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- iii) requires additional national guidance or information

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 23150-13

Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions —

Part 13: Camera specific interfaces

*Véhicules routiers — Interface logique entre capteurs et unité de
fusion de données pour les fonctions de conduite automatisée —*

Partie 13: Interfaces spécifiques de caméra

ICS: 43.040.15

ISO/TC 22/SC 31

Secretariat: DIN

Voting begins on:
2025-05-14

Voting terminates on:
2025-08-06

This document is circulated as received from the committee secretariat.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

A list of all parts in the ISO series can be found on the ISO website.

Introduction

Sensors for highly automated driving according to the ISO 23150 document series provide logical interfaces between a single sensor or a single sensor cluster and the fusion unit or automated driving functions. Interfaces are defined on different levels. The interfaces on feature level, advanced detection level and detection level are technology specific and differ by each technology.

[Figure 1](#) shows the schematic and contextual relationships between the documents relating to logical interfaces of the ISO 23150 document series.

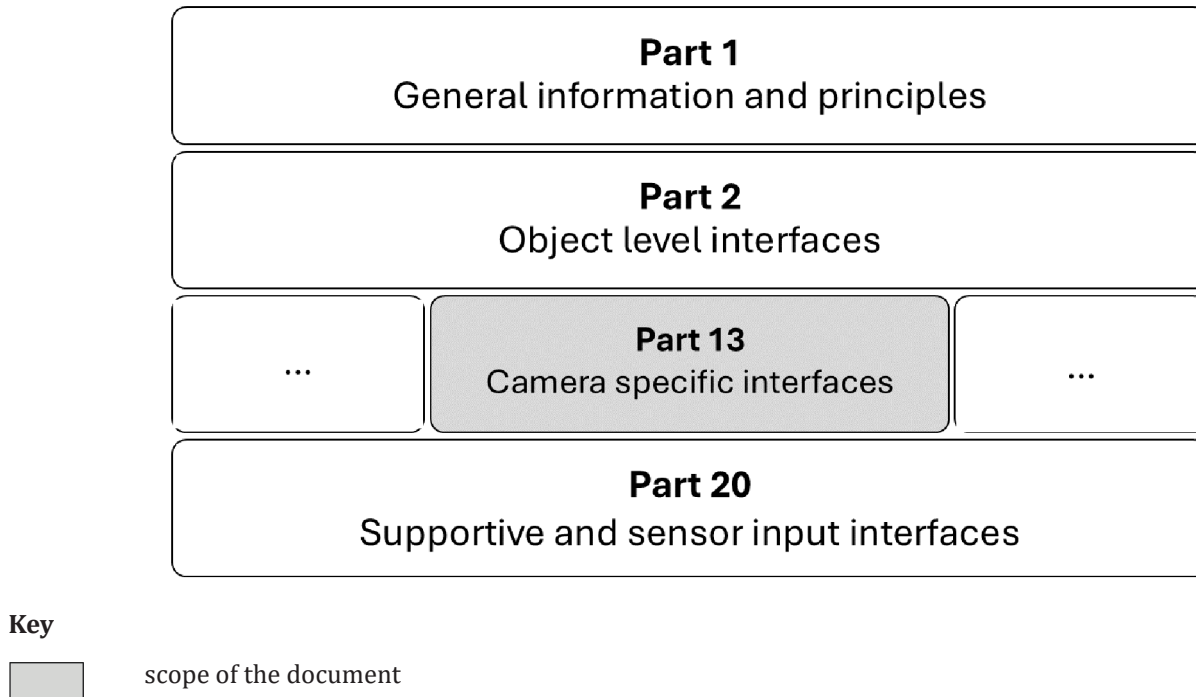


Figure 1 — Relationship of the ISO 23150 document series "Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions"

This document specifies technology specific interfaces for camera sensors as well as sensor clusters. The interfaces base on the generic specifications of the interfaces in ISO/DIS 23150-1. This document references to generic specifications of signals for the interface header, the generic interface levels and the profiles.

A camera sensor or sensor cluster may also implement (provide or receive) logical interfaces:

- on object level (see ISO 23150-2)
- for additional interfaces as supportive sensor interfaces and sensor input information interfaces (see ISO 23150-20)

This document is not intended to replace the logical interface specifications of other documents in the ISO 23150 document series.

Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions —

Part 13: Camera specific interfaces

1 Scope

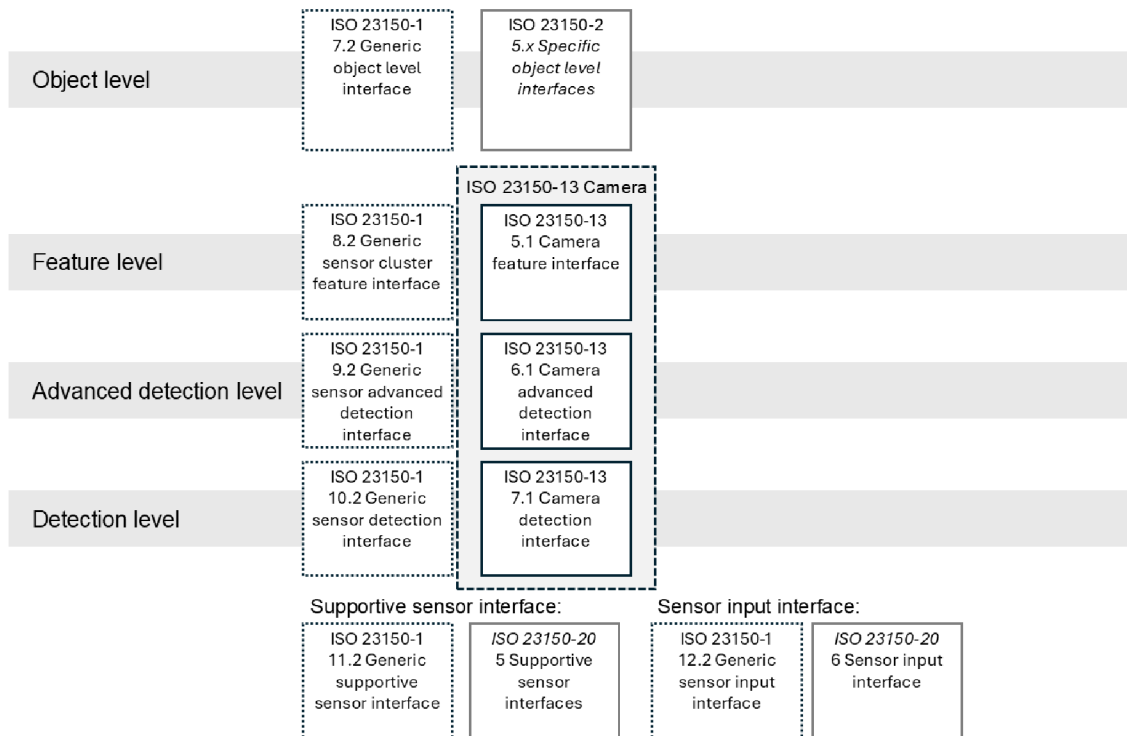
This document is applicable to road vehicles with automated driving functions. The document series specifies the logical interface between in-vehicle environmental perception sensors and the fusion unit which generates a surround model and interprets the scene around the vehicle based on the sensor data. The interface is described in a modular and semantic representation and provides information on different abstraction levels based on sensor technology specific information.

This part of the ISO 23150 document series specifies the technology specific logical interfaces for camera sensors or sensor clusters:

- Feature level interface;
- Advanced detection level interface;
- Detection level interface.

This document enhances the ISO/DIS 23150-1 and bases in particular on generic specifications of ISO/DIS 23150-1 (see [Figure 2](#)):

- Generic sensor cluster feature interface (ISO/DIS 23150-1, 8.2);
- Generic sensor advanced detection interface (ISO/DIS 23150-1, 9.2);
- Generic sensor detection interface (ISO/DIS 23150-1, 10.2);
- General level-independent profiles (ISO/DIS 23150-1, 6.5).



Key



scope of the document

Figure 2 — Interfaces in the scope of this document and the related interfaces of the ISO 23150 document series

This document does not provide electrical and mechanical interface specifications. Raw data interfaces are also excluded.

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.

ISO/DIS 23150-1, *Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions — Part 1: General information and principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/DIS 23150-1 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>

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO/DIS 23150-1 and the following apply.

