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2020-11-30	R20-11	AUTOSAR Release Management	• Initial release

Disclaimer

Contents

1 Introduction

This specification describes the functional description and interfaces of the function cluster `Sensor Interfaces` which belongs to `AUTOSAR Adaptive Platform Services`.The `Sensor Interfaces` has the responsibility of connecting sensors to AUTOSAR Adaptive computing unit via a service interface.

The `Sensor Interfaces` are based on the logical interface defined in [1]. The sensor types covered by the specification are the following:

- Camera Sensors
- Lidar Sensors
- Radar Sensors
- Ultrasonic Sensors

There are three levels for the sensor data reporting:

- Detection level
- Feature level
- Object level

Besides data reporting interfaces, the sensor supporing interfaces, i.e.sensor health and performance, are also defined.

The sensors as the `AUTOSAR service provider` and the `AUTOSAR Adaptive applications` are located in different ECUs. To allow the flexiblity usage of the `Sensor Interfaces`, it will expose its functionality via ara::com service interfaces, not direct APIs.

Further functional details are described in [2].

2 Acronyms and Abbreviations

The glossary below includes acronyms and abbreviations relevant to the Sensor Interfaces that are not included in AUTOSAR Glossary [3].

Abbreviation / Acronym:	Description:
AD	Automated Driving
ADI	Automated Driving Interfaces
AEB	Autonomous Emergency Braking
HiL	Hardware in the Loop
ISO	International Organization for Standardization
LIDAR	LIght Detection And Ranging
MiL	Model in the Loop
OEM	Original Equipment Manufacturer
OSI	Open Simulation Interface
RADAR	RAdio Detection And Ranging
SAE	Society of Automotive Engineers
USS	UltraSonic Sensor
XiL	... in the Loop

Terms:	Description:
V2X	Vehicle-to-X-Communication is the generic term for various communication technologies in automotive, including vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication. The information is either transmitted directly between vehicles, between vehicle and roadside infrastructure or by using existing mobile networks.

3 Related documentation

3.1 Input documents & related standards and norms

[1] ISO-23150 Road vehicles–Data communication between sensors and data fusion unit for automated driving functions–Logical interface

[2] Explanation of Sensor Interfaces
AUTOSAR_EXP_SensorInterfaces

[3] Glossary
AUTOSAR_TR_Glossary

[4] Specification of Adaptive Platform Core
AUTOSAR_SWS_AdaptivePlatformCore

[5] Specification of Communication Management
AUTOSAR_SWS_CommunicationManagement

[6] Specification of Identity and Access Management
AUTOSAR_SWS_IdentityAndAccessManagement

[7] Requirements on Automated Driving Interfaces
AUTOSAR_RS_AutomatedDrivingInterfaces

3.2 Further applicable specification

AUTOSAR provides a core specification [4] which is also applicable for `Automated Driving Interfaces`. The chapter "General requirements for all FunctionalClusters" of this specification shall be considered as an additional and required specification for implementation of `Automated Driving Interfaces`.

4 Constraints and assumptions

Dedicated interfaces for particular sensors like radar, lidar, USS and camera are provided.

4.1 Limitations

4.1.1 ISO Optionals

All the ISO optionals are supported in the service defintiion, but the presence of an optional signal is decided during the design time. The optional signal presence is indicated by a capability vector. There is no change of optional presence during the run time.

4.1.2 Sensor Control Interfaces

Sensor control interfaces are not supported, e.g. actions like reset, initialization, and calibration.

4.1.3 Sensor Capabilities

The configuration of sensor capabilities is not supported, e.g. sensor opening angle and detection range.

4.2 Applicability to car domains

AUTOSAR Sensor Interfaces are used as service interfaces between dedicated sensors for enviroment precesion and the `AUTOSAR Adaptive applications`.

5 Dependencies to other modules

The Automated Driving Interfaces serve as common interfaces for the `AUTOSAR Adaptive applications`. The sensor information is provided by a non-platform service.The sensor interfaces are exposed to client applications via the `ara::com` middleware. Communication Management,[5] uses Identity and Access Management [6] to validate the authorization of requests made to the specific service interfaces, i.e. the Communication Management shall check if the invoker is allowed to access the requested service interface of a specific sensor. The following Figure shows a radar and camera sensor instance which provide sensor information to a Data Fusion instance consuming sensor data.
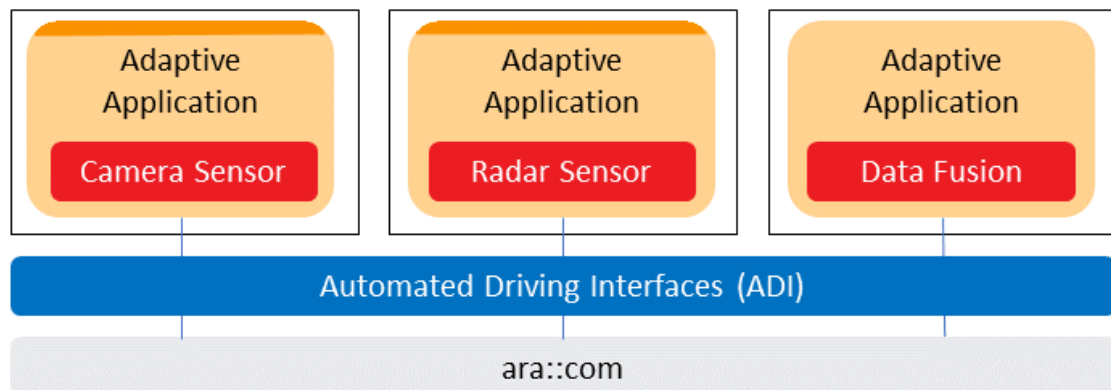
Figure 5.1: `Sensor Interfaces` **dependencies to other** `AUTOSAR Adaptive Applications.`

For each sensor type like radar, lidar, USS or camera, the ISO standard will contain lots of optional sensor data or signals in addition to the required signals, e.g. the classification of an object might be optional. During development of a driving function or data fusion system, a specific set of optional signals is selected by the function or data fusion developer according to the requirements of the driving function. To reduce development costs, especially in terms of functional safety, the set of optionals and thus the resulting logical sensor interface are required to be fixed during design-time, i.e. the specified sensor signals must not suddenly disappear from the interface of the sensor during runtime of the system so that a data fusion system can rely on the presence of the specified signals. Vice versa, a sensor interface must not add additional signals during runtime, e.g. not to risk an unintentional behavior change due to the increased bandwidth requirements.

6 Requirements Tracing

The following tables reference the requirements specified in [7] and links to the fulfillment of these. Please note that if column "Satisfied by" is empty for a specific requirement this means that this requirement is not fulfilled by this document.

Requirement	Description	Satisfied by
[RS_ADI_00001]	The ADI shall support the camera sensor technology for on-board sensors	[SWS_ADI_00001] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00119] [SWS_ADI_00120] [SWS_ADI_00121] [SWS_ADI_00122] [SWS_ADI_00123] [SWS_ADI_00124] [SWS_ADI_00125] [SWS_ADI_00126] [SWS_ADI_00127] [SWS_ADI_00128] [SWS_ADI_00129] [SWS_ADI_00130] [SWS_ADI_00200] [SWS_ADI_00201] [SWS_ADI_00202] [SWS_ADI_00203] [SWS_ADI_00204] [SWS_ADI_00205] [SWS_ADI_00206] [SWS_ADI_00207] [SWS_ADI_00208] [SWS_ADI_00209] [SWS_ADI_00210] [SWS_ADI_00211] [SWS_ADI_00212] [SWS_ADI_00213] [SWS_ADI_00214] [SWS_ADI_00215] [SWS_ADI_00216] [SWS_ADI_00217] [SWS_ADI_00218] [SWS_ADI_00219] [SWS_ADI_00220] [SWS_ADI_00221] [SWS_ADI_00222] [SWS_ADI_00223] [SWS_ADI_00224] [SWS_ADI_00225] [SWS_ADI_00226] [SWS_ADI_00227] [SWS_ADI_00228] [SWS_ADI_00229] [SWS_ADI_00230] [SWS_ADI_00231] [SWS_ADI_00232] [SWS_ADI_00233] [SWS_ADI_00234] [SWS_ADI_00235] [SWS_ADI_00236] [SWS_ADI_00239] [SWS_ADI_00300] [SWS_ADI_00301] [SWS_ADI_00302] [SWS_ADI_00303] [SWS_ADI_00304] [SWS_ADI_00305] [SWS_ADI_00306] [SWS_ADI_00307] [SWS_ADI_00308] [SWS_ADI_00309] [SWS_ADI_00310] [SWS_ADI_00311] [SWS_ADI_00312] [SWS_ADI_00313] [SWS_ADI_00314] [SWS_ADI_00315] [SWS_ADI_00316] [SWS_ADI_00317] [SWS_ADI_00318] [SWS_ADI_00319] [SWS_ADI_00320] [SWS_ADI_00321] [SWS_ADI_00322] [SWS_ADI_00323] [SWS_ADI_00324] [SWS_ADI_00325] [SWS_ADI_00326] [SWS_ADI_00327] [SWS_ADI_00328] [SWS_ADI_00329]

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[RS_ADI_00002]	The ADI shall support the lidar sensor technology for on-board sensors	[SWS_ADI_00002] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00121] [SWS_ADI_00123] [SWS_ADI_00124] [SWS_ADI_00125] [SWS_ADI_00126] [SWS_ADI_00127] [SWS_ADI_00128] [SWS_ADI_00129]

Requirement	Description	Satisfied by
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Requirement	Description	Satisfied by
[RS_ADI_00003]	The ADI shall support the radar sensor technology for on-board sensors	[SWS_ADI_00003] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00109] [SWS_ADI_00110] [SWS_ADI_00111] [SWS_ADI_00112] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00121] [SWS_ADI_00123] [SWS_ADI_00124] [SWS_ADI_00125] [SWS_ADI_00126] [SWS_ADI_00127] [SWS_ADI_00128] [SWS_ADI_00129] [SWS_ADI_00130] [SWS_ADI_00200] [SWS_ADI_00201] [SWS_ADI_00202] [SWS_ADI_00203] [SWS_ADI_00204] [SWS_ADI_00205] [SWS_ADI_00206] [SWS_ADI_00207] [SWS_ADI_00208] [SWS_ADI_00209] [SWS_ADI_00210] [SWS_ADI_00211] [SWS_ADI_00212] [SWS_ADI_00213] [SWS_ADI_00214] [SWS_ADI_00215] [SWS_ADI_00216] [SWS_ADI_00218] [SWS_ADI_00219] [SWS_ADI_00220] [SWS_ADI_00227] [SWS_ADI_00228] [SWS_ADI_00229] [SWS_ADI_00230] [SWS_ADI_00231] [SWS_ADI_00232] [SWS_ADI_00233] [SWS_ADI_00234] [SWS_ADI_00235] [SWS_ADI_00237] [SWS_ADI_00239] [SWS_ADI_00300] [SWS_ADI_00301] [SWS_ADI_00302] [SWS_ADI_00303] [SWS_ADI_00304] [SWS_ADI_00305] [SWS_ADI_00306] [SWS_ADI_00308] [SWS_ADI_00310] [SWS_ADI_00311] [SWS_ADI_00312] [SWS_ADI_00313] [SWS_ADI_00314] [SWS_ADI_00315] [SWS_ADI_00316] [SWS_ADI_00317] [SWS_ADI_00318] [SWS_ADI_00319] [SWS_ADI_00320] [SWS_ADI_00321] [SWS_ADI_00322] [SWS_ADI_00323] [SWS_ADI_00325] [SWS_ADI_00326] [SWS_ADI_00327] [SWS_ADI_00336] [SWS_ADI_00338] [SWS_ADI_00339] [SWS_ADI_00340] [SWS_ADI_00341] [SWS_ADI_00342] [SWS_ADI_00343] [SWS_ADI_00344] [SWS_ADI_00345] [SWS_ADI_00346] [SWS_ADI_00347]

