Driver Behavior

Recently, fleet managers have required measurable feedback concerning the quality of the drivers within their fleet, in order to:

- Ensure the safety and wellbeing of fleet drivers.
- Minimize high maintenance costs associated with improper use of fleet vehicles.
- Document that regulations concerning driver behavior are adhered to by the fleet.

The latest beacon models include a self-calibrating, three axis accelerometer. This onboard hardware device has been integrated into the system, and is used to collect and report the following accelerometer-based events:

- Harsh Acceleration
- Harsh Braking
- Harsh Cornering
- Potential Accident

The beacons can also be equipped with an audio feedback device, which tells the driver in real-time when they perform a maneuver that falls outside the safety thresholds set for the fleet.

The System provides a summary report for the entire fleet that allows managers to assess the performance of the fleet as a whole, and compare the number of events generated from individual vehicles to overall fleet averages.

This guide describes the setup and configuration of the Driver Behavior feature, and also provides guidelines to fleet managers for the interpretation of the fleet report.

Supported Beacons

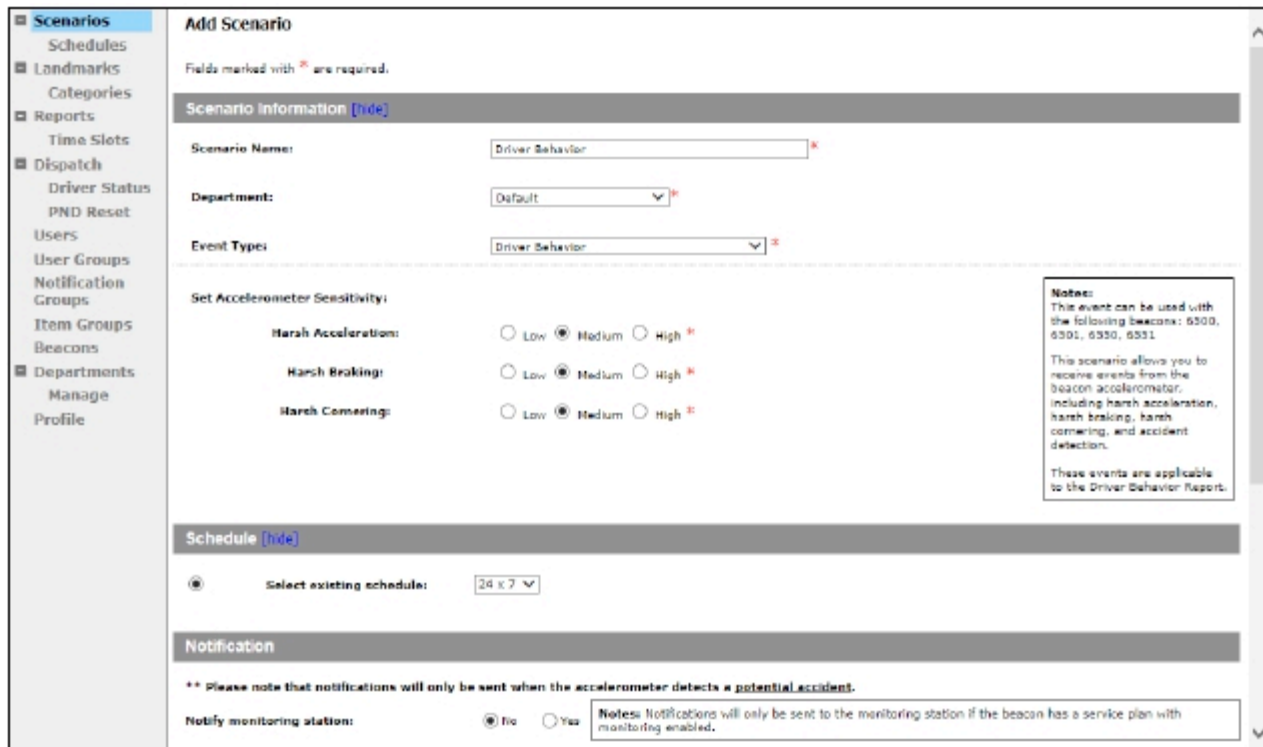The Driver Behavior feature is currently available on the following beacon models:

- 6500, 6501 (2G GPRS)
- 6550, 6551 (3G HSPA)

1. Scenario Configuration

In order to collect accelerometer-based events from the beacon, a Driver Behavior scenario must be configured and assigned to the vehicle. The user has the option of configuring the sensitivity of the accelerometer to best suit the type of vehicle being driven.