CADI	camera advanced detection interface
CDI	camera detection interface
CFI	camera feature interface

5 Feature level

5.1 Camera feature interface

The generic specification of the feature level interfaces is defined in ISO/DIS 23150-1 clause 8. The camera feature interface bases on the "Generic sensor feature interface" (ISO/DIS 23150-1, 8.2). [Table 1](#) defines the general structure of the camera feature interface (CFI).

Table 1 — Camera feature interface structure

Structure	Multiplicity	Option
Camera feature header (5.2)	1	
Features	Multiple	Size type: dynamic/fixed

[Table 2](#) defines the logical structure of the CFI.

Table 2 — Camera feature interface

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
Information: inter- face	M	Interface version ID {major, minor, patch} (ISO/DIS 23150-1, A.1.1)	M	Profile: Unique- ness of interface versioning (ISO/ DIS 23150-1, 6.5.1)
		Interface ID (ISO/DIS 23150-1, A.1.2)	O	Profile: Unique- ness of interface versioning (ISO/ DIS 23150-1, 6.5.1)
		Number of valid serving sensors (ISO/DIS 23150-1, A.1.3)	M	Profile: Unique- ness of interface versioning (ISO/ DIS 23150-1, 6.5.1) Optimise LL (ISO/ DIS 23150-1, B.1.1) Alternative UTL (ISO/DIS 23150-1, B.1.6) Key: Sensor ID (ISO/DIS 23150-1, A.1.4)
a Features may not be tracked continuously. The same feature may be tracked as a new entity multiple times. Therefore the profile does not provide the signal "Age" (ISO/DIS 23150-1, A.2.14) on FLI.				
b For polyline interpolation a linear interpolation between two sequential vertex points is assumed. Therefore the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) always has the mandatory enumeration "PIM_Linear". The profile does not provide the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) explicitly. Camera features are described by zero, one or two dimensional shapes. Therefore the signal "Shape type" (ISO/DIS 23150-1, A.2.27) has the mandatory enumeration "ST_Point", "ST_Line" or "ST_2DSurface". For the definition of a "ST_2DSurface", only the exemplary enumeration "ST_2DSurface_Segment" is not used.				

Table 2 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
		Size type: dynamic/fixed Size #: Number of valid serving sensors (ISO/DIS 23150-1, A.1.3)		
		Sensor ID (ISO/DIS 23150-1, A.1.4)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Alternative VRO (ISO/DIS 23150-1, B.1.3)
		Time stamp – prediction (ISO/DIS 23150-1, A.1.5.1)	M	
		Cycle counter (ISO/DIS 23150-1, A.1.6.1)	O	Redundancy (ISO/DIS 23150-1, B.1.2) Signal: Time stamp – prediction (ISO/DIS 23150-1, A.1.5.1)
		Interface cycle time (ISO/DIS 23150-1, A.1.7)	O	
		Interface cycle time – variation (ISO/DIS 23150-1, A.1.8)	O	
		Data qualifier (ISO/DIS 23150-1, A.1.9)	M	Optimise DE (ISO/DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)
		Colour model type (ISO/DIS 23150-1, A.1.13)	M	Profile: Colour model (ISO/DIS 23150-1, 6.5.2) Alternative VRO (ISO/DIS 23150-1, B.1.3) Use enumeration to define colours by defining colour values and the applied colour model for each enumerator. Optimise DE (ISO/DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)
Features				

a Features may not be tracked continuously. The same feature may be tracked as a new entity multiple times. Therefore the profile does not provide the signal "Age" (ISO/DIS 23150-1, A.2.14) on FLI.

b For polyline interpolation a linear interpolation between two sequential vertex points is assumed. Therefore the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) always has the mandatory enumeration "PIM_Linear". The profile does not provide the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) explicitly. Camera features are described by zero, one or two dimensional shapes. Therefore the signal "Shape type" (ISO/DIS 23150-1, A.2.27) has the mandatory enumeration "ST_Point", "ST_Line" or "ST_2DSurface". For the definition of a "ST_2DSurface", only the exemplary enumeration "ST_2DSurface_Segment" is not used.

