

Real-time Onboard Vehicle Reporting (ROVR) System

Features

- ▶ High occupancy tolling (HOT) capability
- ▶ Infrastructure-free tolling capability
- ▶ Easy to understand scorecard provides useful insights into driving changes that will improve safety, conserve fuel, and reduce greenhouse gases (GHG)
- ▶ Helpful tips teach drivers how behaviors impact their safety and efficiency, enabling them to become better drivers
- ▶ Scorecard is e-mailed to each driver every Monday
- ▶ Helps the driver view, learn, and improve from trends in driving behavior
- ▶ Vehicle tracking data is available only to the subscriber, ensuring confidentiality
- ▶ Carbon calculation tells how much GHG the vehicle produces weekly
- ▶ Installs in less than a minute in cars built since 1996
- ▶ Target users include
 - ▶ General public
 - ▶ Commercial fleet drivers
 - ▶ Teen drivers



ROVR



ROVR₃

TransCore's ROVR™ and ROVR™₃, global positioning system (GPS) devices with GSM (global system for mobile communications) that can be used for HOT lane applications as well as infrastructure-free tolling. The system can also provide an optional driver safety monitoring feature that has been shown to dramatically reduce accidents, improve fuel economy, and decrease GHG.

ROVR wirelessly relays the driving conditions to our online, cloud-based Network Operations Center. The system evaluates the data and produces weekly scorecards showing performance metrics in key parameters. Graphs and charts illustrate driver performance and improvement trends over time and can also compare individual metrics against those of other drivers in a given category. The driver scorecard option is ideal for commercial vehicle fleets, parents of teen drivers, departments of motor vehicles, or driver education schools that need performance data or asset location devices.

The ROVR₃ device plugs into the on-board diagnostic (OBD) port located under the dashboard, near the steering column on every car built since 1996. Installation takes only seconds to complete. The ROVR can be used in fleet vehicles without an OBD port.

Infrastructure-free Tolling

TransCore developed sophisticated, new algorithms designed to deliver high accuracy while using minimum bandwidth for both HOT lanes and infrastructure-free tolling. In addition, the ROVR device is precise enough for tolling in a HOT lane environment that is adjacent to free lanes not being charged. Testing of highway speed, infrastructure-free tolling was performed at existing toll lanes. The ROVR device charges and the transponder charges were identical.

Driver Scorecard

For commercial fleets ROVR can provide automated vehicle and driver monitoring. For new teenage drivers, ROVR instructs and promotes safe driving habits, minimizing potential vehicle incidents. Measuring certain driving characteristics like hard braking, rapid acceleration, or overspeed has shown to effectively quantify driver performance and risk. In research studies, providing this type of feedback to drivers has shown to improve driver performance. The way each motorist drives affects motorists' safety, the fuel economy of cars, and the impact vehicles have on the environment.

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SYSTEM REQUIREMENTS

- ▶ 1996 or newer vehicle with onboard diagnostic (OBD) port
- ▶ Fleet vehicles without OBD port

PACKAGE AND FORM FACTOR

Plugs into vehicle's OBD port or vehicle power adapter. Motorcycle and heavy truck versions are available.

DATA STORAGE AND RETRIEVAL

- ▶ Downloads new tolling points/charges over the air
- ▶ Reports account balance
- ▶ Receives software updates
- ▶ Deducts tolls from balance and stores all information
- ▶ Differentiates between side-by-side lanes for HOT lane charging

READ/WRITE

- ▶ Wireless firmware and tolling point charges
- ▶ Wireless firmware updates

WARRANTY

One year

MAINTAINABILITY

- ▶ Integrated self-diagnostics
- ▶ Replaced as single module

MOUNTING LOCATION

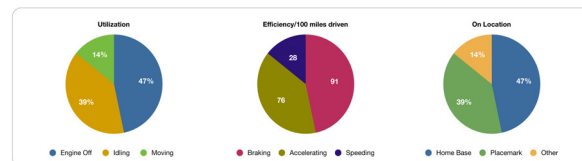
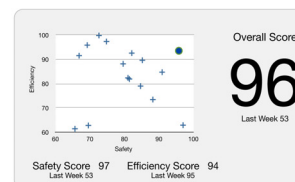
- ▶ Under vehicle dashboard

SCORECARD PARAMETERS

- ▶ Hard braking (number of events per hour)
- ▶ Rapid acceleration (number of events per hour)
- ▶ Overspeed (number of events per hour)
- ▶ Nighttime driving (hours:minutes)
- ▶ Idling (minutes)
- ▶ Fuel consumption (miles per gallon)

ROVR™ Scorecard

| | |
|-----------------|---------------------|
| Date | September 1-7, 2011 |
| Driver | Mark Jones |
| Primary Vehicle | #1191 |
| Plate | CO ETX-234 |
| Description | F150 White Pickup |



| Location | Speed (mph) | Event Type | When |
|-----------------------|-------------|-------------------------|---------------------------|
| Ln_Progress_PA | 6 | Deceleration (-6 mph/s) | Fri Oct 7 2011 2:20:36 PM |
| Ln_Progress_PA | 12 | Deceleration (-6 mph/s) | Fri Oct 7 2011 2:20:35 PM |
| Ln_Progress_PA | 18 | Deceleration (-6 mph/s) | Fri Oct 7 2011 2:20:34 PM |
| Ln_Progress_PA | 26 | Moving | Fri Oct 7 2011 2:20:28 PM |
| Ln_Progress_PA | 12 | Direction Change | Fri Oct 7 2011 2:20:08 PM |
| ress_Ave_Progress_PA | 41 | Moving | Fri Oct 7 2011 2:19:28 PM |
| Ave_Progress_PA | 27 | Moving | Fri Oct 7 2011 2:18:28 PM |
| ve_Susquehanna_PA | 0 | Moving | Fri Oct 7 2011 2:17:02 PM |
| ress_Ave_Susquehanna | 38 | Moving | Fri Oct 7 2011 2:16:02 PM |
| ress_Ave_Susquehanna | 0 | Moving | Fri Oct 7 2011 2:15:02 PM |
| ress_Ave_Susquehanna | 48 | Moving | Fri Oct 7 2011 2:14:02 PM |
| Rte_39_Susquehanna_PA | 0 | Moving | Fri Oct 7 2011 2:13:02 PM |

Infrastructure-free Tolling Points Report

Idling this week
Your car idled for 12:13 this week. With a total of 48:23 operating hours, this resulted in an efficiency ratio of 75%. Your Group had an average of 72%. When your vehicle is idling your mileage is exactly 0 mpg. The estimated costs, including fuel and maintenance, associated with your engine idling were \$12.73.

Driving Efficiency this week
Driving efficiency is a composite measurement that compares your performance to a theoretical optimum. Your measured performance of 84% is significantly above the fleet average. Factors that contribute to a high performance metric include lower highway speeds, infrequent braking and jack-rabbit starts, all of which contribute to improved fuel economy.

GHG this week
Total green house gas (GHG) emissions show you how much your vehicle's operations are impacting the environment. Your estimated emissions this week were 823 lbs. Reducing unnecessary idling and improving your overall driving efficiency will result in lower GHG emissions. Your vehicle emitted an estimated average of 7.2 lbs/hour.

Sample Driving Score Report

For more information:

Call **214.461.6443** (Sales Support) • **505.856.8007** (Technical Support)

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