Requirement	Description	Satisfied by
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Requirement	Description	Satisfied by
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[RS_ADI_00004]	The ADI shall support the ultrasonic sensor technology for on-board sensors	[SWS_ADI_00004] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00121] [SWS_ADI_00123] [SWS_ADI_00124] [SWS_ADI_00125] [SWS_ADI_00126] [SWS_ADI_00127] [SWS_ADI_00128] [SWS_ADI_00129] [SWS_ADI_00130] [SWS_ADI_00200] [SWS_ADI_00201] [SWS_ADI_00202] [SWS_ADI_00203] [SWS_ADI_00204] [SWS_ADI_00205] [SWS_ADI_00206] [SWS_ADI_00207] [SWS_ADI_00208] [SWS_ADI_00209] [SWS_ADI_00210] [SWS_ADI_00211] [SWS_ADI_00212] [SWS_ADI_00213] [SWS_ADI_00214] [SWS_ADI_00215] [SWS_ADI_00216] [SWS_ADI_00218] [SWS_ADI_00219] [SWS_ADI_00220] [SWS_ADI_00227] [SWS_ADI_00228] [SWS_ADI_00229] [SWS_ADI_00230] [SWS_ADI_00231] [SWS_ADI_00232] [SWS_ADI_00233] [SWS_ADI_00234] [SWS_ADI_00235] [SWS_ADI_00239] [SWS_ADI_00300] [SWS_ADI_00301] [SWS_ADI_00302] [SWS_ADI_00303] [SWS_ADI_00304] [SWS_ADI_00305] [SWS_ADI_00306] [SWS_ADI_00308] [SWS_ADI_00310] [SWS_ADI_00311] [SWS_ADI_00312] [SWS_ADI_00313] [SWS_ADI_00314] [SWS_ADI_00315] [SWS_ADI_00316] [SWS_ADI_00317] [SWS_ADI_00318]

Requirement	Description	Satisfied by
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Requirement	Description	Satisfied by
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[RS_ADI_00005]	The ADI shall be open for future extensions towards new sensor technologies	[SWS_ADI_00006]
[RS_ADI_00006]	The ADI shall provide interfaces which enable exchangeability of service compatible AUTOSAR Adaptive applications without changing the rest of the system.	[SWS_ADI_00010] [SWS_ADI_00012]
[RS_ADI_00007]	The ADI shall enable use cases with different resource limitations.	[SWS_ADI_00011]
[RS_ADI_00012]	The ADI shall support the ISO-23150 interfaces and ISO-23150 interface signals	[SWS_ADI_00006] [SWS_ADI_00007] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00109] [SWS_ADI_00110] [SWS_ADI_00111] [SWS_ADI_00112] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00119] [SWS_ADI_00120] [SWS_ADI_00121]

Requirement	Description	Satisfied by
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Requirement	Description	Satisfied by
		[SWS_ADI_00347] [SWS_ADI_00348] [SWS_ADI_00349] [SWS_ADI_00350] [SWS_ADI_00401] [SWS_ADI_00402] [SWS_ADI_00403] [SWS_ADI_00404] [SWS_ADI_00405] [SWS_ADI_00406] [SWS_ADI_00407] [SWS_ADI_00408] [SWS_ADI_00409] [SWS_ADI_00410] [SWS_ADI_00411] [SWS_ADI_00412] [SWS_ADI_00413] [SWS_ADI_00414] [SWS_ADI_00415] [SWS_ADI_00416] [SWS_ADI_00417] [SWS_ADI_00418] [SWS_ADI_00419] [SWS_ADI_00420] [SWS_ADI_00421] [SWS_ADI_00422] [SWS_ADI_00423] [SWS_ADI_00424] [SWS_ADI_00425] [SWS_ADI_00426] [SWS_ADI_00427] [SWS_ADI_00428] [SWS_ADI_00429] [SWS_ADI_00430] [SWS_ADI_00431] [SWS_ADI_00432] [SWS_ADI_00433] [SWS_ADI_00434] [SWS_ADI_00435] [SWS_ADI_00436] [SWS_ADI_00437] [SWS_ADI_00438] [SWS_ADI_00439] [SWS_ADI_00440] [SWS_ADI_00441] [SWS_ADI_00442] [SWS_ADI_00443] [SWS_ADI_00444] [SWS_ADI_00445] [SWS_ADI_00446] [SWS_ADI_00447] [SWS_ADI_00448] [SWS_ADI_00449] [SWS_ADI_00450] [SWS_ADI_00451] [SWS_ADI_00452] [SWS_ADI_00453] [SWS_ADI_00454] [SWS_ADI_00501] [SWS_ADI_00502] [SWS_ADI_00503] [SWS_ADI_00504] [SWS_ADI_00505] [SWS_ADI_00506] [SWS_ADI_00507] [SWS_ADI_00508] [SWS_ADI_00509] [SWS_ADI_00510] [SWS_ADI_00511] [SWS_ADI_00512] [SWS_ADI_00513] [SWS_ADI_00514] [SWS_ADI_00515] [SWS_ADI_00516] [SWS_ADI_00517] [SWS_ADI_00518] [SWS_ADI_00519] [SWS_ADI_00520] [SWS_ADI_00521] [SWS_ADI_00523] [SWS_ADI_00524] [SWS_ADI_00525] [SWS_ADI_00526] [SWS_ADI_00527] [SWS_ADI_00528] [SWS_ADI_00529] [SWS_ADI_00530] [SWS_ADI_00531] [SWS_ADI_00532] [SWS_ADI_00533] [SWS_ADI_00534] [SWS_ADI_00535] [SWS_ADI_00536] [SWS_ADI_00537] [SWS_ADI_00538] [SWS_ADI_00539]

Requirement	Description	Satisfied by
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[RS_ADI_00013]	The ADI shall interpret the ISO-23150 compliant to AUTOSAR	[SWS_ADI_00006] [SWS_ADI_00007] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00109] [SWS_ADI_00110] [SWS_ADI_00111] [SWS_ADI_00112] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00119] [SWS_ADI_00120] [SWS_ADI_00121]

Requirement	Description	Satisfied by
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[RS_ADI_00014]	The ADI shall be aligned with the semantics of the corresponding elements in the ISO-23150 .	[SWS_ADI_00006] [SWS_ADI_00007] [SWS_ADI_00100] [SWS_ADI_00101] [SWS_ADI_00102] [SWS_ADI_00103] [SWS_ADI_00104] [SWS_ADI_00105] [SWS_ADI_00106] [SWS_ADI_00107] [SWS_ADI_00108] [SWS_ADI_00109] [SWS_ADI_00110] [SWS_ADI_00111] [SWS_ADI_00112] [SWS_ADI_00113] [SWS_ADI_00114] [SWS_ADI_00115] [SWS_ADI_00116] [SWS_ADI_00117] [SWS_ADI_00118] [SWS_ADI_00119] [SWS_ADI_00120] [SWS_ADI_00121]

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Requirement	Description	Satisfied by
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[RS_ADI_00015]	The ADI shall limit the transmission of unused data.	[SWS_ADI_00010] [SWS_ADI_00012]
[RS_ADI_00016]	The ADI specification shall support the replacement of a sensor by another one providing more profiles without recompilation of the client software.	[SWS_ADI_00010] [SWS_ADI_00012]
[RS_ADI_00017]	The ADI specification shall support the replacement of a sensor by another one providing less profiles without recompilation of the client software if the removed profiles are not used.	[SWS_ADI_00010] [SWS_ADI_00012]

Requirement	Description	Satisfied by
[RS_ADI_00018]	The ADI specification shall enable AUTOSAR Adaptive applications to discard sensor data when newer sensor data is available.	[SWS_ADI_00005]
[RS_ADI_00019]	The ADI shall provide interface specifications that support an automatic translation of an interface specification to an implementable service interface.	[SWS_ADI_00006] [SWS_ADI_00007]

7 Functional Specification

7.1 Outline

7.1.1 Goals and scope

The specification is to provide well-defined sensor interfaces which is compliant to the sensor interface specification [1]. The ISO document covers just semantic definitions of interfaces whereas this specification aims to cover all aspects of the interfaces to make them fully compliant to the AUTOSAR Adaptive platform.

The specification shall enable the compatibility of sensors and data fusion algorithms independently of the supplier. To ensure the compatibility between sensors the interfaces are provided on implementation data type level.

The Automated Driving Interfaces serve as common interfaces for the `AUTOSAR Adaptive applications`. Consumers of the interfaces are `AUTOSAR Adaptive applications` containing functional elements as sensor data receivers, sensor data processors, data fusion applications, and automated driving functions. The sensor information is provided by a non-platform service.The non-platform service consumer is running in the apdative platfom as an `AUTOSAR adaptive application`, where the sensor could be deployed on different AUTOSAR platforms (Classic and Adaptive) as shown in the following figure.
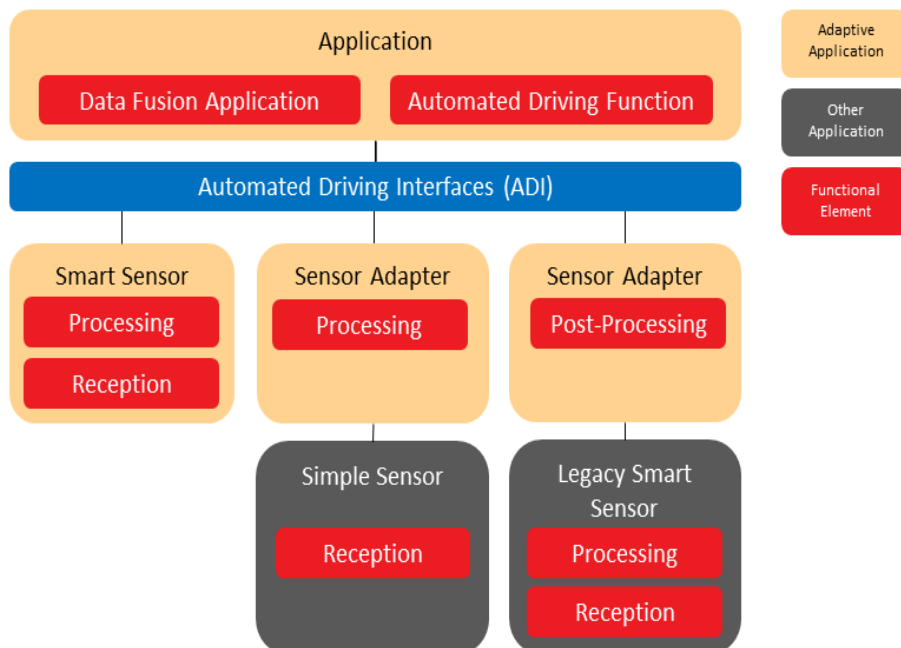
Figure 7.1: Functional elements communicating via ADI

Apart from the Automated Driving Interfaces (ADI), the other relevent elements are defined as follows :

- Sensor Data Reception: A functional element which receives or reads sensor data from a sensor. Such an element can provide raw sensor data. Raw sensor data means that it provides the actual data a sensor can measure. There is no processing of the sensor data. There are no data streams provided.

- Sensor Data Processing: This element which usually processes raw sensor data, provides pre-processed and post-processed sensor data. It provides data a sensor cannot directly measure but needs a processing stage for.

- Sensor Fusion Application: The data fusion algorithm is an application which collects sensor data and fuses it to provide a unified environmental model. Data fusion applications are typical consumers of sensor data. They provide their output to Automated Driving Functions.

- Automated Driving Function: Automated Driving Functions can also directly use the interfaces.