Table 2 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
Features information	M	Recognised features – capability (ISO/DIS 23150-1, A.1.10.2)	0	
		Recognised features – status (ISO/DIS 23150-1, A.1.11.2)	0	Redundancy (ISO/DIS 23150-1, B.1.2) Signal: Recognised features – capability (ISO/DIS 23150-1, A.1.10.2) Optimise DE (ISO/DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)
		Number of valid features (ISO/DIS 23150-1, A.1.12.2)	M	Optimise LL (ISO/DIS 23150-1, B.1.1)
		Size type: dynamic/fixed Size #: Number of valid features (ISO/DIS 23150-1, A.1.12.2)		
↔ Status	M	Existence probability – feature level (ISO/DIS 23150-1, A.4.1)	M	
		Feature ID (ISO/DIS 23150-1, A.4.2)	C (ISO/DIS 23150-1, B.3.1) Exist: DLI	Alternative A2I (ISO/DIS 23150-1, B.3.2)
		Feature grouping ID (A.2.1)	0	
		Object ID reference (ISO/DIS 23150-1, A.2.35)	C (ISO/DIS 23150-1, B.3.1) Exist: OLI	Alternative A2I (ISO/DIS 23150-1, B.3.2)
a Features may not be tracked continuously. The same feature may be tracked as a new entity multiple times. Therefore the profile does not provide the signal "Age" (ISO/DIS 23150-1, A.2.14) on FLI. b For polyline interpolation a linear interpolation between two sequential vertex points is assumed. Therefore the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) always has the mandatory enumeration "PIM_Linear". The profile does not provide the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) explicitly. Camera features are described by zero, one or two dimensional shapes. Therefore the signal "Shape type" (ISO/DIS 23150-1, A.2.27) has the mandatory enumeration "ST_Point", "ST_Line" or "ST_2DSurface". For the definition of a "ST_2DSurface", only the exemplary enumeration "ST_2DSurface_Segment" is not used.				

Table 2 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
		Time stamp difference – feature level (ISO/DIS 23150-1, A.4.3)	M	Optimise IV (ISO/DIS 23150-1, B.1.5)
		Number of valid observations (ISO/DIS 23150-1, A.2.20)	0	Profile: Observations (ISO/DIS 23150-1, 6.5.7) ^a Optimise LL (ISO/DIS 23150-1, B.1.1) Alternative UTL (ISO/DIS 23150-1, B.1.6) Key: Time stamp reference (ISO/DIS 23150-1, A.2.21)
		Size type: dynamic/fixed Size #: Number of valid observations (ISO/DIS 23150-1, A.2.20)		
		Time stamp reference (ISO/DIS 23150-1, A.2.21)	M	Profile: Observations (ISO/DIS 23150-1, 6.5.7) ^a Alternative VRO (ISO/DIS 23150-1, B.1.3)
		Observation status (ISO/DIS 23150-1, A.2.22)	M	Profile: Observations (ISO/DIS 23150-1, 6.5.7) ^a Redundancy (ISO/DIS 23150-1, B.1.2) Signal: Feature ID (ISO/DIS 23150-1, A.4.2) (if unique over time), Time stamp – prediction (ISO/DIS 23150-1, A.1.5.1) Optimise DE (ISO/DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)

a Features may not be tracked continuously. The same feature may be tracked as a new entity multiple times. Therefore the profile does not provide the signal "Age" (ISO/DIS 23150-1, A.2.14) on FLI.

b For polyline interpolation a linear interpolation between two sequential vertex points is assumed. Therefore the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) always has the mandatory enumeration "PIM_Linear". The profile does not provide the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) explicitly. Camera features are described by zero, one or two dimensional shapes. Therefore the signal "Shape type" (ISO/DIS 23150-1, A.2.27) has the mandatory enumeration "ST_Point", "ST_Line" or "ST_2DSurface". For the definition of a "ST_2DSurface", only the exemplary enumeration "ST_2DSurface_Segment" is not used.

