



TELEMATICS
MOBILE INFORMATION EXCHANGE

Event Configuration Guidelines



Table of Contents

1	Background and Scope	3
2	Event Configuration Best Practices	3
2.1	General Guidelines.....	4
2.2	Event Configuration Cleanup.....	4
2.3	Diagnostic Events.....	5
2.4	Active versus Passive Events.....	5
2.5	Tools to monitor events and data usage.....	5
3	Appendix A - Event Configuration	7
3.1	Event Types	7
3.2	Conditions	7
3.3	Record.....	7
3.4	Actions.....	8
3.5	Active.....	9
4	Appendix B - Viewing of Events	11
4.1	Live Tracking	11
4.2	Historical Tracking.....	15
4.3	Viewing Events on the Trip Timeline	19
4.4	Viewing Events in MiX Insight Reports.....	20

1 Background and Scope

MiX Telematics' SaaS Platform allows users to create and customise events according to their specific requirements. MiX Telematics has also made various default, diagnostic, and system events available to simplify the configuration process. These events are loaded to the FM, MiX4000, and MiX6000 on-board computers and are reported back into the system when triggered. These events are displayed throughout various parts of the user interface.

If you have prior knowledge of event configuration then please refer to section two (2) in this document. If however you are new to the MiX Telematics platform, please refer to the following sections at the end of this document:

- - The tool provides you with different reports to drill down and find:
 - The number of active events in last 7 days
 - Event Analysis
 - Position Analysis
 - Trip Analysis
 - Worst Organisations – Active Events
 - Worst Organisations – Events
 - Redirected Events

- Appendix A - Event Configuration
- Appendix B - Viewing of Events

The aim of this document is to clarify how to properly configure events in order to increase their usefulness and minimise unnecessary communication cost and overhead of the solution.

A bad event configuration that generates an excessive amount of events will have a negative impact on the performance and response of MiX Fleet manager and will slow the system down for all other users.

2 Event Configuration Best Practices

This section provides a guideline on how to set up events in the most effective and useful way in order to get the most value out of the system. A lot of people configure events without understanding what the various actions and options on the event relate to in turn configuring additional unnecessary functions. Each option on the event configuration, when enabled, adds to the size of the event and the cost to send and process the event.

There are a couple of principles/rules-of-thumb that are absolutely critical when it comes to event configuration:

- Only record events that are **actually** needed and used in reports (everything else is expensive junk)
- Be **sensible** when setting "Recording Type" and use Detailed only when absolutely necessary
- Active messages should **only** be used in cases where an event occurrence (such as a panic button being pressed) requires an immediate or real-time response by a live monitoring system.
 - The processing cost and overhead of active messages is **extremely** high - unless they are being consumed immediately, there's no point in sending them

MOST IMPORTANTLY: after creating / modifying ANY event configuration, **CHECK THE REAL-WORLD RESULTS:**

1. Upload the configuration to one or two **production** vehicles (not a bench-test unit or vehicle in a workshop)
2. Let the vehicles operate for 2 days
3. Run a Detailed Event Report that includes **EVERY EVENT IN THE ORGANISATION** in the event selection criteria, for the test vehicles for those 2 days.
4. If you see any events that triggers excessively or contains useless data – cull them!

2.1 General Guidelines

The following are general guidelines:

- Do not create notification or detailed events for parameters that will continuously change during a trip. Examples of such parameters are: Brake Pedal Pressed, Gear Changes, Clutch Engaged, Accelerator Pedal Position etc. Rather use these type of parameters in a Summary event that only provides the count and total duration at the end of a trip.

- Do not select unnecessary Record Actions (Start odometer, End odometer, Start Position, End Position, Record Video, Record Fuel Pulse). This will increase the amount of data for each event and will lead to higher communication cost and load on the servers. For example, if you configure an Over Speeding event, adding the record odometer or Fuel pulses does not add value.
- Do not record Video on events such as “Over Speeding”. If the speed limit is for example set at 80 km/h and somebody is trying to drive at exactly 80 km/h, he will trigger this event multiple times in a trip and each time a video of 60-80 Kbyte will be uploaded to the servers. Rather set video to record on other harsh events that rarely occur i.e. Harsh Braking, Harsh Cornering or Harsh Acceleration.
- Do not record Video on events such as “Out of Green band”. This event makes use of a combination of speed and RPM and the limits are usually incorrectly specified for automatic or modern vehicles. This means that for modern vehicle that uses an Eco mode or with automatic transmission, this event will trigger multiple times and the driver has absolutely no control over it.
- If you record data at a regular interval (Ticker Event), make sure that you specify “Ignition ON” or “In Trip (Drive)” as a condition. If for example you set up “Temperature” to record every minute, it will record 1440 events in a 24-hour period. Rather set up events to trigger on exceptions. Examples of data that can be recorded with exceptions are Cold Chain Temperatures, Oil Pressure, Engine Temperature, Tyre Pressure, Fuel Level e.g.:
 - Temperature > 10 degrees Celsius
 - Temperature < -5 Degrees Celsius
- Only use Detailed events if require a start/end and duration for the event. Detailed events require the most resources and has the most dependencies. For example, if you want to create an event when something is switched ON and OFF again but you do not care how long it was ON or OFF, rather create Notification events and not Detailed events.

