

INTERNATIONAL STANDARD

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**Car multimedia systems and equipment – Drive monitoring system
Part 2: Recording methods of the drive monitoring system**

**Systèmes et équipements multimédias pour automobiles – Système de
surveillance de la conduite**
Partie 2: Méthodes d'enregistrement du système de surveillance de la conduite



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**CAR MULTIMEDIA SYSTEMS AND EQUIPMENT –
DRIVE MONITORING SYSTEM****Part 2: Recording methods of the drive monitoring system**

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

CDV	Report on voting
100/3029/CDV	100/3134/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.

A list of all parts in the IEC 63033 series, published under the general title *Car multimedia systems and equipment – Drive monitoring system*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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INTRODUCTION

This document specifies recording methods of the drive monitoring system that is specified in IEC TS 63033-1, which also specifies the model for generating the surrounding visual image of the drive monitoring system. The system allows drivers to monitor the car's perimeter in real time by using "free eye point" technology, which allows drivers to dynamically change the viewing perspective, offering the most appropriate views according to the driving situation.

IEC 63033-2 specifies recording methods of the drive monitoring system in order to view the recorded video file with "free eye point" technology.

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CAR MULTIMEDIA SYSTEMS AND EQUIPMENT – DRIVE MONITORING SYSTEM

Part 2: Recording methods of the drive monitoring system

1 Scope

This part of IEC 63033 specifies recording methods of the drive monitoring system that is specified in IEC TS 63033-1 in order to view the recorded video file with free eye point technology.

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 TS 63033-1:2017, *Car multimedia system and equipment – Drive monitoring system – Part1: General*

3 Terms, definitions and abbreviated terms

3.1 General

No terms and definitions are listed in this document.

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>

3.2 Abbreviated terms

GNSS global navigation satellite system

SIM stream information and metadata

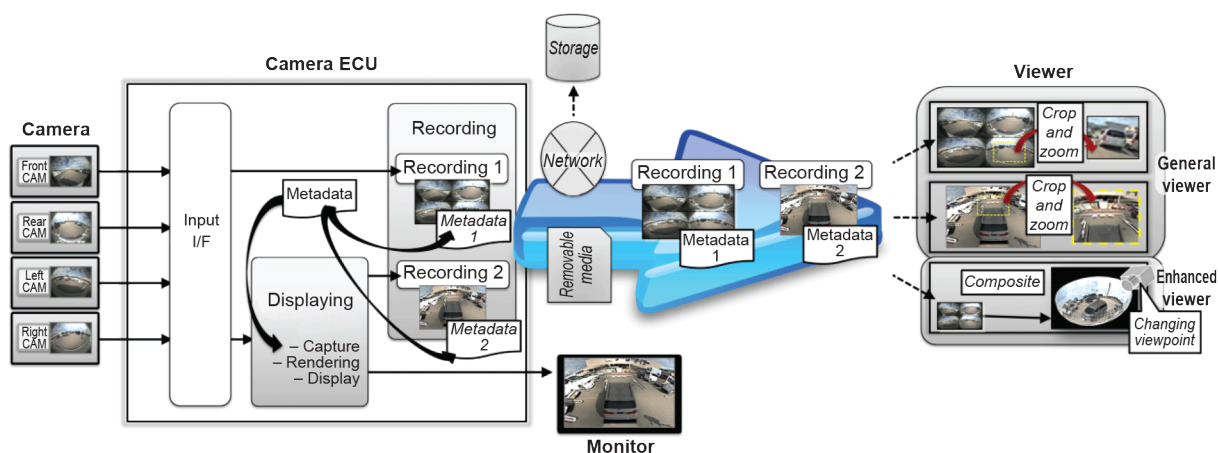
4 System model

4.1 General

IEC 63033-2 specifies recording methods of the drive monitoring system. Specifically, the recording from a vehicle-mounted camera as obtained by the drive monitoring system, and also a model for the replay of the recorded video. The purpose of the replay of the recorded video can be considered in various ways, such as verification at the occurrence of an accident, as legal proof, for reviewing driving behaviour and use at educational sites.

There are two types of recorded videos: recording of each camera image (referred to as "recording 1"), and recording of the composite image (referred to as "recording 2"). For replay of the recorded videos, the related metadata (refer to 4.2.2.3 and 4.2.3.3) is simultaneously saved in recording 1 and recording 2. These recorded files are transferred by the portable recording medium or via a network, where they can be later replayed by the user. The user

can also recreate the composite image by using the stored metadata in the free eye point in the viewer (refer to Clause 5). It is also possible to provide the distribution service with the recorded file by using storage on the network.



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Figure 1 – Displaying and Recording system model of drive monitoring system

4.2 Video recording

4.2.1 General

There are two types of recording files provided by the driver monitor system and as shown Figure 1: recording 1 and recording 2.

