



TANKER TRUCK MONITORING SYSTEM[®] **(TTMS)**

Tanker Truck Monitoring System (TTMS) solution is an advanced wireless asset tracking system for control of fuel tankers during all phases of operation.

The system secures the tanker's fueling hatches and American Petroleum Institute (API) valves and enables continuous real time remote monitoring of the vehicle at all points on the route. Any unauthorized attempts to access the secured hatches or valves are recorded on the seals and invoke real-time events /alarms at the Customer Control Center.

All tanker access points are secured with intelligent wireless electronic seals. These intelligent seals are controlled and monitored wirelessly by the AVL Reader installed in the truck cabin. The AVL Reader communicates via RS-232 with a cellular or a satellite modem and uses this modem connection to communicate with the software running in the Customer Control Center and establish full electronic chain of custody for the tanker truck being monitored.

The control center can also transmit commands or information to the seals via the AVL Reader. In addition, a LED display mounted inside the cabin provides a visual indication of the status of each seal, enabling the operator in the truck or an inspector at a distribution facility to see, at a glance, if any hatch or valve Seals are open or have been opened since they were armed.

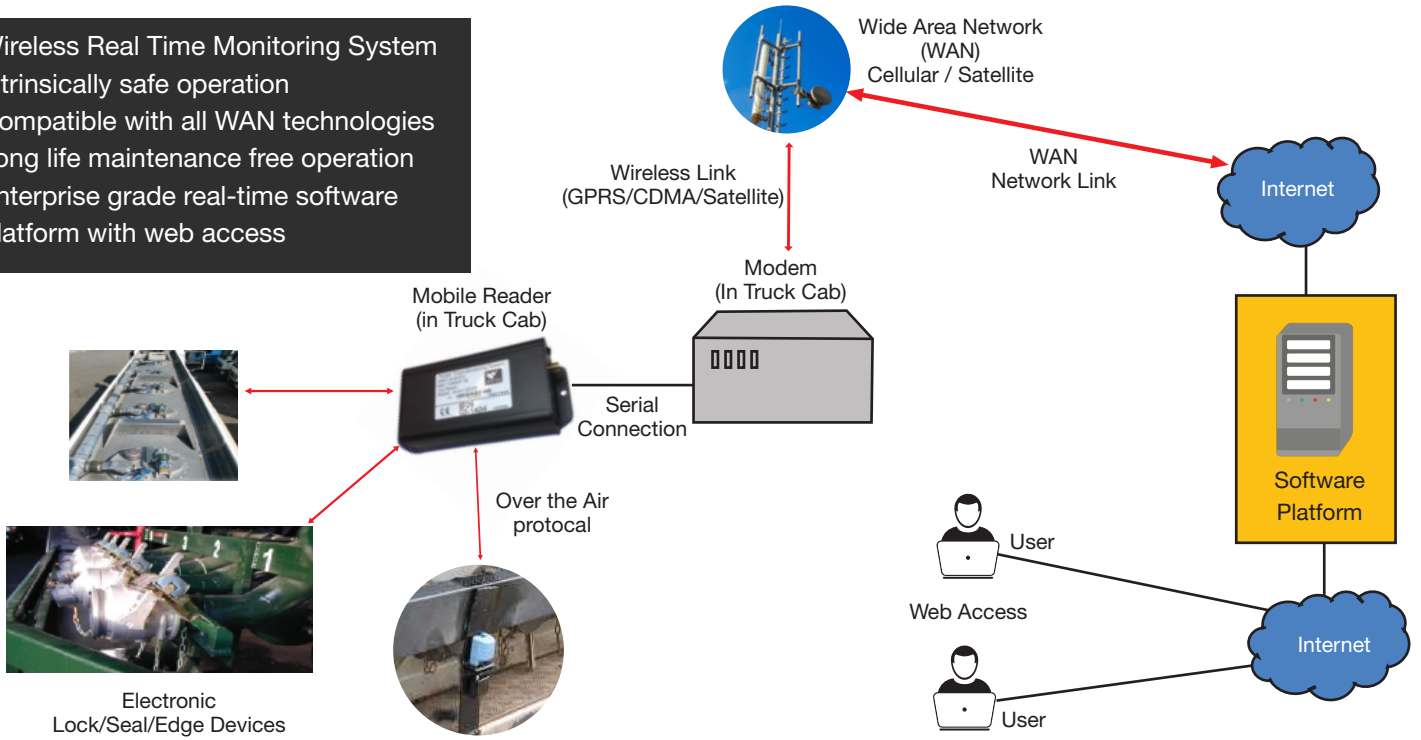


The main purpose of a TTMS system is to provide the customer management team with information to gauge the performance of their employees and fleet so that the correct actions can be taken to reduce pilferage, prevent contamination, improve efficiency, improve safety and create competitive advantages for customer.