Table 2 (continued)

LSG	RL LSG M/C/O	Signal		RL signal M/C/O	Option	
↔ Shape informa- tion	M		Number of valid shape classifications (ISO/DIS 23150-1, A.2.23)	M	Profile: Shape classification (ISO/DIS 23150-1, 6.5.8) Optimise LL (ISO/ DIS 23150-1, B.1.1) Alternative UTL (ISO/DIS 23150-1, B.1.6) Key: Shape clas- sification type (ISO/DIS 23150-1, A.2.24)	
			Size type: dynamic/fixed Size #: Number of valid shape classifications (ISO/DIS 23150-1, A.2.23)			
			Shape classification type (ISO/DIS 23150-1, A.2.24)	M	Profile: Shape classification (ISO/DIS 23150-1, 6.5.8) Alternative VRO (ISO/DIS 23150-1, B.1.3) Optimise DE (ISO/ DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)	
			Shape classification type – confi- dence (ISO/DIS 23150-1, A.2.25)	M	Profile: Shape classification (ISO/DIS 23150-1, 6.5.8) Alternative VRO (ISO/DIS 23150-1, B.1.3) Optimise DE (ISO/ DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)	
↔ Shape colour tone	M		Size type: dynamic/fixed Size # * Implicit list length – Optimise LL (ISO/DIS 23150-1, B.1.1): depends on Colour model type (ISO/DIS 23150-1, A.1.13)			
			Colour value (ISO/DIS 23150-1, A.2.17)	M	Profile: Colour model (ISO/DIS 23150-1, 6.5.2)	
			Colour tone – confidence (ISO/DIS 23150-1, A.2.18)	O	Profile: Colour model (ISO/DIS 23150-1, 6.5.2)	
a Features may not be tracked continuously. The same feature may be tracked as a new entity multiple times. Therefore the profile does not provide the signal "Age" (ISO/DIS 23150-1, A.2.14) on FLI.						
b For polyline interpolation a linear interpolation between two sequential vertex points is assumed. Therefore the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) always has the mandatory enumeration "PIM_Linear". The profile does not provide the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) explicitly. Camera features are described by zero, one or two dimensional shapes. Therefore the signal "Shape type" (ISO/DIS 23150-1, A.2.27) has the mandatory enumeration "ST_Point", "ST_Line" or "ST_2DSurface". For the definition of a "ST_2DSurface", only the exemplary enumeration "ST_2DSurface_Segment" is not used.						

Table 2 (continued)

LSG	RL LSG M/C/O	Signal		RL signal M/C/O	Option	
↪ Shape points	M		Shape type (ISO/DIS 23150-1, A.2.27)	M	Profile: Shape type {x, y, z} (ISO/DIS 23150-1, 6.5.9.2) ^b Optimise DE (ISO/DIS 23150-1, B.1.7) Optimise EES (ISO/DIS 23150-1, B.1.8)	
			Number of valid vertices (ISO/DIS 23150-1, A.2.28)	M	Profile: Shape type {x, y, z} (ISO/DIS 23150-1, 6.5.9.2) ^b Optimise LL (ISO/DIS 23150-1, B.1.1)	
			Size type: dynamic/fixed Size #: Number of valid vertices (ISO/DIS 23150-1, A.2.28)			
			Vertex point {x,y,z} (ISO/DIS 23150-1, A.2.32)	M	Profile: Shape type {x, y, z} (ISO/DIS 23150-1, 6.5.9.2) ^b	
			Vertex point {x,y,z} – error (ISO/DIS 23150-1, A.2.33)	M	Profile: Shape type {x, y, z} (ISO/DIS 23150-1, 6.5.9.2) ^b Implementation EM (ISO/DIS 23150-1, B.4.1)	
			Vertex point {x,y,z} – confidence (ISO/DIS 23150-1, A.2.34)	O	Profile: Shape type {x, y, z} (ISO/DIS 23150-1, 6.5.9.2) ^b	
		a Features may not be tracked continuously. The same feature may be tracked as a new entity multiple times. Therefore the profile does not provide the signal "Age" (ISO/DIS 23150-1, A.2.14) on FLI. b For polyline interpolation a linear interpolation between two sequential vertex points is assumed. Therefore the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) always has the mandatory enumeration "PIM_Linear". The profile does not provide the signal "Polyline interpolation method" (ISO/DIS 23150-1, A.2.26) explicitly. Camera features are described by zero, one or two dimensional shapes. Therefore the signal "Shape type" (ISO/DIS 23150-1, A.2.27) has the mandatory enumeration "ST_Point", "ST_Line" or "ST_2DSurface". For the definition of a "ST_2DSurface", only the exemplary enumeration "ST_2DSurface_Segment" is not used.				