Driver Behavior Scenario Configuration

There are three levels of sensitivity that may be configured for each of the three driving characteristics being monitored: Acceleration, Braking and Cornering. Note that there is no configuration for the Possible Accident event, which has a fixed configuration on the beacon designed to detect the equivalent of an impact.

In most cases, the Medium settings will suffice. Low sensitivity settings will produce less events, and are suitable for small vehicles such as motorcycles which typically experience higher G-force when accelerating or cornering. The High sensitivity settings are most suitable for large vehicles, as they generally experience smaller G-forces than other vehicles during operation.

The following table provides recommended settings for the accelerometer sensitivity for various fleet vehicle types.

Recommended Accelerometer Sensitivity Settings

Vehicle Type	Harsh Acceleration	Harsh Braking	Harsh Cornering
Motorcycle	Low	Low	Low
Passenger Car	Medium	Medium	Medium
SUV	Medium	Medium	Medium
Van	Medium	Medium	Medium
Small Truck	Medium	Medium	Medium
Mid-sized Truck	Medium	Medium	Medium

Vehicle Type	Harsh Acceleration	Harsh Braking	Harsh Cornering
Large Truck	High	High	High
Bus	High	High	High

Note that for reporting purposes the ignition scenario is used to determine whether or not a vehicle is active during the reporting period, so an ignition scenario must be assigned to the vehicle in addition to the Driver Behavior scenario.

Note that the Potential Accident event is the only event for which SMS and e-mail notifications may be generated. Also, this is the only event type that will open an Incident at the monitoring station if this feature is included in the service plan.

2. Audio Feedback – Buzzer Installation

An optional buzzer may be connected directly to the beacon to provide immediate audio feedback to drivers whenever Driver Behavior events are generated. A 12V piezoelectric buzzer capable of emitting a 75db alarm is appropriate in most cases. If the installation is in a large vehicle where the beacon is under the dashboard, a louder buzzer may be required so that it can be heard by the driver. For large trucks, the buzzer can be in the 12V to 28V range. An example buzzer that is appropriate for most installations can be found here: http://www.radioshack.com/product/index.jsp?productId=23262846