2.2 Event Configuration Cleanup

- It is important to audit existing event configurations and remove any events from the configurations that are not needed. A lot of times events are added for testing or other purposes and then never removed from the configurations afterwards. This means we are actively processing events that are not used by anyone and is wasteful.
- It is also necessary to review existing events to ensure that they are configured optimally and do not have additional record actions that do not add value or are configured as a detailed event when the customer actually just requires a notification event.

2.3 Diagnostic Events

Diagnostic events are usually set up to monitor things like GSM coverage, CAN parameters, or communication robustness. This data does not have to appear on reports or on the timeline and MiX has created mechanism to deal with such events without placing a burden on the system or affecting other users.

The RSO should notify CSO when they set up diagnostic events that the customers do not use in reports or timeline. CSO can then add these events to a filter file that re-directs them to a cost-effective data store where it can be retrieved later using a special tool.

An example candidate for this would be brake pedal events. When this event is set up from CAN data, it currently is not possible to write it to TACHO, but the data is only needed for an accident investigation. If the data is recorded via this mechanism it then can be retrieved with the tool, and it saves a lot of processing and storage resources especially on our high performance expensive databases.

2.4 Active versus Passive Events

Active messages should **only** be used in cases where an event occurrence (such as a panic button being pressed) requires an immediate or real-time response by a live monitoring system.

- The processing cost and overhead of active messages is **extremely** high - unless they are being consumed immediately, there's no point in sending them

Active events are only available in **Live Tracking** and **Info hub** or you can subscribe to **Event Notifications**. Active events are only stored short term (3 days) and are not available on the TimeLine, Historical Tracking or Insight reports.

If you also choose the **Record action** on an active event, it means that each event has to be processed twice.

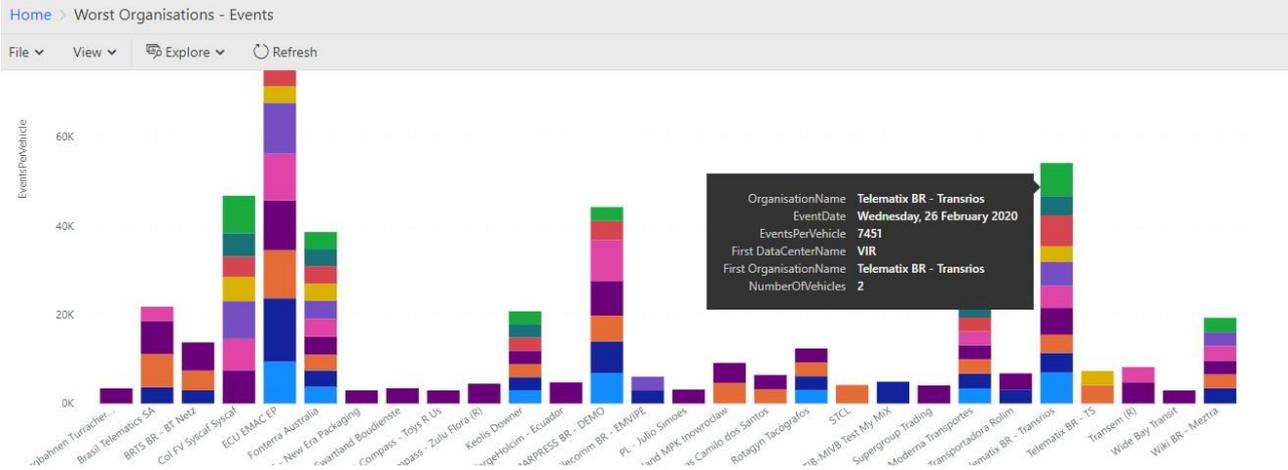
It is therefore important to consider if it is required to **record** an active event or if you can just pull the data via MiX Integrate before it expires.

2.5 Tools to monitor events and data usage

The following link is accessible to anybody with a MiX Telematics user account.

- https://sea-reports.mixtelematics.com/pbi_reports/browse/
- These reports can be used to analyse event volumes.
- They are a bit slow, but the information in them is extremely valuable.
- Please contact Herbie Marais at herbie.marais@mixtelematics.com to grant you access if needed.

Below is a screenshot of the type of information that you can get from this tool. It shows how a specific organization with only 2 vehicles are generating 7451 events per vehicle per day.