4.2.2 Recording 1

4.2.2.1 General

Recording 1 consists of both the raw (before composite) video data as obtained by each camera, and related metadata (refer to 4.2.2.3) at the same time. Using both, the video data and the metadata, enables the user to recreate a new composite image. The user can change the view point freely while viewing the composite image. In addition, they can also see a vehicle's surroundings instantly in a single composite image.

4.2.2.2 Video data

The raw video data obtained from the vehicle-mounted cameras is recorded. A raw video data example is shown in Figure 2.

Since the recording is pre-composition, there is no distortion and the image cut-off is as directly input from each vehicle-mounted camera. This method allows for the full image to be transferred, thus, keeping as much of the original image information.



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Figure 2 – Raw video data example of recording 1, the image before composition

4.2.2.3 Metadata for recording 1

The metadata listed in Table 1 and Table 2 shall be saved together with the video data. Some metadata will be included in the SIM source packet.

Table 1 – Metadata for recording 1

Metadata	Explanation	Mandatory
Time stamp	It is necessary to identify the exact time when a certain event occurred. The time information is generally extracted from GNSS. If GNSS is not included in the system, the time information can be extracted from another system equivalent to GNSS.	✓
GNSS	It is necessary to identify details about the location and the exact time when a certain event occurred.	✓
ID data	It is necessary to specify which car the recorded file came from.	✓
Orientation	It is necessary to identify details about orientation when a certain event occurred.	✓

Table 2 – Metadata for dependent part of video data 1

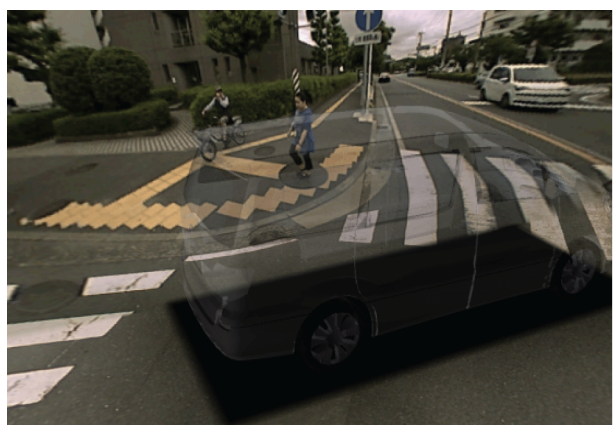
Metadata	Explanation	Mandatory
Optical axis shift data	The optical axis shift adjusts the central coordinates and the captured image's width and height. For details, please see IEC TS 63033-1.	✓
Lens distortion data	Distortion data of lens used for each camera. For details, please see IEC TS 63033-1.	✓
Camera position and direction data	Camera position information consisting of mounted camera position (X, Y, Z) at optics' centre (mm) and camera angle (tilt angle ψ , rot angle ϕ , pan angle θ) at optical axis direction (in $^{\circ}$). For details, see IEC TS 63033-1.	✓
View point position and direction data	The same view point position data as registered to make the existing composite image. It contains the virtual view point position (X, Y, Z), angle and virtual 3D projection surface.	Preferable to be saved
3D car model data and size	The same 3D car model data and size as registered to make the existing composite image. It contains 3D model data, transparency and drawing car model size (left, front, right, bottom, tail, top) described in mm.	Preferable to be saved

4.2.3 Recording 2

4.2.3.1 General

Recording 2 records both the composite image video data and the related metadata (refer to 4.2.3.3) at the same time. A composite image video data example is shown in Figure 3.

Users cannot change the view point while viewing the composite image. However, the user can instantly view the vehicle's surroundings through a specific pre-set composite image regardless of the viewer used (see Clause 5 for details).



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Figure 3 – The composite video data example of recording 2

4.2.3.2 Video data

The composite video data obtained from vehicle-mounted cameras is recorded.

Compared to the case of recording the raw video data of all cameras, it can reduce the data size and memory required since only the composite result is recorded. On the other hand, the image information from each camera that has not been used in the composite image will be lost.

4.2.3.3 Metadata for recording 2

The metadata listed in Table 3 shall be saved together with the video data. Some metadata will be included in the SIM source packet.

Table 3 – Metadata for recording 2

Metadata	Explanation	Mandatory
Time stamp	It is necessary to identify the exact time when a certain event occurred. The time information is generally extracted from GNSS. If GNSS is not included in the system, the time information can be extracted from another system equivalent to the GNSS.	✓
GNSS	It is necessary to identify details about the location and the exact time when a certain event occurred.	✓
ID data	It is necessary to specify which car the recorded file came from.	✓
Orientation	It is necessary to identify details about orientation when a certain event occurred.	✓

Since users cannot create a composite image in recording 2, only the metadata given in Table 4 is required.

Table 4 – Metadata for dependent part of video data 2

Metadata	Explanation	Mandatory
View point position and direction data	The same view point position data as registered to make the existing composite image. It contains virtual view point position (X , Y , Z), angle and the virtual 3D projection surface.	Preferable to be saved