On the beacon, the yellow wire in the wiring harness (Pin 2 – Relay 2 output) is connected to the ground terminal on the buzzer, and the power terminal is connected to the vehicle source. Please refer to the following wiring diagram.
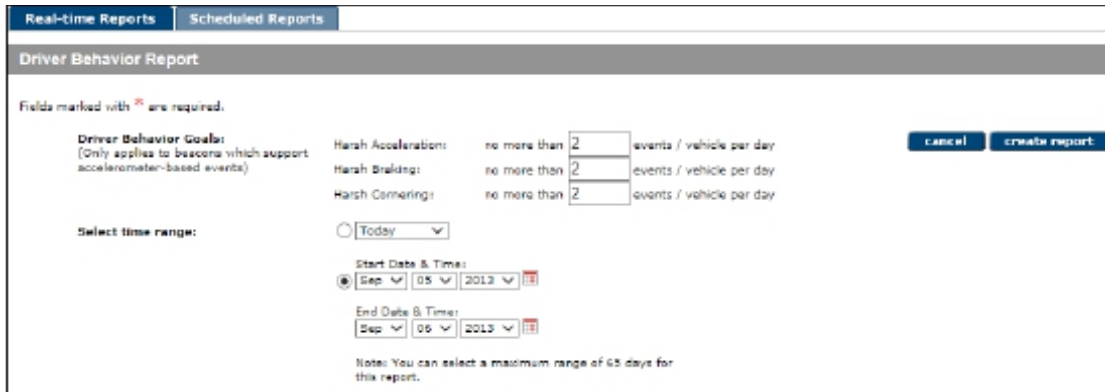
Buzzer Wiring Diagram
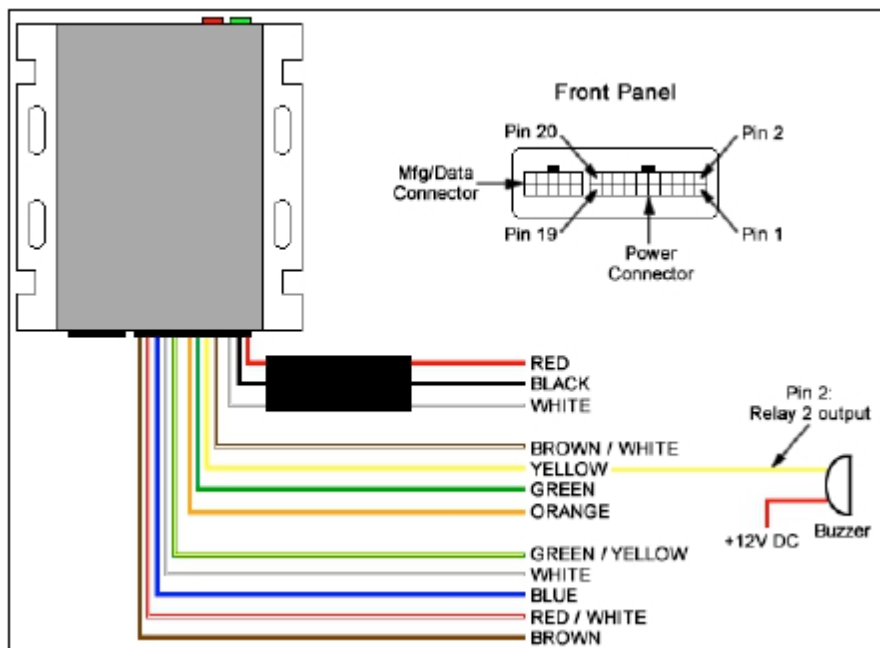
3. Event Reporting

The Driver Behavior Report summarizes the events for the entire fleet over the chosen time period. When generating the report, the user may select target goals for the fleet, which indicate the maximum number of events per active vehicle, per day. The target goal for Potential Accidents cannot be set, as it is zero (0) by default. Setting goals for the fleet can be a subjective exercise. Fleet managers may want to base the initial values on their expectations for the best driver currently in their fleet. Selected goals will remain in the report setup for subsequent reports, and may be edited at any time.
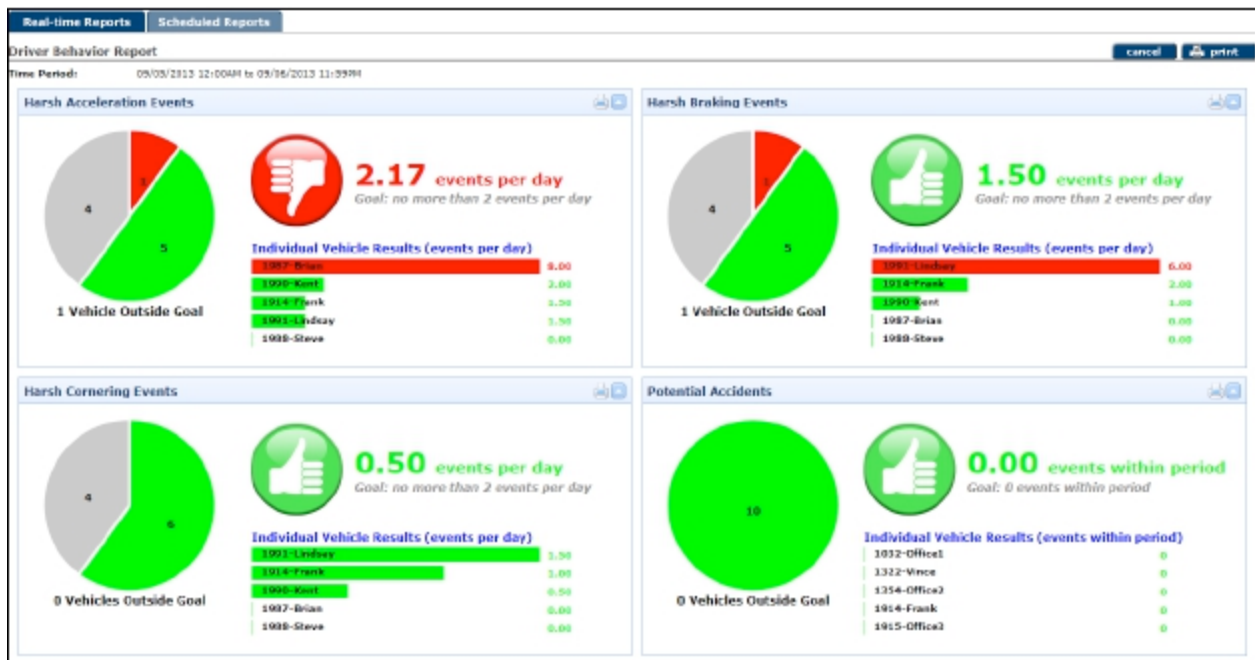
Driver Behavior Report Setup