The tool provides you with different reports to drill down and find:

- The number of active events in last 7 days
- Event Analysis
- Position Analysis
- Trip Analysis
- Worst Organisations – Active Events
- Worst Organisations – Events
- Redirected Events

3 Appendix A - Event Configuration

Events define what should be monitored and/or recorded by the unit as well as what other actions the unit should take when an event is detected, for example sending a message back to the office, switching a device on or off etc. On-board events used within an Organisation reside in the Event Library.

Please note: Changes made to the events within the Event Library will not cascade to the event templates or the configuration groups using the event template. If the update is required, it must be made at the template level as well.

3.1 Event Types

1. **Default** – Default events are loaded onto the mobile device by default.
2. **System** – System events are available in the Library by default and have to be added to an Event Template.
Default and System events are configured by MiX Technical Support Representatives and certain permissions are required to add, edit, or remove event conditions from these events.
3. **Custom** – Custom events are user-defined events.
4. **Diagnostic** – Diagnostic events are used for diagnostic purposes.

3.2 Conditions

A condition is the combination of a parameter, an operator, and a trigger value. A combination of one or more conditions is used to define when an event should be recognised by the unit. For example, the default Over Speeding event occurs when the Road Speed parameter is greater than 120 km/h (75 mph).

Parameter – Select the parameter for which a value must be returned for. “Ignition Off” or “Door Open” are examples of parameters.

Operator – Operators are used in the definition of an Event, to relate a Parameter to a Trigger or threshold value. Valid operators are Greater Than (>), Less Than (<), Greater Than or Equal To (>=), Less Than or Equal To (<=), and Equal To (=).

Trigger Value – A trigger value is a threshold value or a Boolean state (true/false) that determines when a condition is true.

3.3 Record

Recorded events can be monitored in Historical Tracking, Trip Timeline, and event-related Insight Reports. Recorded events are stored and visible in the system long-term.

Record event – Tick the box to enable the recording of the event.

Record delay – The recording delay is the amount of time for which the event must be true before the unit will record the occurrence of the event.

Recording type:

1. **Detailed** – Records the start and end of each occurrence of the event.
2. **Summarised** - Records the total duration (and trigger value) that the condition was true for.
3. **Notification** - Records each time the condition becomes true. This will not record the duration for which the condition was true.

Record actions – Available options for Detailed Events:

1. **Start odometer** – Record the odometer reading on the unit when the event condition becomes true.
2. **End odometer** – Record the odometer reading on the unit when the event condition becomes false.

Recording the odometer is useful when using the Detailed Event Report. It allows users to view the exact distance between the event start and event end. Users can also calculate the distance between various events based on the odo reading.

3. **Start position** – Record the start position of the event.
4. **End position** – Record the end position of the event.

It is important to select the start and end position in order to plot the event on the map in Tracking and on the map in the Detailed Event Report.

5. **Record video** – Record a video when the event is triggered.

This is only applicable if the asset has a MiX Vision peripheral connected. The recording duration and other settings are defined in the Peripheral Library.

6. **Record pulse count** – Record pulse counts when the event is triggered.

Users that have a connected fuel measuring device are able to monitor how much fuel was used when the event triggered.

Record actions – Available options for Notification Events

1. **Start odometer** – Record the odometer reading on the unit when the event condition becomes true.
2. **Start position** – Record the start position of the event.
3. **Record video** – Record a video when the event is triggered.

This is only applicable if the asset has a MiX Vision peripheral connected. The recording duration and other settings are defined in the Peripheral Library.

3.4 Actions

The “Actions” section defines what action must be taken when the event is triggered and contains various properties:

Sound the buzzer after - Indicates whether an alarm must warn the driver and if so after what duration of time.

Enable the relay after - Indicates whether the relay must be switched and if so after what duration of time.

This will not be available if a GPS or other device is using the relay for power control.

Allow Override – If selected, the alarm and relay will not activate during a trip if a System Override plug was inserted between identifying the driver and starting the trip.

Display warning after – Users are able to specify the delay (time that the event must be true) before a warning is displayed on a connected display device.

3.5 Active

The “Active” section is where a user defines whether an event should be flagged as an active event or not. Active events are monitored in Live Tracking and Info Hub and also by creating Event Notifications.

It is important to note that Active events are only stored short term so it is advised to also set the event to record if it needs to be stored and visible in the system in the long term.

Send active message – Indicates whether the vehicle is to send an active message notifying that the event has occurred. Users must tick this box if they want to view the event in Live Tracking, Info Hub, and also receive Event Notifications.

Queue after a delay of – Users are able to specify the delay (time that the event must be true) before a message is sent. This delay is independent of the recording delay.

Send when condition becomes true/false – The delay period begins immediately if the event becomes true/false.

Message Priority - The “Message Priority” section defines when the message should be sent.