The Automated Driving interfaces can be used in following usages to enable the interoperability between different players and improve the efficiency for the development and validation of automated driving functions :

- Sensor Supplier Interface: The automated driving use case defines the requirements to the fusion algorithm and the used sensors. The OEM wants to rely on a standardized interface which provides well defined sensor information which are defined by the ISO-23150 and on an AUTOSAR standardized interface. The scope shall be the data format between a sensor and a computing unit running an AUTOSAR Adaptive application.

- Standardized Sensor API: Sensor developers need well described and standardized interfaces to provide an implementation which can be used by automated driving applications and data fusion algorithms. So, the same information is provided to all potential consumers of the data.

- Sensor Fusion Algorithm: To combine information from different sensors and to develop sensor fusion algorithms for automated driving a detailed description of all signals provided is needed.

- Sensor Fusion Integration: Sensor fusion algorithms shall be integrated on a high-performance computing platform within an Adaptive Application as the central unit of automated driving functions.

- Sensor Implementation Testing: Testing is performed at each stage of the development of the sensor system. To create a test specification for the system testable implementations are needed which are based on well-defined interfaces and descriptions.

- Sensor Simulation: By simulating the sensor fusion algorithms before actual target integration, it is possible to ensure smooth integration during the design, development, test and safeguarding steps. This ensures compatibility of algorithm integration into AUTOSAR Adaptive ECUs.

- Sensor Data Record and Replay: To be able to test and debug sensor fusion algorithms offline it is necessary to replay sensor data recorded in real world scenarios. This enables sensor fusion designers to reproduce failures and determine faults.

7.1.2 Relation to other standards

The currently ongoing standardization of the international standard ISO 23150 "Road vehicles - Data communication between sensors and data fusion unit for automated driving functions - Logical interface" will be applicable to road vehicles with automated driving functions. It specifies the logical interface between smart in-vehicle sensors that sense the environment (e.g. camera, lidar, radar, ultrasonic, etc.) and the vehicle fusion unit. The interface is described in a modular, semantic representation allowing different types of sensor technologies and fusion concepts. The "Open Simulation Interface" (OSI) is a generic software interface for the environmental perception of automated driving functions in virtual scenarios (https://github.com/OpenSimulationInterface/open-simulation-interface). OSI ensures modularity, integrability and interchangeability of the individual components. These can be environment simulation models, sensor models, logical models for the detected environment or sensor fusion and models for automated driving functions. Additional informations can be found on https://opensimulationinterface.github.io/open-simulation-interface/.
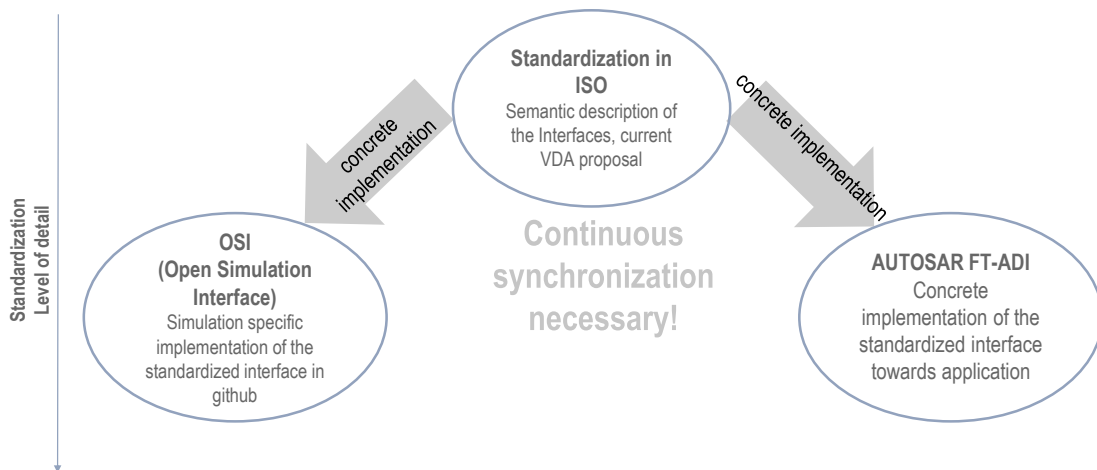
Figure 7.2: Scope of Standardization

The Open Simulation Interface and the Autosar ADI will support the ISO 23150.

7.2 AD Sensor Service Design

7.2.1 ISO mapping to Sensor Services

7.2.1.1 Sensor Types

To comply with the ISO 23150, the specific service is defined with different sensor types. Currently, Camera, Lidar, Radar, and Ultrasonic sercives are supported in the specification. The new service will be introduced along with the evolution of [1].

[SWS_ADI_00001]{DRAFT} **The Camera Sensor Data periodical Transmission** ⌈A Camera senor with Automated Driving interfaces shall provide the camera sensor data periodically to the `Adaptive Applications`⌋*(RS_ADI_00001)*

[SWS_ADI_00002]{DRAFT} **The Lidar Sensor Data periodical Transmission** ⌈A Lidar sensor with Automated Driving interfaces shall provide the lidar sensor data periodically to the `Adaptive Applications`⌋*(RS_ADI_00002)*

[SWS_ADI_00003]{DRAFT} **The Radar Sensor Data periodical Transmission** ⌈A radar sensor with Automated Driving interfaces shall be able to provide the radar sensor data periodically to the `Adaptive Applications`⌋*(RS_ADI_00003)*

[SWS_ADI_00004]{DRAFT} **The Ultrasonic Sensor Data periodical Transmission** ⌈A ultrasonic sensor with Automated Driving interfaces shall be able to provide the ultrasonic sensor data periodically to the `Adaptive Applications`⌋*(RS_ADI_00004)*

[SWS_ADI_00005]{DRAFT} **Receiving periodical sensor data** ⌈The `Adaptive Applications` as the sevice consumer shall process the sensor data according to the timestamp in the package, not the package arrival time. The most recent data is always the highest priority for processing.⌋*(RS_ADI_00018)*

7.2.1.2 Sensor Data level

In ISO 23150, there are three ISO logic interface levels to support different levels of fusion: object level, feature level and detection level:

- Object level interface: Potentially moving object interface, Road object interface and Static object interface;

- Feature level interface: Camera feature interface and USS feature interface;

- Detection level interface: Radar detection interface,Lidar detection interface, Camera detection interface and USS detection interface.

A sensor could provide several ISO logical interfaces, and shall provide at least one ISO interface either on object, feature, or detection level.

[SWS_ADI_00006]{DRAFT} **Sensor specific services for different level ISO interfaces** ⌈To allow the flexibility of service providing by a sensor, each ISO interface shall

be mapped to a propriate `ara::com` means like events. The service interface shall support the defintions of ISO signals.The services for new types of sensors shall be added along with the evolution of [1]. The follwing AP services are defined in this specification:

- Camera,Lidar,Radar,Ultrasonic: Potentially moving object service, road object service, static object service
- Camera: Camera features service, camera detections service;
- Lidar: Lidar detections service;
- Radar: Radar detections service;
- Ultrasonic: Ultrasonic features service, Ultrasonic detection service.

⌋*(RS_ADI_00012, RS_ADI_00013, RS_ADI_00014, RS_ADI_00019, RS_ADI_00005)*

7.2.1.3 Supportive Sensor interfaces

In ISO, there are two supportive senor interfaces for the `Adaptive Applications` process the reliability of the used measurement method or data, which are also used to the implementation of safety concept. The two supportive sensor interfaces are sensor technology indepedent, i.e. common to camera, lidar, radar and ultrasonic sensor, but with sensor technology specific data.

[SWS_ADI_00007]{DRAFT} **Sensor independent supportive services** ⌈The supportive interfaces shall be mapped to two sensor indpendent AP services and support the defintions of ISO signals.The follwing services are defined in this specification:

- Sensor Performance service;
- Sensor Health information service.

⌋*(RS_ADI_00012, RS_ADI_00013, RS_ADI_00014, RS_ADI_00019)*

7.2.2 Service Optional Elements

An individual Sensor Service design faces the challenge that each ISO interface contains a lot of optional elements. The optional elements are known and fixed at design time by service providers and service users. The present of optional elements shall not be changed during run time.

[SWS_ADI_00010]{DRAFT} **Capability Vector** ⌈A service capability vector indicates which optional element is provided by the Service provider. The optional elements indicated by the capability vector shall be always sent during the runtime of the service. The service consumer should check the vector at the initialization time and subcribe the service if it includes all the optional elements that the consumer requires.The consumer

may ignore the optional elements, if these elements are not required.⌋*(RS_ADI_00006, RS_ADI_00015, RS_ADI_00016, RS_ADI_00017)*

[SWS_ADI_00011]{DRAFT} **Service Profiles** ⌈In different use cases, there are different requirements on the sensor data i.e.for different data Types, behavior, content, performance, resolution, etc. Different Service Profiles for a Sensor Type enables the flexiblity of the corresponding sensor service for different use cases. In this release, only one profile is supported and more profiles should be considered in future releases.⌋*(RS_ADI_00007)*

[SWS_ADI_00012]{DRAFT} **Service Versioning** ⌈Service Versioning covers different configurations, i.e. optionals, additional data representation, etc. The same services with different service versioning, but with the same profile, shall be backward compatible.⌋*(RS_ADI_00006, RS_ADI_00015, RS_ADI_00016, RS_ADI_00017)*

8 API specification

There are no APIs defined in this release.

Document ID 912: AUTOSAR_SWS_SensorInterfaces

9 Service Interfaces

9.1 Type definitions

This chapter lists all types provided by the `ADI`.

9.1.1 General Header Definition

This section lists all the data types used in the header of the service interfaces.

9.1.1.1 CapabilityVector

[SWS_ADI_00100]{DRAFT} ⌈

Name	CapabilityVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`bool`
Derived from	-
Description	To identify presence of optional signal. The exact bit reference is denfined in the specification. For each service, there is exact one capabilityVector table, which is deified in chapter 10.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.2 InterfaceVersionId

[SWS_ADI_00101]{DRAFT} ⌈

Name	InterfaceVersionId
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	InterfaceVersionIdMajor `uint8_t`
	InterfaceVersionIdMinor `uint8_t`
	InterfaceVersionIdPatch `uint8_t`
Derived from	-
Description	Represents the version of the service.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.3 InterfaceCycleTimeVariation

[SWS_ADI_00102]{DRAFT} ⌈

Name	InterfaceCycleTimeVariation
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	To indicate the cycle time variation. It represents a linear value between 0% and 100%.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.4 InterfaceId

[SWS_ADI_00103]{DRAFT} ⌈

Name	InterfaceId	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Uniquely identify the interface.	
Range / Symbol	**Limit**	**Description**
kPotentialMovingObject	0x00	The Potential Moving Object interface.
kRoadObject	0x01	The Road Object interface.
kStaticObject	0x02	The Static Object interface.
kCameraFeature	0x03	The Camera Feature interface.
kUltrasonicFeature	0x04	The Ultrasonic Feature interface.
kRadarDetection	0x05	The Radar Detection interface.
kLidarDetection	0x06	The Lidar Detection interface.
kCameraDetection	0x07	The Camera Detection interface.
kUltrasonicDetection	0x08	The Ultrasonic Detection interface.
kSensorPerformance	0x09	The Sensor Performance interface.
kSensorHealthInformation	0x0A	The Sensor Health interface.
kUnknown	0x0B	The interface ID is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.5 DataQualifier

