mobiles units.

Program **SmartTracer 150** supports up to 150 mobiles units.

Program **SmartTracer 50 (SmartTracer 150)** is intended for construction vehicle and special machinery control systems and fleet management system with fuel monitoring function (Off-Line Vehicles and Fuel Monitoring Systems).



The program **SmartTracer 50 (SmartTracer 150)** allows:

- to carry out the control of the motor transport movement;
- to control fuel usage (consumption, refueling, drain);
- to control a trip;
- to control the parameters of transport movement;
- to control the condition of the external logic sensors;
- to display the track and events on electronics maps;
- to check the mileage of motor transport;
- to control drivers working hours;
- to analyze efficiency of motor transport function;



**SmartTracer 50 (SmartTracer 150) - main control function:**

- Generation the series of reports of vehicle activity and fuel consumption:
  - general reports;
  - general fuel reports;
  - consolidated reports per days;
  - consolidated fuel reports;
  - detailed daily reports and tables;
  - daily detailed events reports;
  - detailed daily fuel reports.
  
- Diagram construction of vehicle activity and fuel information:
  - daily diagrams;
  - weekly diagrams.
  
- Report generation of driver activity;
  
- Diagram construction of driver activity;
  
- Visualization on electronic maps:
  - track passed by vehicle;
  - parameters of vehicle traffic (stamps: date, time, speed);
  - start-stop points with stamps (date, time);
  - points of fuel draining with stamps (date, time, volume);
  - points of fueling with stamps (date, time, volume);
  - ignition On-Off points with stamps (date, time);
  - event button pressing points with stamps (date, time);
  - activation-deactivation of logical inputs with stamps (date, time);
  - engine starting points and condition of engine starting with stamps (date, time, driver);
  - main power alarm points with stamps (date, time);
  - engine overheat points with stamps (date, time, speed);
  - GPS alarm points with stamps (date, time).

**5. Sample of Main Information**

**“Fuel Reports”**

Initial volume	191,4 L
Final volume	373,3 L
Minimum volume	13,6 L
Maximum volume	471,0 L
Refuels volume	2913,4 L
Drainings volume	10,2 L
Consumption	2721,2 L
Consumption per 100 km.	33,8 L
Consumption per motohour	19,6 L
Consumption per 100 km. driving	32,4 L

**Fuel Consumption Report**

Finish time	Volume, Lt	Refuel/Draining
09.06.2005 18:52	160,7	refuel
10.06.2005 09:07	130	refuel
11.06.2005 09:06	193,3	refuel
13.06.2005 08:12	129,4	refuel
14.06.2005 09:53	159,4	refuel
15.06.2005 04:56	37,2	draining
15.06.2005 08:50	211	refuel
18.06.2005 08:35	185,2	refuel
19.06.2005 08:48	123,6	refuel
21.06.2005 08:24	176,4	refuel

**Fueling and Fuel Drain Report**



## 6. Visualization



Fuel Drain Point Localization in Map



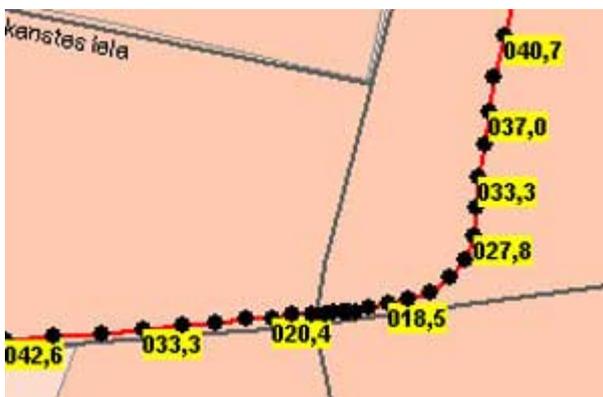
Fueling Point Localization in Map



Fuel Level in Fuel Tank



Trip Visualization on Map



Trip Parameters