1. **Normal** - The message will be sent when the message buffer is full
2. **Urgent** - The queued message will be sent immediately. Any normal priority messages that have been queued will be sent at the same time.
3. **Critical (Limited)** - The message will be sent immediately using any available transport, including satellite, and adhere to the daily message limits. Mobile device will surface if required.
4. **Critical** - The message will be sent immediately using any available transport, including satellite and ignore any daily message limits. Mobile device will surface if required.
5. **Emergency** - The message will be sent immediately using ALL available transport channels, including satellite, and ignore any daily message limits. Mobile device will surface if required. Duplicate active events will be shown in the system.

Send current position in message – Select whether the message should include GPS position information.

Users must select this if they want to plot the events on the trail in Live Tracking.

Enable active tracking while the condition is true - Indicates whether the asset should be actively tracked (position information sent at regular intervals) while the event condition is true.

Tracking delay – Users are able to specify the delay (time that the event must be true) before active tracking starts.

Tracking interval – The interval at which the active tracking messages are to be sent while the event condition is true and the setting to enable active tracking is selected.

4 Appendix B - Viewing of Events

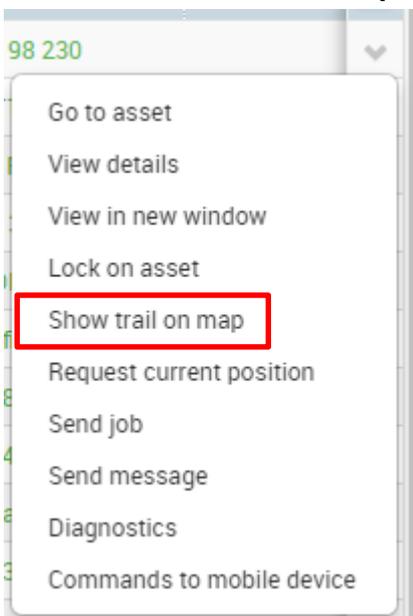
4.1 Live Tracking

Events that are configured as active events are displayed on the map as they are reported into the system. The tracking interval and event information is based on the configuration of the event under the “Active” section.

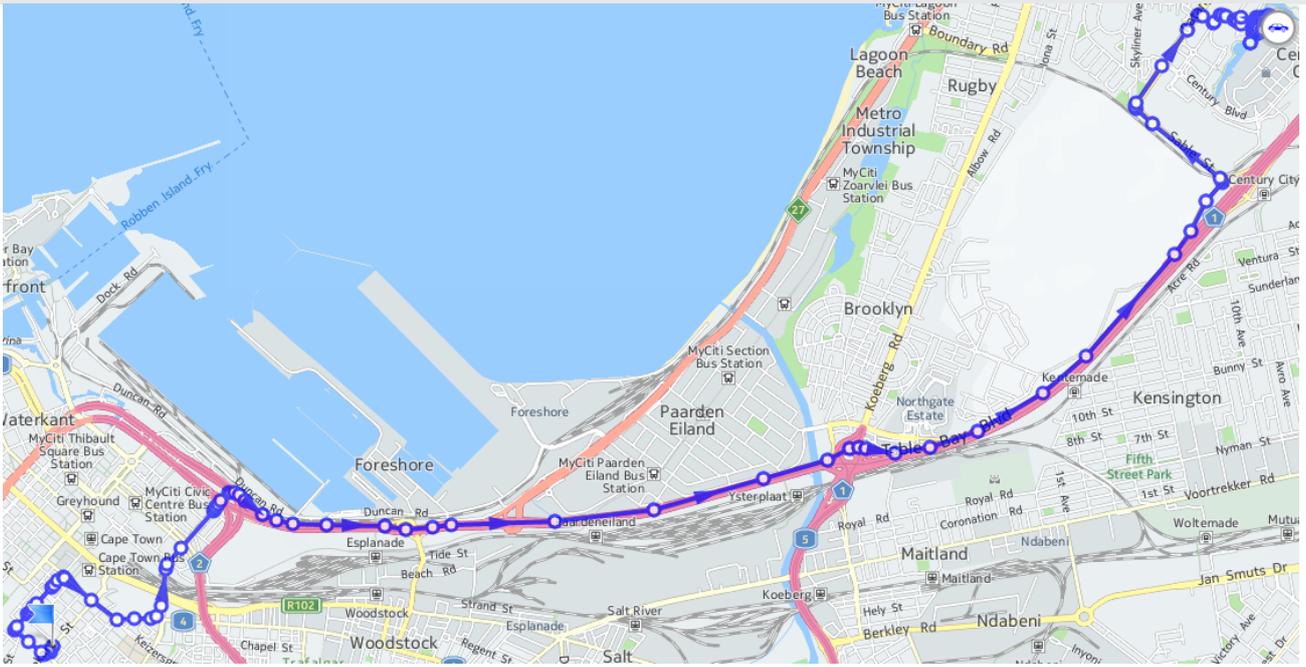
4.1.1 Events on Trail – Map View

Users can view events on the trail by selecting it in the Map Layers.