Once goals are set, a time period is selected and the resulting report shows the fleet summary for the four different types of events.

Sample Driver Behavior Report

Each quadrant of the report shows a summary for the fleet for that particular aspect of Driver Behavior. The pie chart shows a distribution of vehicles across the fleet. The green area represents the proportion of vehicles at or below the goal, while red indicates vehicles failing to meet the goal. The vehicles indicated by the grey part of the chart were inactive during the time period chosen.

Note that vehicles are considered inactive (i.e. appear as grey) for one of the following reasons:

1. The vehicle has no, or incorrectly assigned scenarios (accelerometer-based and ignition events)
2. The vehicle has proper scenarios assigned, but no ignition event is recorded during the report period

The thumb-up or thumb-down indicates whether the average result for the entire fleet lies above or below the goal for the fleet.

The bar chart on the main report page lists the top five vehicles that have generated events under that category during the chosen time period for the report. Clicking on the title for the Individual Vehicle Results list will display a popup showing the results for that category for all vehicles in the fleet.

**Sample Fleet View for Harsh Braking Events**
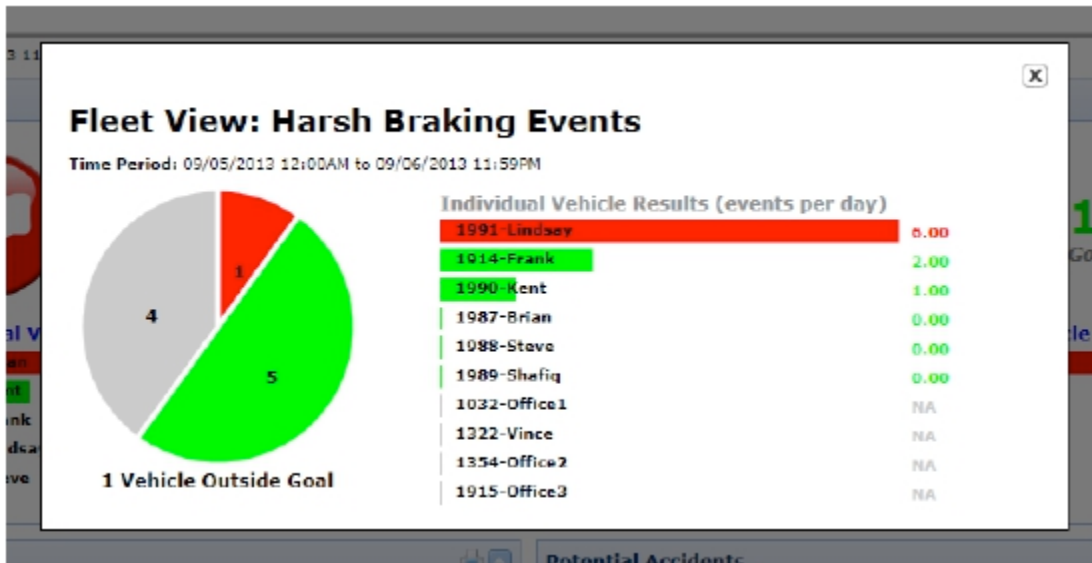
4. Interpreting the Report

The following image is a close-up of the Harsh Acceleration quadrant of the example report. There are ten total vehicles in this particular fleet, four of which were inactive during the time period of the report.