[SWS_ADI_00104]{DRAFT} ⌈

Name	DataQualifier	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the data quality of the transmitted data.	
Range / Symbol	**Limit**	**Description**
kNormal	0x00	Information can be used without restriction.
kNotAvailable	0x01	Information from the senor is not available.
kReduceInCoverage	0x02	Reported data are from the sensor in a restricted view.
kReduceInPerformance	0x03	Reported data are from the sensor in a restricted performance.
kReduceInViewAnd Performance	0x04	Reported data are from the sensor in a restricted view and performance.
kTestMode	0x05	Reported data are from the sensor in a test mode.
kInvalid	0x06	Mesaurement cycle was invalid and no valid objects will be reported.
kUnknown	0x07	Data quality is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.6 RecognizedStatus

[SWS_ADI_00105]{DRAFT} ⌈

Name	RecognizedStatus	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To indicate the recognition process status of the sensor due to resource limitations.	
Range / Symbol	**Limit**	**Description**
kNormal	0x00	The performance of the sensor is enough to process all recognized entities. If additional entities would have been in the environment the sensor would have processed additional entities.
kPreLimits	0x01	The performance of the sensor is close to the limits to process all recognized entities.
kLimited	0x02	The performance of the sensor is not enough to process all recognized entities.
kUnknown	0x03	The performance status of the sensor is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.7 TrackingMotionModel

[SWS_ADI_00106]{DRAFT} ⌈

Name	TrackingMotionModel	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	The motion model for tracking moving objects.	
Range / Symbol	Limit	Description
kConstantVelocity	0x00	Motion model uses constant velocity.
kConstantAcceleration	0x01	Motion model uses constant acceleration.
kConstantTurnRate	0x02	Motion model uses constant turn rate.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.8 MotionType

[SWS_ADI_00107]{DRAFT} ⌈

Name	MotionType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the applied motion type in the message, i.e. absolute or relative motion values.	
Range / Symbol	Limit	Description
kRelativeValues	0x00	Relative motion values are used.
kAbsoluteValues	0x01	Absolute motion values are used.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.9 ColourModelType

[SWS_ADI_00108]{DRAFT} ⌈

Name	ColourModelType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the applied colour model in the service.	
Range / Symbol	Limit	Description
kGrey	0x00	Grey scale - 1 colour value is used for grey value.

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kRGB	0x01	Red, green, blue - 3 colour values are used for the values for red, green, blue.
kHSV	0x02	Hue, saturation, value - 3 colour values are used for the values for hue, saturation, value.
kLUV	0x03	Luminance and colour coordinates U, V - 3 colour values are used for the values for hue, saturation, value.
kColourList	0x04	Each value reference a pre-defined colour - 1 colour value.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.10   RadialVelocityAmbiguityDomain

[SWS_ADI_00109]{DRAFT} ⌈

Name	RadialVelocityAmbiguityDomain
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	The Doppler ambiguity caused by under sampling. m/s

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.11   RangeAmbiguityDomain

[SWS_ADI_00110]{DRAFT} ⌈

Name	RangeAmbiguityDomain
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	The range of the ambiguity domain. m

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.12 AngleAzimuthAmbiguityDomain

[SWS_ADI_00111]{DRAFT} ⌈

Name	AngleAzimuthAmbiguityDomain
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	The azimuth angle of the ambiguity domain is defined by {begin} and {end}. The unit is {rad,rad}

⌋(*RS_ADI_00003*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.13 AngleElevationAmbiguityDomain

[SWS_ADI_00112]{DRAFT} ⌈

Name	AngleElevationAmbiguityDomain
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	The elevation angle of the ambiguity domain is defined by {begin} and {end}.The unit is {rad,rad}.

⌋(*RS_ADI_00003*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.14 InterfaceApplicability

[SWS_ADI_00113]{DRAFT} ⌈

Name	InterfaceApplicability	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the related interface of the service.	
Range / Symbol	*Limit*	*Description*
kObjectLevelInterfaces	0x00	Object level interfaces.
kFeatureLevelInterface	0x01	Feature level interface.
kDetectionLevelInterface	0x02	Detection level interface.
kFLIandDLI	0x03	Feature level and detection level interfaces.
kPMOI	0x04	Potential Moving Objects Interface.
kRDOI	0x05	Road Objects Interface.

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kSOI	0x06	Static Objects Interface.
kAll	0x07	All interfaces.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.15 VehicleCoordinateSystemType

[SWS_ADI_00114]{DRAFT} ⌈

Name	VehicleCoordinateSystemType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Defines the reference vehicle coordinate system for the interfaces of the sensor.	
Range / Symbol	*Limit*	*Description*
kRearAxle	0x00	Use vehicle rear axle coordinate system.
kRoadLevel	0x01	Use vehicle road level coordinate system.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.16 Point3D

[SWS_ADI_00115]{DRAFT} ⌈

Name	Point3D
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

Subelements	`x float`
	`y float`
	`z float` (optional)

Derived from	-
Description	Represents a 3 dimension vector, the unit will be vary according to the refering data type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.17 Point3DError

[SWS_ADI_00116]{DRAFT} ⌈

Name	Point3DError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	xError `float`
	yError `float`
	zError `float` (optional)
Derived from	-
Description	Represents Error value in 3 dimension vector, the unit will be vary according to the refering data type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.18 Orientation3D

[SWS_ADI_00117]{DRAFT} ⌈

Name	Orientation3D
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Yaw `float`
	Pitch `float`
	Roll `float`
Derived from	-
Description	Represents a 3 dimension vector {yaw, pitch,roll}, the unit will be vary according to the refering data type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.19 Orientation3DError

[SWS_ADI_00118]{DRAFT} ⌈

Name	Orientation3DError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	YawError `float`
	PitchError `float`
	RollError `float`
Derived from	-
Description	Represents Error value in 3 dimension vector {yaw, pitch, roll}, the unit will be vary according to the refering data type.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.20 Point3DErrorVector

[SWS_ADI_00129]{DRAFT} ⌈

Name	Point3DErrorVector
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	xxError `float` (optional)
	xyError `float` (optional)
	xzError `float` (optional)
	yxError `float` (optional)
	yyError `float` (optional)
	yzError `float` (optional)
	zxError `float` (optional)
	zyError `float` (optional)
	zzError `float` (optional)
Derived from	-
Description	Represents the Error value in 3 dimension vector, the unit will be vary according to the refering data type.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.21 Orientation3DErrorVector

[SWS_ADI_00130]{DRAFT} ⌈

Name	Orientation3DErrorVector
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	yawyawError `float` (optional)
	yawpitchError `float` (optional)
	yawrollError `float` (optional)
	pitchyawError `float` (optional)
	pitchpitchError `float` (optional)
	pitchrollError `float` (optional)
	rollyawError `float` (optional)
	rollpitchError `float` (optional)
	rollrollError `float` (optional)
Derived from	-
Description	Represents the Error value in 3 dimension vector {yaw, pitch, roll}, the unit will be vary according to the refering data type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.22 VanishingPoint

[SWS_ADI_00119]{DRAFT} ⌈

Name	VanishingPoint
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Azimuth `float`
	Elevation `float`
Derived from	-
Description	A set of lines in the image plane that corresponds to a set of parallel surface lines in the 3D world space converges to a common point in the image space known as the Vanishing point {azimuth, elevation}.The unit is {rad,rad}.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.23 VanishingPointError

[SWS_ADI_00120]{DRAFT} ⌈

Name	VanishingPointError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Azimuth `float`
	Elevation `float`
Derived from	-
Description	Uncertainty of the Vanishing point {azimuth, elevation},using Error value.The unit is {rad,rad}.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.24 InformationSensorPose

[SWS_ADI_00121]{DRAFT} ⌈

Name	InformationSensorPose
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	SensorOriginPoint `Point3D`
	SensorOriginPointError `Point3DError` (optional)
	SensorOriginPointErrorVector `Point3DErrorVector` (optional)
	SensorOrientation `Orientation3D`
	SensorOrientationError `Orientation3DError` (optional)
	SensorOrientationErrorVector `Orientation3DErrorVector` (optional)
Derived from	-
Description	Represents the Sensor Pos info.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.25 InformationSensorSurrounding

[SWS_ADI_00122]{DRAFT} ⌈

Name	InformationSensorSurrounding
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	VanishingPoint `VanishingPoint`
	VanishingPointError `VanishingPointError` (optional)
Derived from	-
Description	Represents the vanishing point info.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.26 InterfaceHeader

[SWS_ADI_00123]{DRAFT} ⌈

Name	InterfaceHeader
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	InformationInterface `InformationInterface`
	VehicleCoordinateSystem `VehicleCoordinateSystemType` (optional)
	SensorPose `InformationSensorPose` (optional)
	SensorCalibration `Calibration` (optional)
	SensorClusterInformation `SensorCluster` (optional)
	InterfaceExtension `InformationInterfaceExtension` (optional)
	SensorSurrounding `InformationSensorSurrounding` (optional)
Derived from	-
Description	Represents the header of each message.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.27 SensorId

[SWS_ADI_00124]{DRAFT} ⌈

Name	SensorID
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	uint8_t
Description	To represent the sensor logical identity.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.28 SensorIdList

[SWS_ADI_00125]{DRAFT} ⌈

Name	SensorIdList
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	SensorID
Derived from	-
Description	Represents a list of Sensor ID.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.29 InformationInterface

[SWS_ADI_00126]{DRAFT} ⌈

Name	InformationInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	VersionId InterfaceVersionId
	NumberOfValidServingSensors uint8_t
	ValidServingSensors SensorIdList
	InterfaceID InterfaceId (optional)
	TimeStamp uint64_t
	CycleCounter uint8_t (optional)
	InterfaceCycleTime uint32_t (optional)
	InterfaceCycleTimeVariation InterfaceCycleTimeVariation (optional)
	DataQualifier DataQualifier
Derived from	-
Description	Represents the basic info of the sensor service.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.30   InformationInterfaceExtension

[SWS_ADI_00127]{DRAFT} ⌈

Name	InformationInterfaceExtension
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TrackingMotionModel `TrackingMotionModel` (optional)
	MotionType `MotionType`
	ColourModelType `ColourModelType` (optional)
	InformationAmbiguityDomain `InformationAmbiguityDomain` (optional)
	InterfaceApplicability `InterfaceApplicability` (optional)
Derived from	-
Description	Represents the additional info of the sensor service.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.31   ProbabilityPercentage

[SWS_ADI_00128]{DRAFT} ⌈

Name	ProbabilityPercentage
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`float`
Description	Represet probability in percentage.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.32   SensorCalibratableComponent

[SWS_ADI_00539]{DRAFT} ⌈

Name	SensorCalibratableComponent
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Enumeration for the sensor component which may be calibrated.