1. Click on the **actions** dropdown next to the asset
2. Select **Show trail on map**



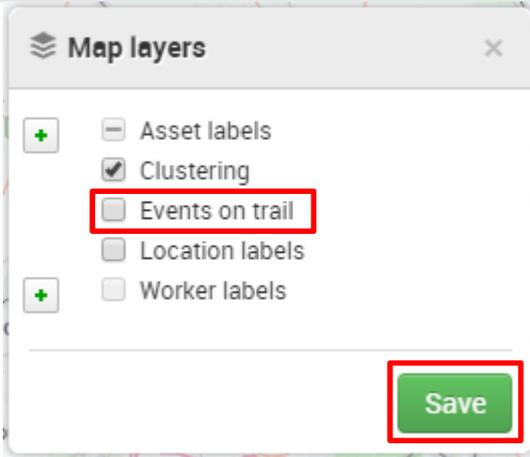
3. The trail is now plotted on the map



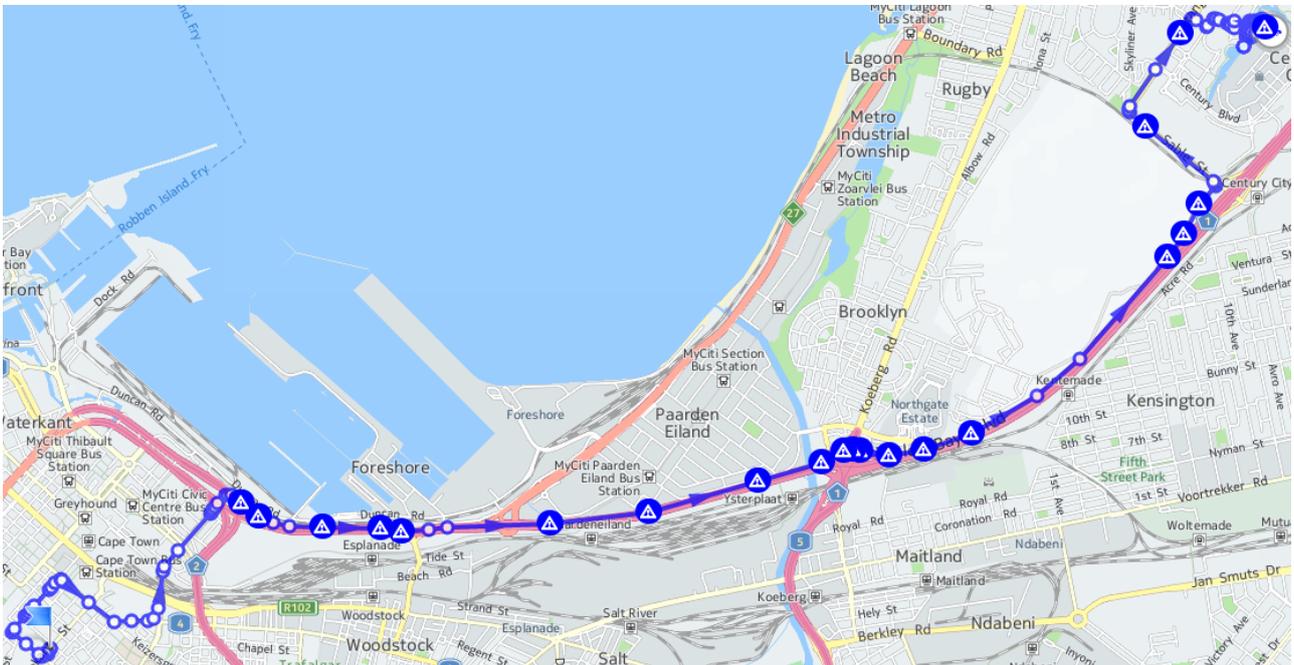
4. Click on the **Map layers icon**



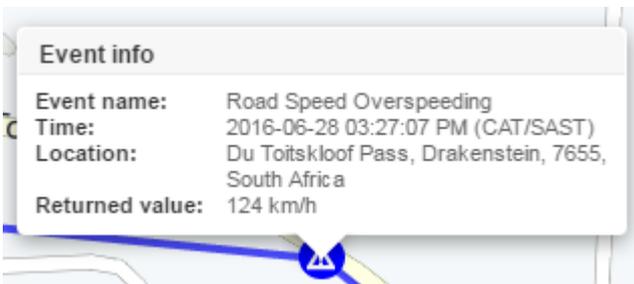
5. Tick the **Events on trail** box



6. Click **Save**
7. The events are now plotted on the trail



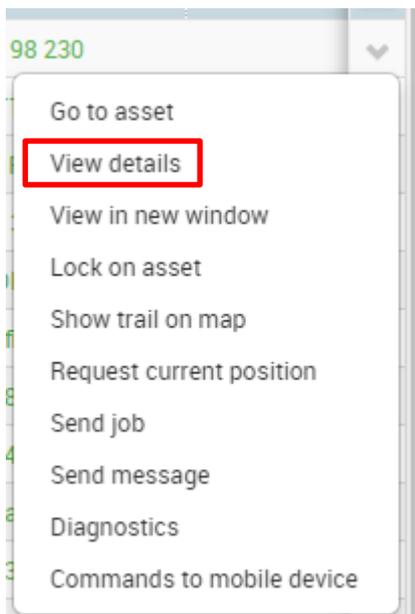
8. Hover over the **event icon** to view more information



4.1.2 Events on Trail - List View

Users are able to view a chronological list of all the events that have occurred on the trail.

1. Click on the **actions** dropdown next to the asset
2. Select **View details**



3. Scroll to **Events on Trail**

Site:	BAS 1.70d
Identified driver:	Unknown
Location:	
GPS Coordinates:	-33.8479996,18.7110004
Heading:	115 ° (ESE)
Number of satellites:	11
HDOP:	1
Last position date and time:	2016-06-28 03:47:45 PM (CAT/SAST)
Events on trail:	2016-06-28 03:47:17 PM (CAT/SAST) - Road Speed Overspeeding - 121 km/h [...]
Asset status:	Available
Servicing and licensing status:	OK

4. Click on the **ellipsis icon** to collapse the list