Our TTMS system will help the customer to further enhance their leadership position in the market by ensuring the reliable delivery of clean, unadulterated fuel to all of its customers all of the time. Utrack is committed to working closely with the customer to implement this industry leading TTMS system.

Tanker Truck Monitoring Architecture

- Wireless Real Time Monitoring System
- Intrinsically safe operation
- Compatible with all WAN technologies
- Long life maintenance free operation
- Enterprise grade real-time software platform with web access



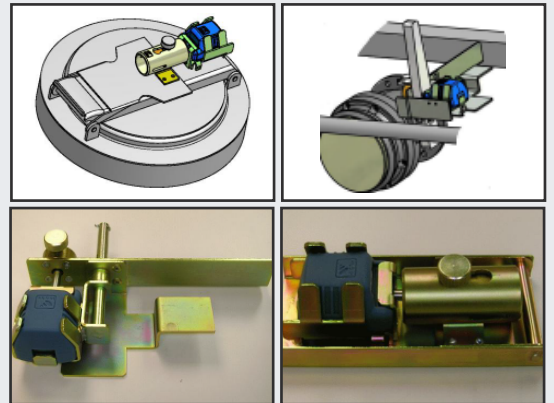
THE SOLUTIONS – Hardware Components

Electronic Seals

The electronic seals are portable, reusable active RFID devices installed on each hatch and valve. The maintenance-free seals have a long-lasting internal battery that requires no recharging of any kind. The seals perform the following functions:

- Physically secure the access point (hatch or valve)
- Monitor the access point through sensors and generate status information and alarms corresponding to various programmed conditions
- Store user data for retrieval

Two types of seals are provided in the **Tanker Truck Monitoring System (TTMS): hatch seals** and **valve seals**. The seals differ in the length of the locking pin and the mounting bracket.



Explosion Proof Certifications:

- Intrinsic Safety, UL Listed file number: E256795
- MIL-STD 810; SAE J 1445
- ATEX, **Intrinsic Safety for potentially explosive environments** Zone 1 & Zone 2



Electronic Seals Deployed



AVL Reader

The **AVL Reader** uses wireless technology to provide automatic processing and real-time monitoring of seals during transit. The reader is powered from the truck power (12-24V) and it's installed inside the truck's cabin, it has read/write capabilities for communicating with the cargo/tank sensors simultaneously in order to verify their presence and status. The reader uses its UHF channel for communication with its corresponding seals. It is equipped with back-up battery and supports two RS232 channels in addition to one RS485 channel for communicating with the Display unit.

The AVL Reader performs three major functions:

- Seal status & events monitoring
(Two-way Communication over UHF channel)
- Provides two way serial communication with the Cellular
(GSM/GPRS) modem & GPS receiver.
- Provides seal status to the Seal Status Display unit
(overRS485 channel)

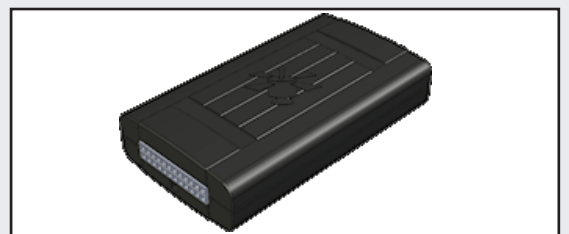


Automatic Vehicle locator: Cellular (GSM/GPRS) modem + GPS Receiver unit

The cellular modem is part of the TTMS. It integrates a GPS receiver, a cellular network modem (GSM/GPRS/EDGE, CDMA/1X). The system monitors various vehicle sensors, and provides the customer with a vast variety of real-time activities and information about the vehicle. The AVL Reader communicates with the modem via RS-232. From the moment the system is set, the electronic sensors and AVL Reader begin to routinely communicate with the driver and control center, reporting any activity involving the hatches, valves as well as the status of the truck, for complete monitoring and security.

The GPS – Cellular Module (GPRS) performs the following functions:

- Continuously receives time and location updates via GPS
- Transmits data between the AVL Reader and the Control Center, where data transmitted to the Control Center is sent with the time and location information.



Display unit

The Display unit is located inside the truck's cabin. It provides the operator / Inspector a local visual status of each seal installed on the truck in real time. Each Seal Status Indicator unit contains two rows of LED displays, corresponding to the hatches and valves and a set of system LEDs providing general status information. The LEDs are lit RED or GREEN according to the status of the seal. The display unit is powered from protection unit (+12VDC regulated). It supports two rows of 8 LEDs that corresponding to each hatch or valve sensor of the tanker.