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Range / Symbol	Limit	Description
kIntrinsic	0x00	Calibration status for the intrinsic parameters of the sensor.
kExtrinsic	0x01	Calibration status for the extrinsic parameters of the sensor.
kOnline	0x02	Calibration status for the online parameters of the sensor.
kUnknown	0x03	The sensor calibratable component is unknown.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.33   SensorCalibrationStatus

[SWS_ADI_00540]{DRAFT} ⌈

Name	SensorCalibrationStatus	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Enumeration for the current calibration status of the Sensor calibratable component.	
Range / **Symbol**	**Limit**	**Description**
kCalibrated	0x00	Sensor calibration was successful and within nominal tolerance range.
kNotCalibrated	0x01	Calibration not done or calibration failed.
kDegraded	0x02	Sensor calibrated, however performance degraded due to limited correction accuracy.
kInitialCalibrationNotPerformed	0x03	Sensor initial calibration not performed yet.
kInitialCalibrationFailed	0x04	Sensor initial calibration process failed.
kRecalibrationNeededIntrinsic	0x05	Recalibration of sensor's intrinsic parameters required.
kRecalibrationNeededExtrinsic	0x06	Recalibration of sensor's extrinsic parameters required.
kRecalibrationNeededFull	0x07	Recalibration of the complete sensor's parameters required.
kUnknown	0x08	The sensor Calibration status is unknown.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.1.34   CaliComponentInfo

[SWS_ADI_00544]{DRAFT} ⌈

Name	CaliComponentInfo
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	CaliComponent `SensorCalibratableComponent`
	CaliStatus `SensorCalibrationStatus`
	CaliProcessStatus `CalibrationProcessState` (optional)

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Derived from	-
Description	Represents the calibration component information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.35 CaliComponentInfoVector

[SWS_ADI_00545]{DRAFT} ⌈

Name	CaliComponentInfoVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`CaliComponentInfo`
Derived from	-
Description	Represents a list of calibration component information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.36 Calibration

[SWS_ADI_00546]{DRAFT} ⌈

Name	Calibration
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NoValidSensorCalibratableComponents `uint8_t`
	ValidSensorCalibratableComponents `CaliComponentInfoVector`
	SensorOriginPointCorrection `Point3D` (optional)
	SensorOriginPointCorrectionError `Point3DError` (optional)
	SensorOriginTranslationCorrectionLimitRange `SensorOriginTranslationCorrectionLimit` (optional)
	CoorectionPosLimitMax `Point3D` (optional)
	SensorOrientationCorrection `Orientation3D` (optional)
	SensorOrientationCorrectionError `Orientation3DError` (optional)
	SensorPoseAngleCorrectionLimitRange `SensorPoseAngleCorrectionLimit` (optional)
Derived from	-
Description	Represents the sensor calibration related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.37   CalibrationProcessState

[SWS_ADI_00548]{DRAFT} ⌈

Name	CalibrationProcessState
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Provides an enumeration for the current state of the Sensor calibration component.

Range / Symbol	Limit	Description
kInitialCalibrationPerformed	0x00	The sensor initial calibration has been performed.
kInitialCalibrationNotPerformed	0x01	The sensor initial calibration has not been performed yet.
kInitialCalibrationFailed	0x02	The sensor initial calibration process failed.
kRecalibrationNeededIntrinsic	0x03	The recalibration of sensor's intrinsic parameters is required.
kRecalibrationNeededExtrinsic	0x04	The recalibration of sensor's extrinsic parameters is required.
kRecalibrationNeededFull	0x05	The recalibration of the complete sensor's parameters is required.
kUnknown	0x06	The sensor Calibration Process State is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.38   SensorOriginTranslationCorrectionLimit

[SWS_ADI_00549]{DRAFT} ⌈

Name	SensorOriginTranslationCorrectionLimit
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	xbegin `float`
	xend `float`
	ybegin `float`
	yend `float`
	zbegin `float` (optional)
	zend `float` (optional)
Derived from	-
Description	Provides the limits of independent position corrections. Begin (minimum) and end (maximum) positions could be defined for each axis {x, y, z} separately.(m, m, m, m, m, m)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.39 SensorPoseAngleCorrectionLimit

[SWS_ADI_00550]{DRAFT} ⌈

Name	SensorPoseAngleCorrectionLimit
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Yawbegin `float`
	Yawend `float`
	Pitchbegin `float`
	Pitchend `float`
	Rollbegin `float`
	Rollend `float`
Derived from	-
Description	Provides the limits of independent angle corrections. Begin (minimum) and end (maximum) angles could be defined for each angle {yaw, pitch, roll} separately.(rad, rad, rad, rad, rad, rad)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.40 SensorCluster

[SWS_ADI_00551]{DRAFT} ⌈

Name	SensorCluster
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidSensors `uint8_t`
	SensorIDReferenceList `SensorIdList`
Derived from	-
Description	Group of sensors of the same technology serving a common logical interface.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.41 Point2D

[SWS_ADI_00604]{DRAFT} ⌈

Name	Point2D
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	x `float`
	y `float`

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Derived from	-
Description	Position with respect to the vehicle origin.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.42 Point2DError

[SWS_ADI_00605]{DRAFT} ⌈

Name	Point2DError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	x `float`
	y `float`
Derived from	-
Description	Error values for feature's 2D position {x, y}.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.1.43 InformationAmbiguityDomain

[SWS_ADI_00713]{DRAFT} ⌈

Name	InformationAmbiguityDomain
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	VelocityAmbiguity `RadialVelocityAmbiguityDomain` (optional)
	RangeAmbiguity `RangeAmbiguityDomain` (optional)
	AzimuthAmbiguity `AngleAzimuthAmbiguityDomain` (optional)
	ElevationAmbiguity `AngleElevationAmbiguityDomain` (optional)
Derived from	-
Description	Radar Sensor Ambiguity Domain informaiton if the sensor has related capability.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2 Potentially Moving Objects Interface Definition

This section lists all the data types used in Potentially moving object interface.

9.1.2.1 MeasurementStatus

[SWS_ADI_00200]{DRAFT} ⌈

Name	MeasurementStatus
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Represent the measurement Status.

Range / Symbol	Limit	Description
kMeasured	0x00	The tracked object is measured.
kNew	0x01	The tracked object is new.
kPredicted	0x02	The result is by predicted.
kPartiallyMeasured	0x03	The tracked object is partically measured.
kInvalid	0x04	The measurement result is invalid.
kPredictedOccluded	0x05	Tracked object is temporarily occluded by another entity.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.2.2 ReferencePoint

[SWS_ADI_00201]{DRAFT} ⌈

Name	ReferencePoint
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Represent outer edges of the recognized object's bounding box.

Range / Symbol	Limit	Description
kFrontLeftTop	0x00	Front Left Top.
kFrontMidwidthTop	0x01	Front Midwidth Top.
kFrontRightTop	0x02	Front Right Top.
kMidsideLeftTop	0x03	Midside Left Top.
kMidsideMidwidthTop	0x04	Midside Midwidth Top.
kMidside Right Top.	0x05	Midside Right Top.
kRearLeftTop	0x06	Rear Left Top.
kRearMidwidthTop	0x07	Rear Midwidth Top.
kRearRightTop	0x08	Rear Right Top.
kFrontLeftMidheight	0x09	Front Left Midheight.
kFrontMidwidthMidheight	0x0A	Front Midwidth Midheight.
kFrontRightMidheight	0x0B	Front Right Midheight.
kMidsideLeftMidheight	0x0C	Midside Left Midheight.
kMidsideMidwidthMidheight	0x0D	Midside Midwidth Midheight.
kMidsideRightMidheight	0x0E	Midside Right Midheight.
kRearLeftMidheight	0x0F	Rear Left Midheight.

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kRearMidwidthMidheight	0x10	Rear Midwidth Midheight.
kRearRightMidheight	0x11	Rear Right Midheight.
kFrontLeftBottom	0x12	Front Left Bottom.
kFrontMidwidthBottom	0x13	Front Midwidth Bottom.
kFrontRightBottom	0x14	Front Right Bottom.
kMidsideLeftBottom	0x15	Midside Left Bottom.
kMidsideMidwidthBottom	0x16	Midside Midwidth Bottom.
kMidsideRightBottom	0x17	Midside Right Bottom.
kRearLeftBottom	0x18	Rear Left Bottom.
kRearMidwidthBottom	0x19	Rear Midwidth Bottom.
kRearRightBottom	0x1A	Rear Right Bottom.
kUnknown	0x1B	Unkonwn.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.3 MovementStatus

[SWS_ADI_00202]{DRAFT} ⌈

Name	MovementStatus	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Represent the relevance to ego vehicle road level.	
Range / Symbol	*Limit*	*Description*
kUnknow	0x00	The status is unknow.
kStoppedMoving	0x01	The object stopped moving.
kStationary	0x02	The object is stationary.
kMoving	0x03	The object is moving.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.4 RoadLevel

[SWS_ADI_00203]{DRAFT} ⌈

Name	RoadLevel	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Represent the relevance to ego vehicle road level.	
Range / Symbol	*Limit*	*Description*

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kUnknown	0x00	The road level is unknown.
kEgoRoadLevel	0x01	The object is on the same road level of the ego vehicle.
kRoadLevelAbove	0x02	The object is above the road level of the ego vehicle .
kRoadLevelBelow	0x03	The object is below the road level of the ego vehicle .

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.5 DimensionBox

[SWS_ADI_00204]{DRAFT} ⌈

Name	DimensionBox
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Length `float`
	Width `float`
	Height `float` (optional)
Derived from	-
Description	Represents the dimension of the bounding box. The unit is {m,m,m}.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.6 DimensionBoxError

[SWS_ADI_00205]{DRAFT} ⌈

Name	DimensionBoxError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Length `float`
	Width `float`
	Height `float` (optional)
Derived from	-
Description	Represents the Error value of the bounding box, the unit is {m,m,m}.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.7 IncludedGeometricStructures

[SWS_ADI_00206]{DRAFT} ⌈

Name	IncludedGeometricStructures
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Represent the geometrical structures that are taken into account in the bounding boxes.

Range / Symbol	Limit	Description
kWithoutMirrors	0x00	Geometrical structures don't include the mirrors.
kWithMirrors	0x01	Geometrical structures include the Mirrors.
kUnknow	0x02	Geometrical structures including the mirrors or not is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.8 PotentiallyMovingObjectClassificationType

[SWS_ADI_00207]{DRAFT} ⌈

Name	PotentiallyMovingObjectClassificationType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Represents the potentially moving object classification probability type.

Range / Symbol	Limit	Description
kCar	0x00	Probability type car.
kHeavyTruck	0x01	Probability type heavy truck.
kVan	0x02	Probability type van.
kBus	0x03	Probability type bus.
kTrailer	0x04	Probability type trailer.
kSemitrailer	0x05	Probability type semitrailer.
kTram	0x06	Probability type tram.
kTrain	0x07	Probability type train.
kOtherVehicle	0x08	Probability type unidentified vehicle.
kMotorbike	0x09	Probability type motorbike.
kAnimal	0x0A	Probability type animal.
kBicycle	0x0B	Probability type bicycle.
kTricycle	0x0C	Probability type tricycle.
kPedestrian	0x0D	Probability type pedestrian.
kWheelchair	0x0E	Probability type wheelchair.
kUnknown	0x0F	Probability type unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.9 LightStatus

[SWS_ADI_00208]{DRAFT} ⌈

Name	LightStatus
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Represents the status of an object's light.
Range / Symbol	*Limit*	*Description*
kOff	0x00	Light status is off.
kOn	0x01	Light status is on.
kFlash	0x02	Light status is cyclic flashing.
kBrake	0x03	Light status indicates braking.
kWarning	0x04	Light status indicates warning.
kOther	0x06	Light status could not be determined.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.10 LightType

[SWS_ADI_00209]{DRAFT} ⌈

Name	LightType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Represents the light classification.
Range / Symbol	*Limit*	*Description*
kLeftFlashLight	0x00	Vehicle's left flash light.
kRightFlashLight	0x01	Probability type heavy truck.
kHazardFlashLight	0x02	Vehicle's hazard flash light.
kLeftBrakeLight	0x03	Vehicle's left break light.
kRightBrakeLight	0x04	Vehicle's right break light.
kCentreBrakeLight	0x05	Vehicle's centre break light.
kLeftOtherLight	0x06	Vehicle's left light (no flash or break light).
kRightOtherLight	0x07	Vehicle's right light (no flash or break light).
kCentreOtherLight	0x08	Vehicle's light not on the left or right site (no flash or break light).
kUnknown	0x09	Light type unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.11 PersonPoseType

[SWS_ADI_00210]{DRAFT} ⌈

Name	PersonPoseType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Represents the person pose possibility type.	
Range / Symbol	Limit	Description
kHead	0x00	The person head pose.
kUpperBody	0x01	The person upper body pose.
kLeftHand	0x02	Described angles are measured between the normal to the hand palm relative to the ego-vehicle axis system.
kRightHand	0x03	Described angles are measured between the normal to the hand palm relative to the ego-vehicle axis system.
kLeftLowerArm	0x04	Described angles are measured between long axis of the left lower arm relative to the ego-vehicle axis system.
kRightLowerArm	0x05	Described angles are measured between long axis of the right lower arm relative to the ego-vehicle axis system.
kRightUpperLeg	0x06	Described angles are measured between long axis of the right upper leg relative to the ego-vehicle axis system.
kLeftLowerLeg	0x07	Described angles are measured between long axis of the left lower leg relative to the ego-vehicle axis system.
kRightLowerLeg	0x08	Described angles are measured between long axis of the right lower leg relative to the ego-vehicle axis system.
kLeftLowerLeg	0x09	Described angles are measured between long axis of the left lower leg relative to the ego-vehicle axis system.
kLeftFoot	0x0A	Described angles are measured between long axis of the left foot relative to the ego-vehicle axis system.
kRightFoot	0x0B	Described angles are measured between long axis of the right foot relative to the ego-vehicle axis system.
kUnknown	0x0C	The person pose is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.12 ObjectLaneAssociation

[SWS_ADI_00211]{DRAFT} ⌈

Name	ObjectLaneAssociation	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Represents an association of the object to neighbouring lanes	
Range / Symbol	Limit	Description
kEgoLine	0x00	Object is in ego lane.