Events on trail:	2016-06-28 03:13:35 PM (CAT/SAST) - GSM Jamming Detected - OK - [...]
------------------	---

5. View a **list of all the events** that have occurred on the trail

Events on trail:	2016-06-28 03:13:35 PM (CAT/SAST) - GSM Jamming Detected - OK - 1 2016-06-28 03:02:17 PM (CAT/SAST) - GSM Jamming Detected - Bad signal - 3 2016-06-28 02:51:14 PM (CAT/SAST) - GSM Jamming Detected - OK - 1 2016-06-28 02:50:52 PM (CAT/SAST) - GSM Jamming Detected - Bad signal - 3 2016-06-28 02:48:41 PM (CAT/SAST) - GSM Jamming Detected - OK - 1 2016-06-28 02:48:12 PM (CAT/SAST) - GSM Jamming Detected - Bad signal - 3
------------------	--

4.2 Historical Tracking

Events that are configured to record positions are displayed in Historical Tracking after the trip download has completed. The events can be viewed in the trip list and on the map. The event information displayed is based on the configuration of the event under the “Record” section.

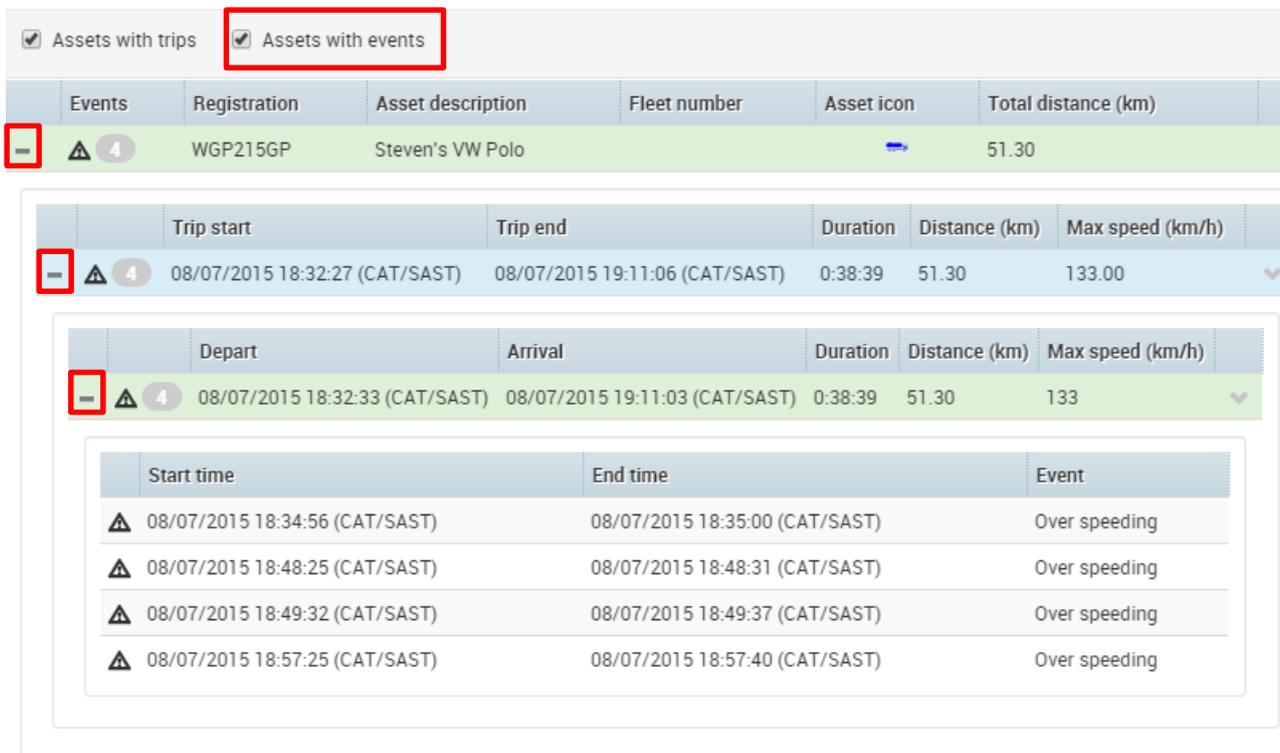
It is important to select the event from the Event selector , in the top right corner, on the Historical Tracking screen.