Four of the six active vehicles generated Harsh Acceleration events during the time period, but only one vehicle failed to meet the goal that was set for the fleet.

The fleet as a whole failed to meet the goal (as indicated by the thumb-down), but it can be seen on the report that only one vehicle generated a significant number of events – enough to push the fleet average outside the goal set for the report.

Sample Report for Harsh Acceleration
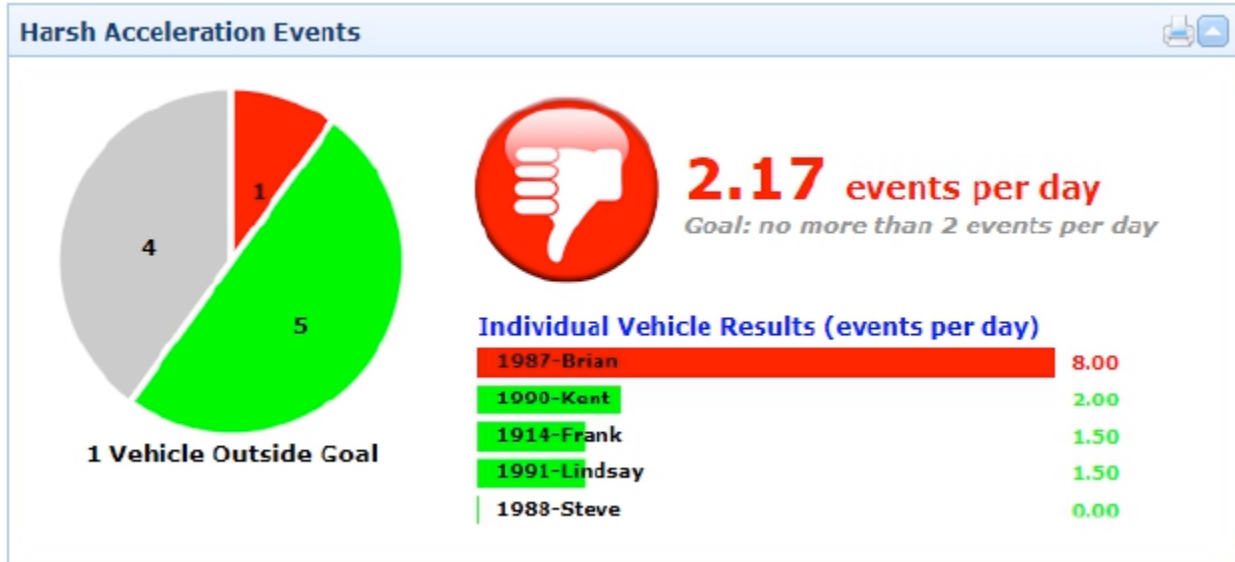
It is important to note that the data generated by the accelerometer is best used for comparison purposes. In the example above, there could be many factors explaining why the one driver generated so many events during the report time period, including the route taken, traffic or weather conditions, etc.

Longer periods of time viewed in the report will generally provide more average values which may be better indicators of driving proficiency. Also, comparing the data for vehicles that travel the same route may provide a better picture of the driving behavior of the fleet.

In the example above, if the first two vehicles in the list are identical, and travel similar routes, then the graph does provide an adequate comparison of the two drivers operating those vehicles.

5. Important Considerations

- The beacon must be firmly attached to the vehicle to ensure accurate accelerometer calibration and accurate event generation. Because the accelerometer is self-calibrating, the orientation of the beacon does not matter.

- In order to prevent false reporting, events detected when the vehicle speed is below 12 mph (20 km/h) are filtered. Note that this filter prevents accident detection for stationary vehicles.

- Sometimes there is 2-3 second delay before audio feedback is received due to event processing time.

- Steep inclines can affect the results returned from the accelerometer. The beacon is more likely to produce events when traveling up or down a steep hill.

If you are still experiencing difficulty obtaining appropriate results from the Driver Behavior feature after following the steps in this document, please contact Support at info@movinongps.com.