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kLeftNeighbouringLane	0x01	Object is in left neighbouring lane.
kRightNeighbouringLane	0x02	Object is in right neighbouring lane.
kEgoRightLane	0x03	Object is located between ego and right neighbouring lane.
kEgoLeftLane	0x04	Object is located between ego and left neighbouring lane.
kUnknown	0x05	Object's lane association is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.13 AngleBetweenObjectEdgeAndLaneRightEdgeLeftLane

[SWS_ADI_00212]{DRAFT} ⌈

Name	AngleBetweenObjectEdgeAndLaneRightEdgeLeftLane
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LeftEdgeRightLane `float`
	RightEdgeLeftLane `float`
Derived from	-
Description	Represents the Angles to object edge to lane. The unit is {rad,rad}.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.14 AngleBetweenObjectEdgeAndLaneRightEdgeLeftLaneError

[SWS_ADI_00213]{DRAFT} ⌈

Name	AngleBetweenObjectEdgeAndLaneRightEdgeLeftLaneError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LeftEdgeRightLane `float`
	RightEdgeLeftLane `float`
Derived from	-
Description	Represents the Error value of the angles to object edge to lane. The unit is {rad,rad}.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.15 PercentageSideLane

[SWS_ADI_00214]{DRAFT} ⌈

Name	PercentageSideLane
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Left `uint16_t`
	Right `uint16_t`
Derived from	-
Description	Represents the percentage value of the object width in the corresponding {left, right} lane.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.2.16 PotentiallyMovingObjectsDynamics

[SWS_ADI_00215]{DRAFT} ⌈

Name	PotentiallyMovingObjectsDynamics
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	VelocityObjectLevel `Point3D`
	VelocityObjectLevelError `Point3DError` (optional)
	Acceleration `Point3D` (optional)
	AccelerationError `Point3DError` (optional)
	InstantaneousCentreOfRotation `Point2D` (optional)
	InstantaneousCentreOfRotationError `Point2DError` (optional)
	RotationRateAtInstantaneousCentreOfRotationYaw `float` (optional)
	RotationRateAtInstantaneousCentreOfRotationYawError `float` (optional)
	MovementStatus `MovementStatus` (optional)
Derived from	-
Description	Represents the dynamics of the possible moving objects.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.2.17 ObjectStatus

[SWS_ADI_00216]{DRAFT} ⌈

Name	ObjectStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	ExistenceProbabilityObjectLevel `ProbabilityPercentage`
	ObjectId `uint16_t`
	GroupingObjectID `uint8_t` (optional)
	Age `uint64_t`
	NumberOfValidObservationsObjectLevel `uint32_t` (optional)
	ValidObservations `ValidObservationVector` (optional)
	TrackQuality `uint16_t` (optional)
	MeasurementStatusObjectLevel `MeasurementStatus`
Derived from	-
Description	Represents the dynamics of the objects.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.18 PotentiallyMovingObjectsBoundingBox

[SWS_ADI_00217]{DRAFT} ⌈

Name	PotentiallyMovingObjectsBoundingBox
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	BoundingBoxExtent `DimensionBox`
	BoundingBoxExtentError `DimensionBoxError` (optional)
	BoundingBoxGroundClearance `float` (optional)
	IncludedGeometricStructures `IncludedGeometricStructures` (optional)
Derived from	-
Description	Represents the bounding box information of the possible moving objects.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.19 PotentiallyMovingObjectsInformation

[SWS_ADI_00218]{DRAFT} ⌈

Name	PotentiallyMovingObjectsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidPotentiallyMovingObjectClassifications `uint8_t`
	PotentiallyMovingObjectClassifications `ValidPotentiallyMovingObjectClassificationVector`
Derived from	-
Description	Represents the certainty information regarding possible moving object types list.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.20 ValidPotentiallyMovingObjectClassification

[SWS_ADI_00219]{DRAFT} ⌈

Name	ValidPotentiallyMovingObjectClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PotentiallyMovingObjectClassificationType `PotentiallyMovingObjectClassificationType`
	PotentiallyMovingObjectClassificationTypeConfidence `float`
Derived from	-
Description	Represents the certainty information regarding a possible moving object type.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.2.21 ValidPotentiallyMovingObjectClassificationVector

[SWS_ADI_00220]{DRAFT} ⌈

Name	ValidPotentiallyMovingObjectClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ValidPotentiallyMovingObjectClassification`
Derived from	-
Description	Represents a list of PMOCertainty.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.2.22 PotentiallyMovingObjectsLight

[SWS_ADI_00221]{DRAFT} ⌈

Name	PotentiallyMovingObjectsLight
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PMOLightType `LightType`
	PMOLightStatus `LightStatus`
Derived from	-
Description	Represents the light information including light type and light status.

⌋(*RS_ADI_00001*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.2.23 PotentiallyMovingObjectsLightVector

[SWS_ADI_00222]{DRAFT} ⌈

Name	PotentiallyMovingObjectsLightVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`PotentiallyMovingObjectsLight`
Derived from	-
Description	Represents a list of light.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.24 PotentiallyMovingObjectsLights

[SWS_ADI_00223]{DRAFT} ⌈

Name	PotentiallyMovingObjectsLights
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidLights `uint8_t`
	PotentiallyMovingObjectsLightList `PotentiallyMovingObjectsLightVector`
Derived from	-
Description	Represents the lights information of the tracked object.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.25 ValidPersonPose

[SWS_ADI_00224]{DRAFT} ⌈

Name	ValidPersonPose
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PoseType `PersonPoseType`
	PersonPoseInfo `Orientation3D`
	PersonPoseError `Orientation3DError` (optional)
Derived from	-
Description	Represents the Pose information including pose type and pose status.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.26 PersonPoseVector

[SWS_ADI_00225]{DRAFT} ⌈

Name	PersonPoseVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ValidPersonPose
Derived from	-
Description	Represents a list of Pose.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.27 PotentiallyMovingObjectsPerson

[SWS_ADI_00226]{DRAFT} ⌈

Name	PotentiallyMovingObjectsPerson
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidPersonSPoses uint8_t
	PersonPoselist PersonPoseVector
Derived from	-
Description	Represents the poses information of the tracked person.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.28 PotentiallyMovingObjectsLaneRelatedInformation

[SWS_ADI_00227]{DRAFT} ⌈

Name	PotentiallyMovingObjectsLaneRelatedInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LaneAssociation ObjectLaneAssociation
	AngleBetweenObjectEdgeAndLane AngleBetweenObjectEdgeAndLaneRightEdgeLeftLane (optional)
	AngleBetweenObjectEdgeAndLaneError AngleBetweenObjectEdgeAndLaneRightEdgeLeftLaneError (optional)
	PercentageSideLane PercentageSideLane (optional)
Derived from	-
Description	Represents the lane related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.29 PotentiallyMovingObjectsMotionRelatedInformation

[SWS_ADI_00228]{DRAFT} ⌈

Name	PotentiallyMovingObjectsMotionRelatedInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	AngularPositionAzimuth `float`
	AngularVelocityAzimuth `float`
Derived from	-
Description	Represents the motion related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.30 ValidPotentiallyMovingObject

[SWS_ADI_00229]{DRAFT} ⌈

Name	ValidPotentiallyMovingObject
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PotentiallyMovingObjectsStatus `ObjectStatus`
	PotentiallyMovingObjectsInformation `PotentiallyMovingObjectsInformation`
	PotentiallyMovingObjectsPosition `PotentiallyMovingObjectsPosition`
	PotentiallyMovingObjectsBoundingBox `PotentiallyMovingObjectsBoundingBox` (optional)
	PotentiallyMovingObjectsDynamics `PotentiallyMovingObjectsDynamics`
	PotentiallyMovingObjectsLights `PotentiallyMovingObjectsLights` (optional)
	PotentiallyMovingObjectsPerson `PotentiallyMovingObjectsPerson` (optional)
	PotentiallyMovingObjectsLaneRelatedInformation `PotentiallyMovingObjectsLaneRelatedInformation` (optional)
	PotentiallyMovingObjectsMotionInformation `PotentiallyMovingObjectsMotionRelatedInformation` (optional)
	CameraSensorSpecific `PotentiallyMovingObjectsCameraSensorTechnologySpecific` (optional)
	RadarSensorSpecific `PotentiallyMovingObjectsRadarSensorTechnologySpecific` (optional)
	LidarSensorSpecific `PotentiallyMovingObjectsLidarSensorTechnologySpecific` (optional)
Derived from	-
Description	Represents the possible moving objects tracked by a camera,radar, lidar or Ultrasonic.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.31 ValidPotentiallyMovingObjectVector

[SWS_ADI_00230]{DRAFT} ⌈

Name	ValidPotentiallyMovingObjectVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ValidPotentiallyMovingObject
Derived from	-
Description	Represents a list of PMO.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.32 PotentiallyMovingObjects

[SWS_ADI_00231]{DRAFT} ⌈

Name	PotentiallyMovingObjects
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RecognisedPotentiallyMovingObjectsCapability `uint16_t` (optional)
	RecognisedPotentiallyMovingObjectsStatus RecognizedStatus (optional)
	NumberOfValidPotentiallyMovingObjects `uint16_t`
	ValidPotentiallyMovingObjects ValidPotentiallyMovingObjectVector
Derived from	-
Description	Represents the possible moving object informaiton provided by a camera,lidar, radar or Ultrasonic sensor.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.33 ValidObservation

[SWS_ADI_00232]{DRAFT} ⌈

Name	ValidObservation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TimeStampReferenceObjectLevel `uint64_t`
	ObservationStatusObjectLevel ObservationStatus
Derived from	-
Description	Represents the Observation status.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.34   ValidObservationVector

[SWS_ADI_00233]{DRAFT} ⌈

Name	ValidObservationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ValidObservation
Derived from	-
Description	Represents a list of Observation status..

