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**Multimedia systems and equipment for vehicles – Surround view system –
Part 4: Application for camera monitor systems**

**Systèmes et équipements multimédias pour véhicules – Système de vision
panoramique –
Partie 4: Application des systèmes à caméra et moniteur**

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SURROUND VIEW SYSTEM –****Part 4: Application for camera monitor systems****FOREWORD**

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

Draft	Report on voting
100/3723/FDIS	100/3750/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 63033 series, published under the general title *Multimedia systems and equipment for vehicles – Surround view system*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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INTRODUCTION

To install a CMS (Camera Monitor System) in a vehicle, it must comply with UN Regulation No. 46. The current CMS only shows one camera image on one display. This document specifies which composite images generated from the multiple cameras of the surround view system specified in IEC 63033-1 comprise the FOV, and which display requirements specified in UN Regulation No. 46 apply.

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MULTIMEDIA SYSTEMS AND EQUIPMENT FOR VEHICLES – SURROUND VIEW SYSTEM –

Part 4: Application for camera monitor systems

1 Scope

This document specifies which composite images generated from the multiple cameras of the surround view system specified in IEC 63033-1 comprise the FOV, and which display requirements specified in UN Regulation No. 46 apply.

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.

UN Regulation No. 46, *Uniform provisions concerning the approval of devices for indirect vision and of motor vehicles with regards to the installation of these devices*

3 Terms, definitions and abbreviated terms

No terms and definitions are listed in this document.

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

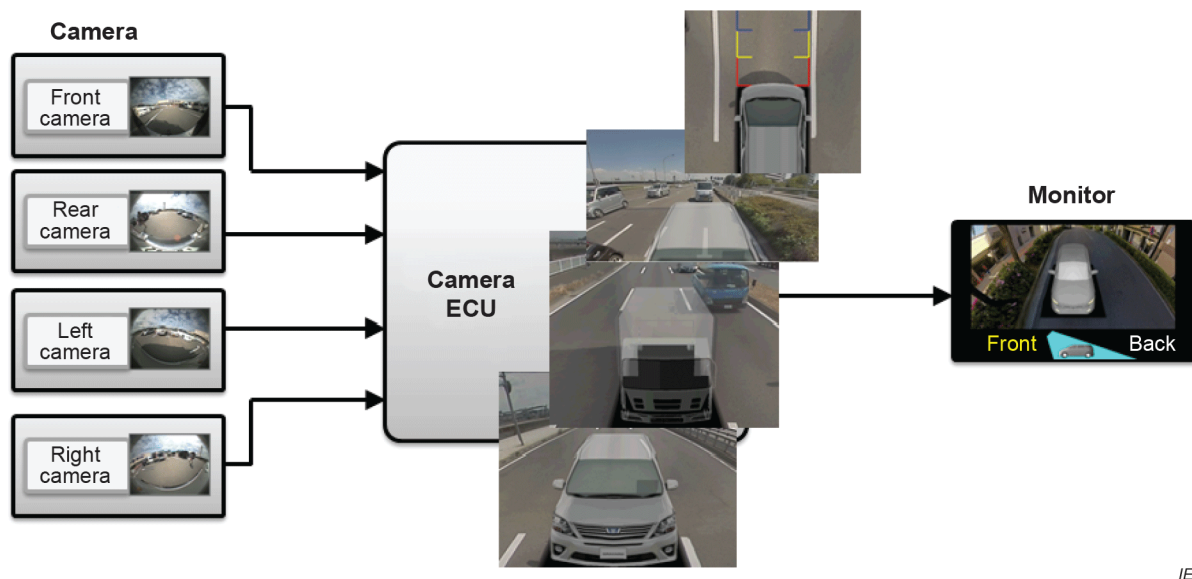
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 Abbreviated terms

FOV field of view

4 System model

The system model of surround view system is described in Figure 1. The surround view system shall generate multiple camera composite images and/or single camera images, using cameras that are mounted on the outside the vehicle. The views to be generated by this system shall capture the fields of view specified in Clause 5. This system shall generate multiple views according to the fields of view to be secured.



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Figure 1 – System model of surround view system