TTMS Platform: Monitoring & Management Enterprise Software Platform (ESP)

The ESP TTMS software platform provides the dispatcher / end user the following monitoring & control capabilities:

- Status visibility on the tanker fueling hatches and valves (Open / Close / Set / Tamper)
- Records time and location information (via GPS) for all seal events
- Displays the vehicle location as required over a map
- Provides real-time alerts to the Control Center through GPRS /GSM network (retrieves information from HGT communication server)
- Allows for remote control and management of system entities (AVL Reader / Seal) from the Control Center
- Allows for configuration of fuel Refineries and Gas Stations
- Generates alerts for any opening / closing events of the tanker's access points outside the permitted areas (Geo-fence)
- Creates Electronic Chain of Custody and Electronic Audit Trail Reports

The ESP is offered as a fully-hosted solution with no need to maintain hardware.

The ESP TTMS application consists of 3 main user views: a map, list of tanker trucks under monitor and a window for RT alerts. On the map, the user can identify the position of the truck at every given moment (subject to 3rd party cellular / GPS coverage).



From the vehicles list, the user can select and observe the current status of selected seals on a particular vehicle - whether they are Opened/Closed, Tampered/Armed, Missing/Present.

The screenshot shows the 'Trucks' application window. At the top, there are navigation buttons for Tracts, Attach, Alerts, Map Rooms, Equipment, Admin, Reports, and System. Below this is a 'Trucks' section with a sub-menu for Tractors, Tanks, Current Trips, Play Back, Delivery Notes, and Current Trucks. The main table lists various trucks with their details. A 'Details' tab is selected, showing a 'Trip Log' for a specific trip on 4/6/2011 at 1:23:23 AM. The trip log table has columns for Date, Description, Ch/SN, Tank SN, Latitude, Longitude, and Location Name. It shows a sequence of seal operations (SEAL CLOSED, SEAL OPENED, SEAL SET) at various locations, including 'Go Well Service Station - Franchise' and 'BP W/Gardens Loading Entry'.

In the "alerts" window, any opening of a seal in an unauthorized location is displayed.

The screenshot shows the 'Alerts' application window. It features a table of alerts with columns for Date, Severity, Truck Serial Number, Text, Tank SN, and Coordinates. The table lists several alerts related to seal openings at unauthorized locations. Below the table, there is a 'Details' section for a selected alert. The details include: Description (50106/ST10), Serial Number (50106), Type Name (Bridging), Attachable (False), Company, Amount of Tanks (1), Last Transmission (3/30/2011 11:13:06 F), Location (Location not found), Longitude (27.52957), and Latitude (-26.84981). A small truck icon is also visible in the details section.

These authorized or unauthorized locations are recognized by the parameters that have been predefined in the application by the end user. For fuel trucks, authorized locations may only be fuel stations where driver's normally need to open the seals for emptying tanks. However, if the driver opens a seal beyond such a location, the seal will appear "Tampered" on the application, and the alert window will display a corresponding message of this event.

Furthermore, the end user can manage the parameters of the AVL Reader, sending commands to them and writing / reading data from seals.

FEATURES OF UTRACK TTMS SOLUTION

- Real Time Vehicle Tracking providing location of cargo at all times
- Real Time Seal Status Monitoring on Hatches and Valves - open and close events with location on map
- Real Time Seal and Route Violation Alerts
- Other Violation Alerts e.g. Speeding, Geofence etc.
- Detailed and updated Maps providing street level information (Google Maps)
- Geo-fencing
- Immobilizer
- Mileage
- Multitude of Reports e.g. Vehicle History, Speeding, Engine Run Hours etc.



BENEFITS OF UTRACK TTMS SOLUTION

- Quality control with the assurance that product that leaves the loading point will arrive at the destination unadulterated.
- Elimination of Cargo theft
- Full vision of the fleet 24/7
- Ensures Compliance to TRA ECTS requirements for Transit Cargo
- Improve turnaround times, hence better productivity and improved profits to the transporters.
- Complete Fleet management system for Fleet Operators.
- Enhanced Fleet Security
- Quicker recovery in event of Vehicle and Cargo Theft
- Reduced Operating Costs
- Quicker Response to Emergency/Recovery/Rescue because of GPS Accuracy
- Identify Vehicle Misuse
- Better Route and Resource Planning
- Enhanced Road Safety through Better Driver Behavior



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