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.35   ObservationStatus

[SWS_ADI_00234]{DRAFT} ⌈

Name	ObservationStatus	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	uint8_t	
Description	Represent the observation status of the object, which was recognized in a previous cycle.	
Range / Symbol	Limit	Description
kObservationTrue	0x00	The object was observed in the current cycle.
kObservationFalse	0x01	The object was not observed in the current cycle. It may be predicted in the cycle.
kUnknown	0x02	The status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.36   PotentiallyMovingObjectsPosition

[SWS_ADI_00235]{DRAFT} ⌈

Name	PotentiallyMovingObjectsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	PositionObjectLevel `Point3D`
	PositionObjectLevelError `Point3DError`
	Orientation `Orientation3D` (optional)
	OrientationError `Orientation3DError` (optional)
	ReferencePoint `ReferencePoint` (optional)
	RoadLevel `RoadLevel` (optional)
Derived from	-
Description	Represents the position information fo a potentially moving object.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.37 PotentiallyMovingObjectsCameraSensorTechnologySpecific

[SWS_ADI_00236]{DRAFT} ⌈

Name	PotentiallyMovingObjectsCameraSensorTechnologySpecific
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ScaleChangeObjectLevel `float` (optional)
Derived from	-
Description	Represents the Camera Sensor Sepcific information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.38 PotentiallyMovingObjectsRadarSensorTechnologySpecific

[SWS_ADI_00237]{DRAFT} ⌈

Name	PotentiallyMovingObjectsRadarSensorTechnologySpecific
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	EntityRadarCrossSection `float` (optional)
Derived from	-
Description	Represents the Radar Sensor Sepcific information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.39 PotentiallyMovingObjectsLidarSensorTechnologySpecific

[SWS_ADI_00238]{DRAFT} ⌈

Name	PotentiallyMovingObjectsLidarSensorTechnologySpecific
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	EntityLidarReflectivity `float` (optional)
Derived from	-
Description	Represents the Lidar Sensor Sepcific information.

⌋*(RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.2.40 PotentiallyMovingObjectInterface

[SWS_ADI_00239]{DRAFT} ⌈

Name	PotentiallyMovingObjectInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PotentiallyMovingObjectInterfaceHeader `InterfaceHeader`
	PotentiallyMovingObjectList `PotentiallyMovingObjects`
Derived from	-
Description	Represents the possible moving object informaiton provided by a camera,lidar, radar or Ultrasonic sensor.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3 Road Objects Interface Definition

This section lists all the data types used in road object interface.

9.1.3.1 RoadType

[SWS_ADI_00300]{DRAFT} ⌈

Name	RoadType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the ego-vehicle relevant type of the road.	
Range / Symbol	*Limit*	*Description*

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kHighway	0x00	Represents the highway.
kRural	0x01	Represents the rural road.
kCity	0x02	Represents the city road.
kOffRoad	0x03	Represents off the road.
kUnknown	0x04	Represents the road type unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.2   RoadSurfaceClassificationType

[SWS_ADI_00301]{DRAFT} ⌈

Name	RoadSurfaceClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the ego-vehicle relevant type of the road surface.	
Range / *Symbol*	*Limit*	*Description*
kRomanRoad	0x00	Roman Road.
kOffRoad	0x01	Off the road.
kFlat	0x02	Flat surface.
kBumpy	0x03	Bumpy surface.
kUnknown	0x04	Surface type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.3   RoadConditionClassificationType

[SWS_ADI_00302]{DRAFT} ⌈

Name	RoadConditionClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the ego-vehicle relevant type of the road surface.	
Range / *Symbol*	*Limit*	*Description*
kDry	0x00	Dry Road.
kWet	0x01	Wet road.
kSnow	0x02	Snow road.
kIce	0x03	Ice Road.
kUnknown	0x04	Road Condition is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.4 RoadMarkingType

[SWS_ADI_00303]{DRAFT} ⌈

Name	RoadMarkingType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the ego-vehicle relevant type of the road surface.	
Range / Symbol	*Limit*	*Description*
kSolid	0x00	The road marking is solid. It could also be a stop line.
kCentreLineDashedMarking	0x01	The centre line road marking is dashed.
kEdgeLineDashedMarking	0x02	The edge line road marking is dashed.
kTriangular	0x03	The road marking is a line of triangles.
kDoubleLineSolid	0x04	The road marking has two lines and the most inner line (w.r.t. the ego-vehicle) is solid.
kCentreLineDoubleLineDashed	0x05	The centre line road marking has two lines and the most inner line (w.r.t. the ego-vehicle) is dashed.
kMultipleLineSolid	0x06	The road marking has more than two lines and the most inner line (w.r.t. the ego-vehicle) is solid.
kCentreLineMultipleLine Dashed	0x07	The centre line road marking has more than two lines and the most inner line (w.r.t. the ego-vehicle) is dashed.
kEdgeLineMultipleLineDashed	0x08	The edge line road marking has more than two lines and the most inner line (w.r.t. the ego-vehicle) is dashed.
kBottsDotsCatsEyes	0x09	The road marking consists of Botts' dots or cats' eyes.
kAttentionMarker	0x0A	The road marking is an attention marker e.g. US, China and Japan.
kHatched	0x0B	The edge line road marking is dashed.
kBox	0x0C	The road marking of a junction.
kColouredArea	0x0D	The road marking is a coloured area.
kArrow	0x0E	The road marking is an arrow.
kZebraCrossing	0x0F	The road marking is a zebra crossing / continental / ladder.
kGenericSymbol	0x10	The edge line road marking has more than two lines and the most inner line (w.r.t. the ego-vehicle) is dashed.
kTrafficSignOnLane	0x11	The road marking is a traffic sign.
kGenericLine	0x12	The road marking is a generic line.
kParkingArea	0x13	The edge line road marking is dashed.
kTShapeMarkingBegin	0x14	The road marking is a parking T-shape beginning parking line.
kTShapeMarkingEnd	0x15	The road marking is a parking T-shape ending parking line.
kIShapeMarkingBegin	0x16	The road marking is a parking I-shape beginning parking line.
kIShapeMarkingEnd	0x17	The road marking is a zebra crossing / continental / ladder.
kLShapeMarkingBegin	0x18	The road marking is a parking L-shape beginning parking line.
kLShapeMarkingEnd	0x19	The road marking is a parking L-shape ending parking line.
kNets	0x1A	The road marking is a net, i.e. a non-stopping area.
kUnknown	0x1B	The road marking is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.5 ArrowDirection

[SWS_ADI_00304]{DRAFT} ⌈

Name	ArrowDirection	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify estimated direction of the displayed arrow.	
Range / Symbol	**Limit**	**Description**
kForeward	0x00	Arrow has an estimated direction of 0 rad to 0.
kLeft	0x01	Arrow has an estimated direction of +pi/2 rad to +90.
kRight	0x02	Arrow has an estimated direction of -pi/2 rad to -90.
kStraightLeft	0x03	Arrow is straight left and has an estimated direction of +pi/2 rad to +90.
kStraightRight	0x04	Arrow is straight right and has an estimated direction of -pi/2 rad to -90.
kTurningPointLeft	0x05	Arrow has an estimated direction of +pi/2 rad to +180.
kTurningPointRight	0x06	Arrow has an estimated direction of -pi/2rad to -180.
k45DegLeft	0x07	Arrow has an estimated direction of +pi/4 rad to +45.
k45DegRight	0x08	Arrow has an estimated direction of -pi/4 rad to -45.
kNoArrow	0x09	No arrow is present.
kUnknown	0x0A	The arrow direction is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.6 SignClassificationType

[SWS_ADI_00305]{DRAFT} ⌈

Name	SignClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the type of the sign as main traffic sign or road marking.	
Range / Symbol	**Limit**	**Description**
kStopSign	0x00	Stop sign.
kYieldSign	0x01	Yield sign.
kSpeedLimitSign	0x02	Speed limit sign.
kNoMainSign	0x03	No main sign, only supplementary signs.
kGreenArrowSign	0x04	Green Arrow Sign.
kHeightLimitSign	0x05	Height limit sign.
kEmptySign	0x06	Sign may be a changeable traffic sign without displaying a traffic sign symbol.
kUnknown	0x07	The Sign type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.7 SignValueUnit

[SWS_ADI_00306]{DRAFT} ⌈

Name	SignValueUnit	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the value unit of the linked sign.	
Range / **Symbol**	**Limit**	**Description**
kKilometrePerHour	0x00	Kilometre per hour
kMilePerHour	0x01	Mile per hour
kMeter	0x02	Meter
kKilometre	0x03	Kilometre
kFeet	0x04	Feet
kMile	0x05	Mile
kMetricTon	0x06	Metric Ton
kShortTon	0x07	Short Ton
kLongTon	0x08	LongTon.
kMinute	0x09	Minute
kHour	0x0A	Hour
Day	0x0B	Day
kWeekday	0x0C	Weekday
kPercentage	0x0D	Percentage
kUnknown	0x0E	Unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.8 ConnectionType

[SWS_ADI_00307]{DRAFT} ⌈

Name	ConnectionType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the type of connection of at least two road markings, polylines or polynomials.	
Range / **Symbol**	**Limit**	**Description**
kMerge	0x00	The connection of road markings is a merge of road markings.
kSplit	0x01	The connection of road markings is a split of road markings.
kInterconnection	0x02	The connection of road markings is an interconnection of road markings.
kExtension	0x03	The connection of road markings is an extension of two road markings.
kUnknown	0x04	The connection type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.9   PolynomialCoefficient

[SWS_ADI_00308]{DRAFT} ⌈

Name	PolynomialCoefficient
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	C0 `float`
	C1 `float`
	C2 `float`
	C3 `float`
Derived from	-
Description	Calculated coefficient. (m, 1, 1/m, 1/m2)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.10   ColourTone

[SWS_ADI_00309]{DRAFT} ⌈

Name	ColourTone
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ValidColourModel `ColourValueVector`
	ColourToneConfidenceObjectLevel `ProbabilityPercentage` (optional)
Derived from	-
Description	Represents the colour Information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.11   RoadObjectInterface

[SWS_ADI_00310]{DRAFT} ⌈

Name	RoadObjectInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RoadObjectInterfaceHeader `InterfaceHeader`
	RoadSurfaceObjectList `RoadSurface` (optional)
	RoadMarkingObjectList `RoadMarkings` (optional)
	RoadBoundariesObjectList `RoadBoundaries` (optional)
Derived from	-
Description	Represents the road object informaiton provided by a camera,lidar, radar or Ultrasonic sensor.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.12 PolynomialRangeX

[SWS_ADI_00311]{DRAFT} ⌈

Name	PolynomialRangeX
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Start `float`
	End `float`
Derived from	-
Description	Valid range of the polynomial [x Start, x End].(m, m)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.13 SupportedDataRangeX

[SWS_ADI_00312]{DRAFT} ⌈

Name	SupportedDataRangeX
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Start `float`
	End `float`
Derived from	-
Description	Supported range of the polynomial [x Start, x End] covered with measured points.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.14 PolylineInterpolationMethod

[SWS_ADI_00313]{DRAFT} ⌈

Name	PolylineInterpolationMethod	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To identify the type of connection of at least two road markings, polylines or polynomials.	
Range / Symbol	**Limit**	**Description**

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kLinear	0x00	Linear interpolation between two sequential points.
kSpline	0x01	Spline interpolation between two sequential points.
kCubic	0x02	Cubic interpolation between two sequential points.
kUnknown	0x03	Interpolation Method is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.15   VertexPointConfidence

[SWS_ADI_00314]{DRAFT} ⌈

Name	VertexPointConfidence
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Vpcx `ProbabilityPercentage`
	Vpcy `ProbabilityPercentage`
	Vpcz `ProbabilityPercentage`
Derived from	-
Description	Measured longitudinal, lateral and vertical distance of the vertex confidence.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.16   RoadBoundaryType

[SWS_ADI_00315]{DRAFT} ⌈

Name	RoadBoundaryType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Indicated the type of the road boundary.	
Range / *Symbol*	*Limit*	*Description*
kGuardrail	0x00	The road boundary is a guardrail.
kFence	0x01	The road boundary is a fence.
kWand	0x02	The road boundary is a wand, a wall, a building, etc.
kBarrier	0x03	The road boundary is a barrier.
kTensionCableSystem	0x04	The road boundary is a tension cable system.
kRoadEdge	0x05	The road boundary is a road edge e.g. grass, vegetation, sand, gravel, soil, etc.
kCurb	0x06	The road boundary is a curb stone.
kUnclassifiedElevated	0x07	The road boundary is an unclassified elevated structure.
kUnknown	0x08	The Road boundary type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.17 RoadObjectLaneAssociation

[SWS_ADI_00316]{DRAFT} ⌈

Name	RoadObjectLaneAssociation
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	To provides the association of a road marking or a road boundary to a lane with respect to the ego-vehicle lane.

