

Safety Technology – Technology Highlights

Technology Description

ERM Safety Technology uses high-sensitivity 3-axis accelerometers and Gyro components for analyzing 20 unique maneuvers, including off-road driving, at three different levels of severity.

ERM Safety technology is available in a few different product implementations:

1. As an external add-on product (e.g. **eSafe** for **StarLink** device).
2. As a feature in a **StarLink** device **SF** variant.

The products that integrate **Safety Technology** will forward data or maneuver event reports to a back-office server, where it can be presented or analyzed according to predefined categories, resulting in a clear ranking of driver behavior: Normal, Harsh and Aggressive.

ERM Safety technology support:

- **Driver education functionality** - Allowing the driving behavior events to be presented clearly to the driver in real-time. Using a **buzzer** or ERM's **eVoice** for aural alerts or using **eFlash SF** for buzzing sound with LED icons is possible.
- **BlackBox** - Offering high sampling rate (1mS) and a 75 sec of accident recording (including time-stamp and location received from a connected ERM StarLink AVL device) for maximum post-accident analysis.
- **PC software** - For setup and configuration profiles customized to the type of vehicle installed, allowing the most efficient operation.

Maneuver Analysis

Safety maneuver reports are based on the following parameters:

1. Maneuver Type
2. Maneuver Level
3. Maneuver Duration
4. Vehicle Type
5. Alert Type



Maneuver Type

*Each maneuver is measured by the forces that are acting on the relevant axis of the vehicle.
Safety Technology detects and analyze 20 different types of maneuvers:*

1.	Acceleration	11.	Right turn while decelerating
2.	Breaking	12.	Right turn while accelerating
3.	Left turn	13.	Wide right turn while decelerating
4.	Right turn	14.	Wide right turn while accelerating
5.	Wide left turn	15.	Traffic circle
6.	Wide right turn	16.	Lane change
7.	Left turn while decelerating	17.	Overtaking
8.	Left turn while accelerating	18.	Speed bump
9.	Wide left turn while decelerating	19.	Start of off-road driving
10.	Wide left turn while accelerating	20.	End of off-road driving

Maneuver Level

Safety technology divides maneuvers into three severity levels: Normal, Harsh, and Aggressive.

Maneuver Duration

The Safety Technology contains an internal real-time clock that measures the duration in real-time.

Vehicle Type

*Since each vehicle behaves differently on the road (e.g., size, weight, shock absorbers, air pressure, etc.), any type of driving behavior monitoring would have a different configuration. According to this point, **ERM Safety Technology** comes with 22 different vehicle types profiles that are predefined, updated, and available for selection during the installation on the product in a vehicle. By selecting the correct vehicle type and uploading the correct profile, the maneuver analysis will be much more accurate.*

Alert Type:

*During implementation, one can define the preferred Driver Education option – Audial or Visual, using one of the tools ERM offers – **eVoice, Buzzer, eFlash SF**. Each tool comes with its own set of alerts, either Audial by a set of beeps or recorded voice alerts, or Visual, by LED icons*



Black Box Scenario

Common

ERM Safety Technology comes with a "black box" functionality, with a sampling rate of 100 times per second (which is 10 Ms per sample). The **Safety** is constantly recording data with a buffer capable of saving 76 seconds of data. Recording and deletions are done on a cyclic basis so that newer data replaces older data (FIFO). The cyclic will stop once an accident was detected.

Accident Detection and Notifications

During regular vehicle operation, the **Safety** logs 50 seconds of data and Re-write on these 50 seconds until an accident occurred. As soon as it detects an accident, it switches to "accident mode" and continues to record for an additional 25 seconds.

So the post-accident recording totals 76 seconds:

The 75 seconds are in fact a 10 milliseconds interval of data related to each axis (X, Y, Z).

Once completed, the whole accident session will be transmitted to the server via the **StarLink** device.

Safety Reports

The **Safety Technology** is designed to offer customized reports. The **Safety Tool software** allows to configure the desired reports based on the maneuver, its severity (G force value), and its duration.

For more information, please contact ERM support team at:

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