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INTERNATIONAL STANDARD

NORME INTERNATIONALE

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Event video data recorder for road vehicle accidents – Part 1: Basic requirements

Enregistreurs de données vidéo pour l'identification et l'analyse des causes des accidents des véhicules routiers – Partie 1: Exigences de base

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Enregistreurs de données vidéo pour l'identification et l'analyse des causes des accidents des véhicules routiers – Partie 1: Exigences de base

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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EVENT VIDEO DATA RECORDER FOR ROAD VEHICLE ACCIDENTS –

Part 1: Basic requirements

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The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2839/CDV	100/2947/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

There is a distinction between event video data recorder (EVDR) systems and digital tachographs (DTG, ISO 16844-7), which record vehicle dynamics and the driver's activities during the entire driving period. There is also a distinction between EVDR systems and event data recorders (EDR, IEEE 1616), which record vehicle dynamics and the driver's activities before, during and after the event. DTGs and EDRs both have direct connections to the vehicle's internal signal line, such as in-vehicle network (IVN) or analogue signal line, whereas direct connection is not required for EVDRs.

EVDR systems are prohibited from serving purposes other than the aforementioned. They cannot be placed in unapproved areas and/or not record sound.

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EVENT VIDEO DATA RECORDER FOR ROAD VEHICLE ACCIDENTS –

Part 1: Basic requirements

1 Scope

This part of IEC 63005 describes basic requirements for event video data recorders (EVDRs) for road vehicle accidents, used for identifying and analysing causes of accidents based on video from a front-mounted camera and other information obtained before and after such events. In addition to video from a front-mounted camera and vehicle behaviour, these products can record side and/or rear video data for enhanced functionalities in determining causes of accidents and analysing collision events.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:2010, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

ISO 12233, *Photography – Electronic still picture imaging — Resolution and spatial frequency responses*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
EVDR for road vehicle accidents
system that stores vehicle video data of the accident on an electronic recording medium before, during, and after collision accident events with other vehicles, with passers-by and with any other objects

3.2
event data
information recorded by the EVDR to facilitate analysis of accident scenarios in the case of collision accident events with other vehicles, pedestrians or objects

Note 1 to entry: The term refers to all videos and additional information before, during, and after collision.

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3.3
video input information
video data before, during, and after collision that contains video data from the front camera

3.4
vehicle dynamics data
information on a vehicle's dynamic behaviour such as acceleration, angular velocity, and physical quantities related to collision

3.5
integrity verification value
information used to detect doctoring and/or deletion of event data

3.6
DTG for road vehicles
digital tachograph for road vehicles
device that adheres to guidelines on driving records and devices defined in ISO 16844-7

3.7
EDR for road vehicles
event data recorder for road vehicles
system that adheres to IEEE 1616

3.8
interlinked video data recording system for road vehicle accidents
EVDR system interlinked to the DTG or EDR

3.9
independent EVDR for road vehicle accidents
EVDR that operates independently from a DTG or EDR

4 Abbreviated terms and symbols

For vehicle orientation related symbols, see Figure 1.

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DTG	digital tachograph
EDR	event data recorder
EVDR	event video data recorder
FOV	field of view
fps	frames per second
g	gravitational acceleration
GPS	Global Positioning System
GNSS	global navigation satellite system
IVN	in-vehicle network
SFR	spacial frequency response
a_x	acceleration in the X_B direction (front and rear) in body fixed coordinates
a_y	acceleration in the Y_B direction (left and right) in body fixed coordinates
a_z	acceleration in the Z_B direction (vertical) in body fixed coordinates
ψ	angular velocity around the Z_B axis in body fixed coordinates (yaw rate)

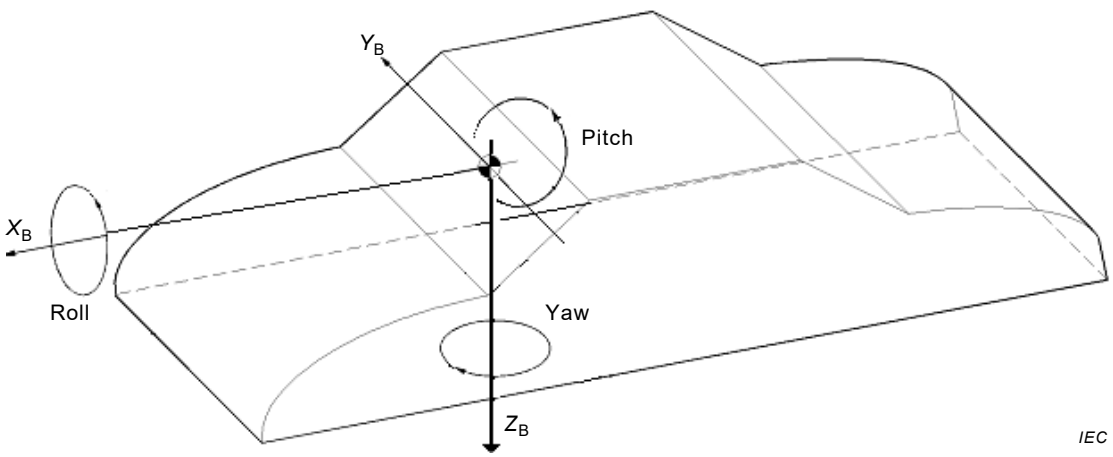

Figure 1 – Standard coordinate system of a vehicle equipped with the EVDR (body fixed coordinates)

5 Types of EVDR

5.1 Classification by security level

EVDRs can be classified into two types listed below depending on the security level.