4.2.1 Events that are triggered in-trip

Trip List

Users can select the “Assets with events” option if they only want to view assets that triggered events within the selected time period. The “Events” column displays the number of events that were triggered within the trip. Collapsing the trip allows the user to view the event count per sub-trip.

View the event details in the trip list by collapsing the trip and the sub-trip.



The screenshot shows the 'Assets with events' filter selected in the top left. Below it is a table of trips. The first trip is expanded to show sub-trips, and one sub-trip is further expanded to show a list of events.

Events	Registration	Asset description	Fleet number	Asset icon	Total distance (km)
4	WGP215GP	Steven's VW Polo			51.30

Trip start	Trip end	Duration	Distance (km)	Max speed (km/h)
08/07/2015 18:32:27 (CAT/SAST)	08/07/2015 19:11:06 (CAT/SAST)	0:38:39	51.30	133.00

Depart	Arrival	Duration	Distance (km)	Max speed (km/h)
08/07/2015 18:32:33 (CAT/SAST)	08/07/2015 19:11:03 (CAT/SAST)	0:38:39	51.30	133

Start time	End time	Event
08/07/2015 18:34:56 (CAT/SAST)	08/07/2015 18:35:00 (CAT/SAST)	Over speeding
08/07/2015 18:48:25 (CAT/SAST)	08/07/2015 18:48:31 (CAT/SAST)	Over speeding
08/07/2015 18:49:32 (CAT/SAST)	08/07/2015 18:49:37 (CAT/SAST)	Over speeding
08/07/2015 18:57:25 (CAT/SAST)	08/07/2015 18:57:40 (CAT/SAST)	Over speeding

Map View

View the event on the map by plotting the trip.

1. Click on the **actions** arrow next to the trip
2. Select **Show on map**

4.2.2 Events that are triggered out of trip

4.2.3 Trip List

Events that were triggered out-of-trip are displayed in their own box in the trip list. The column headings of the out-of-trip event box are grey instead of blue.

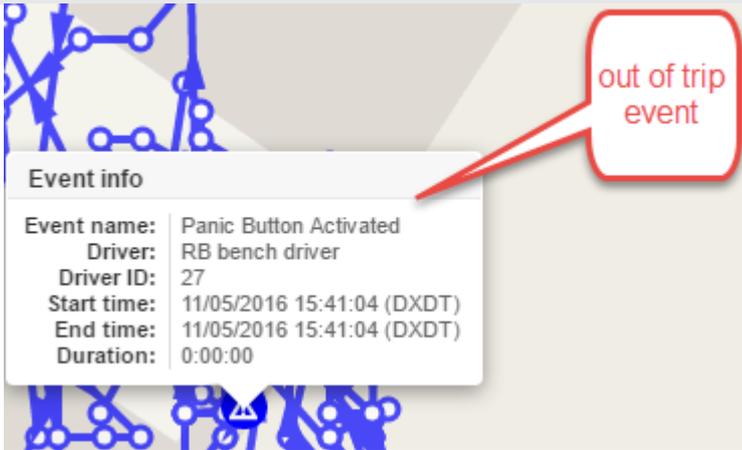
-  4 11/05/2016 15:47:51 (DXDT) 11/05/2016 15:59:17 (DXDT) 0:11:30 6.80 110			
Start time	End time	Event	
 11/05/2016 15:47:53 (DXDT)	11/05/2016 15:59:17 (DXDT)	Out of green band driving	
 11/05/2016 15:47:53 (DXDT)	11/05/2016 15:57:41 (DXDT)	Harsh acceleration	
 11/05/2016 15:57:44 (DXDT)	11/05/2016 15:57:46 (DXDT)	Harsh deceleration	
 11/05/2016 15:57:44 (DXDT)	11/05/2016 15:57:46 (DXDT)	Harsh braking	

Start time	End time	Event	
 11/05/2016 15:41:04 (DXDT)	11/05/2016 15:41:04 (DXDT)	Panic Button Activated	
 11/05/2016 15:59:18 (DXDT)	11/05/2016 15:59:20 (DXDT)	Idle	

out of trip event

4.2.4 Map View

Following the release of DynaMiX 16.2 all events that occurred out-of-trip will also be plotted on the map by default.