5 Field of view

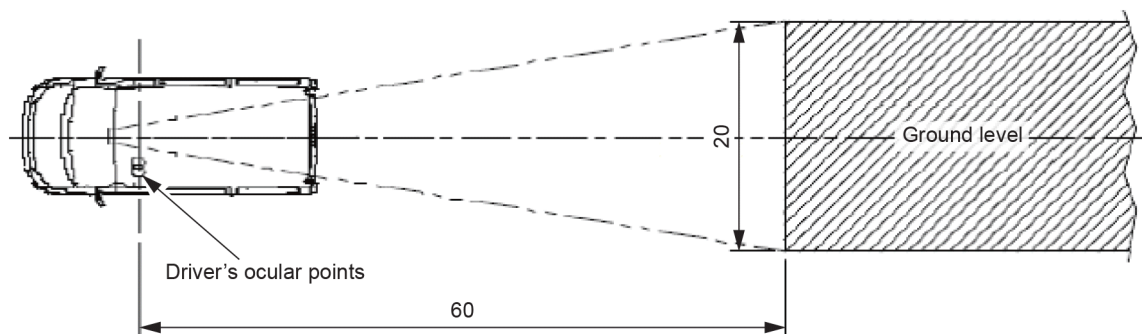
5.1 General

The field of view of the system is the visible area displayed by the composite images (i.e. from the multiple cameras composing the system) or the image captured by any single camera that is then converted and displayed. If the target of the application of this system is to replace an existing type approval that is required for vehicular equipment, it shall follow the respective regulation. For example, the FOV shall capture the respective FOV as defined in UN Regulation No. 46 (classes I to VI) if the system is intended to be used in such an application. The compulsory or optional FOV shall follow the requirement as specified in the table under paragraph 15.2.1.1.1 in UN Regulation No. 46.

5.2 Class I FOV

The field of vision shall be such that the driver can see at least a 20 m wide, flat, horizontal portion of the road centred on the vertical longitudinal median plane of the vehicle and extending from 60 m behind the driver's ocular points to the horizon. Class I FOV and an example of the displayed view conforming to this FOV are shown in Figure 2. See Annex A for an example of a simultaneous display with a class III FOV.

Dimensions in metres



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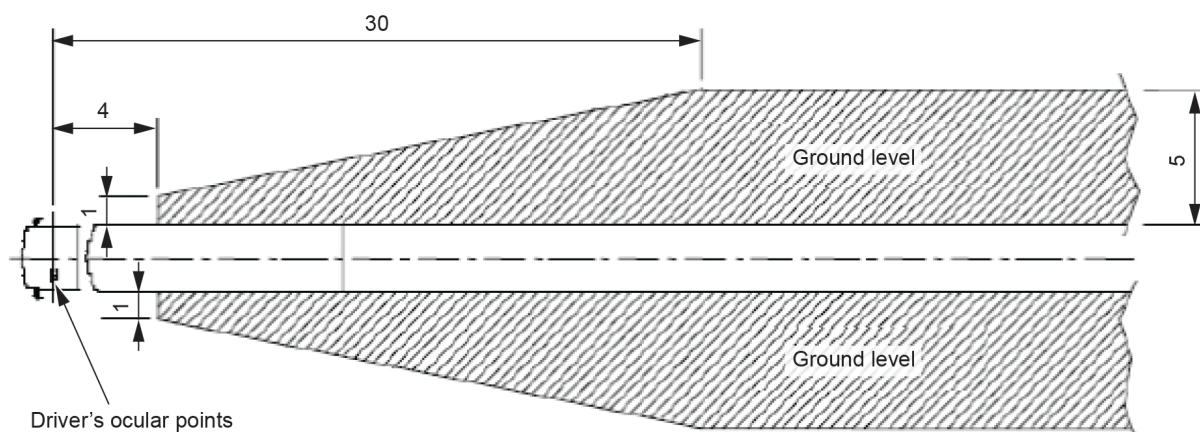
Figure 2 – Class I FOV and example of display view

5.3 Class II FOV

The field of vision shall be such that the driver can see at least a 5 m wide, flat, horizontal portion of the road, which is bounded by a plane which is parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle on the driver's side of the vehicle, and extends from 30 m behind the driver's ocular points to the horizon. In addition, the road shall be visible to the driver over a width of 1 m, which is bounded by a plane parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle starting from a point 4 m behind the vertical plane passing through the driver's ocular points. The corresponding text is valid on the passenger side. Class II FOV and an example of the displayed view conforming to this FOV are shown in Figure 3.

For composite images of left and right cameras, non-continuous images shall be clearly separated from each other. The image of the right side field of view shall be presented to the right of the longitudinal vertical plane through the ocular reference point. The image of the left side field of view shall be presented to the left of the longitudinal vertical plane through the ocular reference point.

Dimensions in metres



IEC

Figure 3 – Class II FOV and example of display view

5.4 Class III FOV

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The field of vision shall be such that the driver can see at least a 4 m wide, flat, horizontal portion of the road, which is bounded by a plane parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle on the driver's side of the vehicle, and extends from 20 m behind the driver's ocular points to the horizon. In addition, the road shall be visible to the driver over a width of 1 m, which is bounded by a plane parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle starting from a point 4 m behind the vertical plane passing through the driver's ocular points. The corresponding text is valid on the passenger side. Class III FOV and an example of the displayed view conforming to this FOV are shown in Figure 4. See Annex A for an example of a simultaneous display with a class I FOV.

For composite images of left and right cameras, non-continuous images shall be clearly separated from each other. The image of the right side field of view shall be presented to the right of the longitudinal vertical plane through the ocular reference point. The image of the left side field of view shall be presented to the left of the longitudinal vertical plane through the ocular reference point.