1) General type: EVDR without video-data integrity-checking function for stored event data.
2) Enhanced security type: EVDR equipped with video-data integrity verification function for stored event data.

5.2 Classification by interoperability of functions

EVDRs can be classified into two types listed below depending on interoperability with DTG or EDR.

1) Independent: EVDRs that operate independently from DTGs or EDRs.
2) Interlinked: EVDRs that operate interlinked to DTGs or EDRs.

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6 Functional requirements

6.1 Basic functions of the EVDR for road vehicle accidents

The primary purpose of EVDRs is to record video data before, during and after the event. For EVDR systems, the direct connection to the vehicle's internal signal line such as the in-vehicle network (IVN) or the analogue signal line is not required. Only the power line of the EVDR is connected to the power line of the installed vehicle.

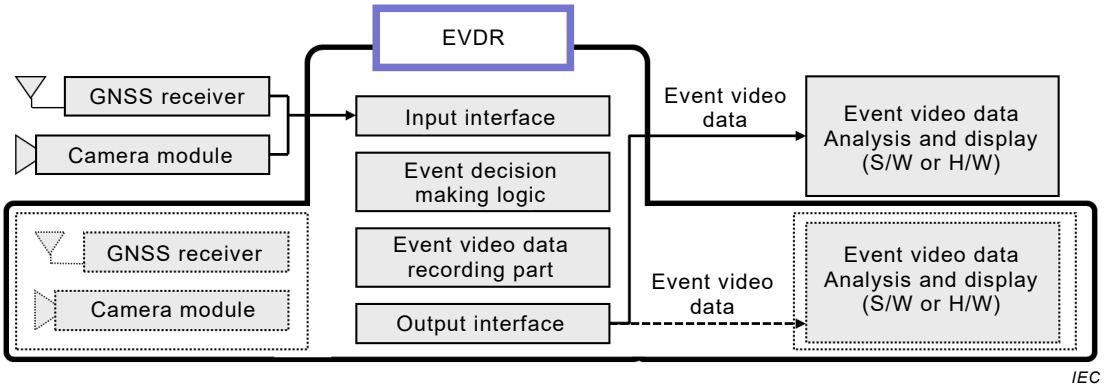

Figure 2 – Basic functions of the EVDR for road vehicle accidents

The EVDR shall have the following basic functions.

a) Input interface function that accepts input from the video acquisition device and the GNSS receiver; the GNSS receiver and/or video acquisition device can be either included in or separated from the EVDR main system (see Figure 2).

b) Decision-making function to check the accident event: the EVDR checks if an accident event has occurred based on the vector sum of acceleration in the X_A and X_B directions, expressed as a_x and a_y, or based on the difference of acceleration per unit of time. For interlinked EVDR systems, the decision-making function to check the accident event can be located in the interlinked DTG or EDR.

c) Recording and maintaining functions for event video data:

   1) general type: safely records and maintains event video data;

   2) enhanced security type: safely records and maintains event video data while preventing doctoring and deletion of the event data.

d) Output interface function to transmit stored event video data: the DTG or EDR of the interlinked EVDR system can have the following functions. Since the interoperability function is enabled, the same functions are not required to be included in the EVDR:

   1) accident event decision making function;

   2) event data recording function;

   3) event data storing function;

   4) sensor function including GNSS for acquisition of event data.

6.2 Types of event data

6.2.1 General

The types of event data to be recorded by the EVDR are as shown in Table 1.

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Table 1 – Types of event data

Types of event data to be recorded	Mandatory event data	Optional event data
Video input information	Front camera video (Including video generation time and product identification number)	Side camera video Rear camera video
Vehicle behaviour information	Acceleration a_x Acceleration a_y	Yaw angular velocity Ψ
Other information	Event occurrence time	GNSS information

6.2.2 Mandatory event data

The types of event data to be recorded by the EVDR can be classified into "mandatory event data" and "optional event data." It is essential for EVDRs to record the following "mandatory event data" listed in Table 2.

Table 2 – Mandatory event data items

Event data item			Resolution	Data measurement range	Data storing term		Minimum sampling rate
					Before event	After event	
Vehicle dynamic data	**Acceleration a_x**		Resolving power < 0,01 g	< −2 g > 2 g	10 s	10 s	20 Hz
	Acceleration a_y		Resolving power < 0,01 g	< −2 g > 2 g	10 s	10 s	20 Hz
Video data	**Front camera video**	**Resolution**	> 900 K pixels	-	10 s	10 s	20 fps
		Horizontal FOV	-	> 80° [a]			
		Vertical FOV	-	> 50° [a]			
		Colour/ B&W	-	Colour			
Other data	**Event occurrence time**		≤ 1 s (including year, month, day, time, minute, second)	-	-	-	Event-based
	Product identification number		-	-	-	-	Event-based

[a] Specifications provided by respective manufacturers take precedence if the above conditions are met. If external power supply to the EVDR is interrupted due to shock or other unforeseen circumstances, storing time conditions need not be fulfilled.

Mandatory items to be stored shall have the following specifications:

- Acceleration a_x: this refers to the acceleration in the longitudinal direction (X direction in the body-fixed coordinate system) of the vehicle. The data storage term shall include 10 s before the event and 10 s after the event. The sampling rate shall be greater than 20 Hz, and the resolution shall be finer than 0,01 g.

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