4.3 Viewing Events on the Trip Timeline

Recorded events are displayed on the trip timeline and the recording type (detailed, summary, or notification) selected in the configuration determines how it is displayed on the timeline screen. Users can select which events they want to view on the timeline screen from the Event selector. The RIBAS (over revving, excessive idling, harsh braking, harsh acceleration, over speeding) events are selected by default. Users can hover their cursor over the event occurrence to view more information.

4.3.1 Detailed events

Detailed events are displayed as blue bars that fill the height of the row. The detailed events display the start and end of each occurrence of the event. The width of the bar is an indication of the duration of the event.

Over speeding



4.3.2 Summary events

Summary events are displayed as green bars and fill half the height of the row. The summary events provide information on the total duration (and value) for which the event condition was true. The width of the bar is an indication of the duration of the event.

Diagnostic: Maximum GPS Velocity



4.3.3 Notification events

Notification events are displayed as single orange bars and fill the height of the row. Notification events are displayed each time the condition became true. It does not display duration.

GPRS - Total bytes sent

4.4 Viewing Events in MiX Insight Reports

The proper configuration of an event increases the usefulness of the Event Reports in the MiX Insight Reports suite. Event Reports allow users to monitor driver behaviour and associated driving styles based on the events they generate when operating an asset. The Event Reports category contains the Detailed Event Report, Overview Event Report, Summary Event Report, and the Terminal Event Report.

4.4.1 Detailed Event Report

The Detailed Event Report provides in-depth information related to recorded events that were triggered in the time period selected. The specific events and associated information are selected in the reporting criteria wizard from the event and column list. A user can select to view events by Driver or Asset. The Detailed Event Report is a same-day report so the events are available in the report as soon as the trip download has completed. A user can also choose to include or exclude Zero Second Events.

Please note: If a comparison is being done between the events displayed in Historical Tracking and the events listed in the report it is not advised to exclude the zero second events as this will cause a perceived mismatch between the two mechanisms for viewing events.

4.4.2 Columns

Listed below is a few of the columns that are available for selection. A description is provided as well as how the event should be configured in order to populate useful information:

1. **Event Description** – Displays the event description for example “Ignition Off”. The event description is defined when adding an event to the Event Library and can be edited.
2. **Start Date** - The date that the start of the event was recorded.
3. **Start Time** - The time that the start of the event was recorded.
4. **Number of Occurrences** – The number of times the event was triggered.
5. **Event Value** – If the event was configured to return a value the value will be displayed in this column.
6. **Duration** – Events with a detailed or summary recording type will have an event duration displayed in this column.
7. **Comms Type** – The communication method, Satellite or Standard, that was used to send the event.
8. **Distance** – Events that are configured to record the Start Odo and End Odo will have the distance from the start of the event until the end of the event displayed in this column.
9. **End date** – The date that the end of the event was recorded.

10. **End location** – Events that are configured to record an End Position that have co-ordinates matching an existing location will have the location name displayed in this column.
11. **End Long/Lat** - Events that are configured to record an End Position will have a Long/Lat in this column. The Long/Lat co-ordinates are clickable and will open a map with a pin where the end of the event was recorded.
12. **End Odo** – Events that are configured to record the End Odo will have the unit's odometer reading at the end of the event displayed in this column.
13. **End Street** – Events that are configured to record an End Position will have a street address in this column.
14. **End Suburb** – Events that are configured to record an End Position will have a suburb name in this column.
15. **Event Type** – Displays if the event is configured as a detailed, summary, or notification event.
16. **Fuel Used** – Events that are configured to Record Pulse will display the total litres of fuel used per event in this column. This is only applicable if a fuel measuring device is connected.
17. **Measurement Units** – The measurement units applied as defined in the user's measurement settings.
18. **Start Location** – Events that are configured to record a Start Position that have co-ordinates matching an existing location will have the location name displayed in this column.
19. **Start Long/Lat** - Events that are configured to record a Start Position will have a Long/Lat in this column. The Long/Lat co-ordinates are clickable and will open a map with a pin where the start of the event was recorded.
20. **Start Odo** – Events that are configured to record the Start Odo will have the unit's odometer reading at the start of the event displayed in this column.
21. **Start Street** – Events that are configured to record a Start Position will have the street address displayed in this column.
22. **Start Suburb** – Events that are configured to record a Start Position will have a suburb name in this column.