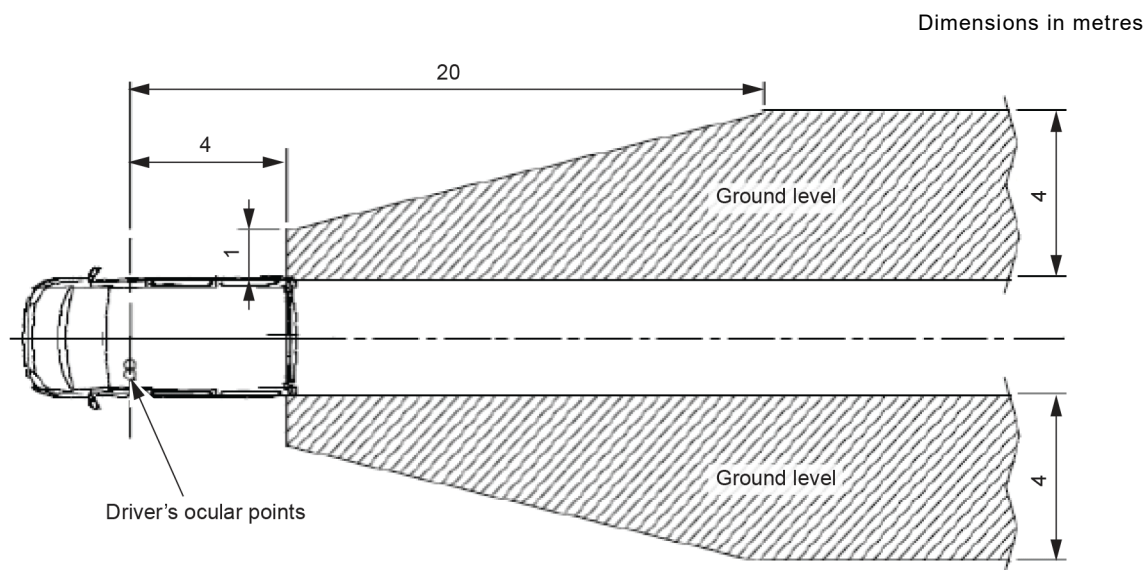


Figure 4 – Class III FOV and example of display view

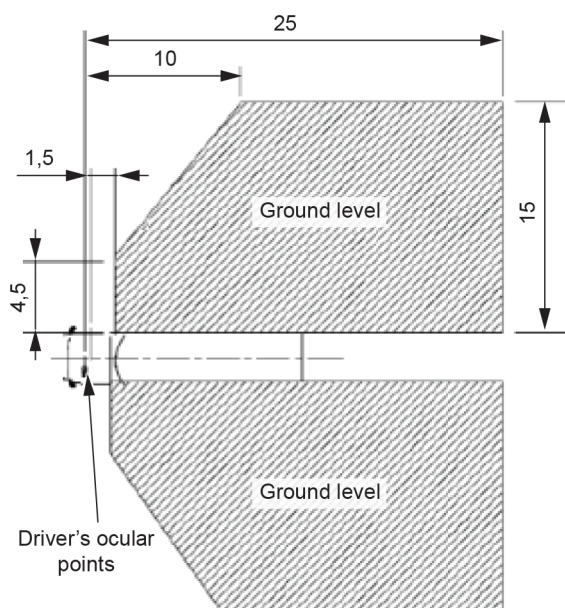
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5.5 Class IV FOV

The field of vision shall be such that the driver can see at least a 15 m wide, flat, horizontal portion of the road, which is bounded by a plane parallel to the median longitudinal vertical plane of the vehicle and passing through the outermost point of the vehicle on the driver's side and which extends from at least 10 m to 25 m behind the driver's ocular points. In addition, the road shall be visible to the driver over a width of 4,5 m, which is bounded by a plane parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle starting from a point 1,5 m behind the vertical plane passing through the driver's ocular points. The corresponding text is valid on the passenger side. Class IV FOV and an example of the displayed view conforming to this FOV are shown in Figure 5.

For composite images of left and right cameras, non-continuous images shall be clearly separated from each other. The image of the right side field of view shall be presented to the right of the longitudinal vertical plane through the ocular reference point. The image of the left side field of view shall be presented to the left of the longitudinal vertical plane through the ocular reference point.

Dimensions in metres



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Figure 5 – Class IV FOV and example of display view

5.6 Class V FOV

The field of vision shall be such that the driver can see a flat horizontal portion of the road along the side of the vehicle, bounded by the following vertical planes:

- The plane parallel to the median longitudinal vertical plane of the vehicle which passes through the outermost point of the vehicle cab on the passenger's side.
- In the transverse direction, the parallel plane passing at a distance of 2 m in front of the plane mentioned in the paragraph above.
- To the rear, the plane parallel to the vertical plane passing through the driver's ocular points and situated at a distance of 1,75 m behind that plane.
- To the front, the plane parallel to the vertical plane passing through the driver's ocular points and situated at a distance of 1 m in front of that plane.

If the vertical transverse plane passing through the leading edge of the vehicle bumper is less than 1 m in front of the vertical plane passing through the driver's ocular points, the field of vision shall be limited to that plane. In the case the field of vision described in Figure 8a and Figure 8b can be perceived through the combination of the field of vision from a class IV wide-angle view device and that of a class VI front-view device, the installation of a class V close-proximity view device is not compulsory. Class V FOV and an example of the displayed view conforming to this FOV are shown in Figure 6.