Range / Symbol	Limit	Description
kEgoLane	0x00	The road marking is on the ego lane.
kEgoLeft1Lane	0x01	The road boundary separates the ego lane from 1st left neighbouring lane.The road marking is associated to the ego lane and the 1st left neighbouring lane.
kEgoRight1Lane	0x02	The road boundary separates the ego lane from 1st right neighbouring lane.The road marking is associated to the ego lane and the 1st right neighbouring lane.
kLeft1Lane	0x03	The road marking is on the 1st left neighbouring lane.
kRight1Lane	0x04	The road marking is on the 1st right neighbouring lane.
kLeft1Left2Lane	0x05	The road boundary separates the 1st left lane from the 2nd left neighbouring lane.The road marking is associated to the 1st lane and the 2nd left neighbouring lane.
kRight1Right2Lane	0x06	The road boundary separates the 1st right lane from the 2nd right neighbouring lane.The road marking is associated to the 1st lane and the 2nd right neighbouring lane.
kLeft2Lane	0x07	The road marking is on the 2nd left neighbouring lane.
kRight2Lane	0x08	The road marking is on the 2nd right neighbouring lane.
kLeftRoadEdge	0x09	The road boundary limits at the outer edge of the leftmost lane.
kRightRoadEdge	0x0A	The road boundary limits at the outer edge of the rightmost lane.
kUnknown	0x0B	The road object lane association is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.18 RoadBoundaries

[SWS_ADI_00317]{DRAFT} ⌈

Name	RoadBoundaries
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	RecognisedRoadBoundariesCapability `uint16_t` (optional)
	RecognizedRoadBoundariesStatus `RecognizedStatus` (optional)
	NumberOfValidRoadBoundaries `uint16_t`
	RoadBoundaryList `RoadBoundaryVector`
Derived from	-
Description	Represents the road boundaries Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.19 RoadSurfaceClassification

[SWS_ADI_00318]{DRAFT} ⌈

Name	RoadSurfaceClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SurfaceType `RoadSurfaceClassificationType`
	RoadSurfaceClassificationTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the road suface type and probability.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.20 SignState

[SWS_ADI_00319]{DRAFT} ⌈

Name	SignState	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	To provides the state of the sign.	
Range / **Symbol**	**Limit**	**Description**
kStatic	0x00	The message sign is not a variable message sign.
kVariable	0x01	The message sign is a variable message sign.
kSwitchedOff	0x02	The message sign is a variable message sign which is switched off.
kFullOutOfService	0x03	The message sign is full out of service.
kPartlyOutOfService	0x04	Part of the message sign is out of service.
kOutOfView	0x05	The message sign has rotated.
kUnknown	0x06	The sign state is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.21 RoadSurfaceClassificationsVector

[SWS_ADI_00320]{DRAFT} ⌈

Name	RoadSurfaceClassificationsVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	RoadSurfaceClassification
Derived from	-
Description	Represents a list of Road Surface.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.22 RoadSurfaceConditionClassification

[SWS_ADI_00321]{DRAFT} ⌈

Name	RoadSurfaceConditionClassification	
Namespace	ara::adi::sensoritf	
Kind	STRUCTURE	
Subelements	RoadConditionType	RoadConditionClassificationType
	RoadSurfaceConditionClassificationTypeConfidence	ProbabilityPercentage
Derived from	-	
Description	Represents the road suface condition and probability.	

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.23 RoadSurfaceConditionClassificationsVector

[SWS_ADI_00322]{DRAFT} ⌈

Name	RoadSurfaceConditionClassificationsVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	RoadSurfaceConditionClassification
Derived from	-
Description	Represents a list of Road Surface condition.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.24 RoadSurface

[SWS_ADI_00323]{DRAFT} ⌈

Name	RoadSurface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RoadType `RoadType`
	NumberOfValidRoadSurfaceClassifications `uint8_t`
	ValidRoadSurfaceClassifications `RoadSurfaceClassificationsVector`
	RoadSurfaceRoughness `float` (optional)
	NumberOfValidRoadSurfaceConditionClassifications `uint8_t` (optional)
	ValidRoadSurfaceConditionClassifications `RoadSurfaceConditionClassificationsVector`
	TrackQuality `uint16_t` (optional)
	PMOMeasurementStatusObjectLevel `MeasurementStatus` (optional)
Derived from	-
Description	Represents the road suface Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.25 ColourValueVector

[SWS_ADI_00324]{DRAFT} ⌈

Name	ColourValueVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`float`
Derived from	-
Description	Represents a list of Colour Value.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.26 RoadMarkingClassification

[SWS_ADI_00325]{DRAFT} ⌈

Name	RoadMarkingClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	ROMarkingType `RoadMarkingType`
	RoadMarkingTypeConfidence `ProbabilityPercentage`
	RoadObjectLaneAssociation `RoadObjectLaneAssociation` (optional)
	RoadObjectLaneAssociationConfidence `ProbabilityPercentage` (optional)
	ArrowOrientation `float` (optional)
	ArrowDirect `ArrowDirection` (optional)
	NumberOfValidSignClassifications `uint8_t` (optional)
	ValidSignClassificationsList `ValidSignClassificationVector` (optional)
	ColourTone `ColourTone` (optional)
Derived from	-
Description	Represents the road marking type Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.27 RoadMarkingClassificationVector

[SWS_ADI_00326]{DRAFT} ⌈

Name	RoadMarkingClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`RoadMarkingClassification`
Derived from	-
Description	Represents a list of Road Marking type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.28 RoadMarkingsInformation

[SWS_ADI_00327]{DRAFT} ⌈

Name	RoadMarkingsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidRoadMarkingClassifications `uint8_t`
	ValidRoadMarkingClassificationsList `RoadMarkingClassificationVector`
Derived from	-
Description	Represents the road marking type Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.29 ValidConnection

[SWS_ADI_00328]{DRAFT} ⌈

Name	ValidConnection
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Type `ConnectionType`
	ConnectionId `uint8_t`
Derived from	-
Description	Represents the road marking connection information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.30 ValidConnectionVector

[SWS_ADI_00329]{DRAFT} ⌈

Name	ValidConnectionVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ValidConnection`
Derived from	-
Description	Represents a list of Road marking connection information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.31 ValidPolynomial

[SWS_ADI_00330]{DRAFT} ⌈

Name	ValidPolynomial
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	PolynomialCoefficientY `PolynomialCoefficient`
	PolynomialCoefficientZ `PolynomialCoefficient`
	PolynomialYError `float` (optional)
	PolynomialZError `float` (optional)
	PolynomialRange `PolynomialRangeX`
	WidthPolynomial `float` (optional)
	WidthPolynomialError `float` (optional)
	WidthPolynomialsConfidence `ProbabilityPercentage` (optional)
	HeightPolynomial `float` (optional)
	HeightPolynomialError `float` (optional)
	HeightPolynomialConfidence `ProbabilityPercentage` (optional)
	NumberOfValidDataRanges `uint8_t` (optional)
	DataRangeList `SupportedDataRangeVector` (optional)
Derived from	-
Description	Represents the Polynomial Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.32 SupportedDataRangeVector

[SWS_ADI_00331]{DRAFT} ⌈

Name	SupportedDataRangeVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`SupportedDataRange`
Derived from	-
Description	Represents a list of supported data range information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.33 ValidPolynomialVector

[SWS_ADI_00332]{DRAFT} ⌈

Name	ValidPolynomialVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ValidPolynomial`
Derived from	-
Description	Represents a list of polynomials information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.34 Polynomials

[SWS_ADI_00333]{DRAFT} ⌈

Name	Polynomials
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidConnections `uint8_t`
	ValidConnectionList `ValidConnectionVector`
	NumberOfValidPolynomials `uint8_t`
	ValidPolynomialsList `ValidPolynomialVector`
Derived from	-
Description	Represents the Polynomials related Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.35 ValidVertice

[SWS_ADI_00334]{DRAFT} ⌈

Name	ValidVertice
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	VertexPoint `Point3D`
	VertexPointError `Point3DError`
	VertexPointConfidence `VertexPointConfidence` (optional)
	WidthVertex `float` (optional)
	WidthVertexError `float` (optional)
	WidthVertexConfidence `ProbabilityPercentage` (optional)
	HeightVertex `float` (optional)
	HeightVertexError `float` (optional)
	HeightVertexConfidence `ProbabilityPercentage` (optional)
Derived from	-
Description	Represents the vertex point Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.36 ValidVerticeVector

[SWS_ADI_00335]{DRAFT} ⌈

Name	ValidVerticeVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ValidVertice`
Derived from	-
Description	Represents a list of vertex points information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.37 ValidPolyline

[SWS_ADI_00336]{DRAFT} ⌈

Name	ValidPolyline
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidVertices `uint8_t`
	ValidVerticesList `ValidVerticeVector`
Derived from	-
Description	Represents the Polyline related Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.38 ValidPolylineVector

[SWS_ADI_00337]{DRAFT} ⌈

Name	ValidPolylineVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ValidPolyline`
Derived from	-
Description	Represents a list of Polyline information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.3.39   Polylines

[SWS_ADI_00338]{DRAFT} ⌈

Name	Polylines
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidConnections `uint8_t`
	ValidConnectionList `ValidConnectionVector`
	InterpolationMethod `PolylineInterpolationMethod`
	NumberOfValidPolylines `uint8_t`
	ValidPolylinesList `ValidPolylineVector`
Derived from	-
Description	Represents the Polylines Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.40   RoadMarking

[SWS_ADI_00339]{DRAFT} ⌈

Name	RoadMarking
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RoadMarkingsStatus `ObjectStatus`
	RoadMarkingsInformation `RoadMarkingsInformation`
	RoadMarkingsPolynomials `Polynomials` (optional)
	RoadMarkingsPolylines `Polylines` (optional)
Derived from	-
Description	Represents the road marking Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.41   RoadMarkingVector

[SWS_ADI_00340]{DRAFT} ⌈

Name	RoadMarkingVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`RoadMarking`
Derived from	-
Description	Represents a list of road marking object information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.42 RoadMarkings

[SWS_ADI_00341]{DRAFT} ⌈

Name	RoadMarkings
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RecognizedRoadMarkingsCapability `uint8_t` (optional)
	RecognizedRoadMarkingsStatus `RecognizedStatus` (optional)
	NumberOfValidRoadMarkings `uint16_t`
	ValidRoadMarkings `RoadMarkingVector`
Derived from	-
Description	Represents the road marking Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.43 ValidRoadBoundaryClassification

[SWS_ADI_00342]{DRAFT} ⌈

Name	ValidRoadBoundaryClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RoadBoundaryType `RoadBoundaryType`
	RoadBoundaryTypeConfidence `ProbabilityPercentage`
	RoadObjectLaneAssociation `RoadObjectLaneAssociation`
	RoadObjectLaneAssociationConfidence `ProbabilityPercentage`
	ColourTone `ColourTone` (optional)
Derived from	-
Description	Represents the road boundary type Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.44 ValidRoadBoundaryClassificationVector

[SWS_ADI_00343]{DRAFT} ⌈

Name	ValidRoadBoundaryClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ValidRoadBoundaryClassification
Derived from	-
Description	Represents a list of road boundary type object information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.45 RoadBoundariesInformation

[SWS_ADI_00344]{DRAFT} ⌈

Name	RoadBoundariesInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidRoadBoundaryClassifications uint8_t
	ValidRoadBoundaryClassificationsList ValidRoadBoundaryClassificationVector
Derived from	-
Description	Represents the road boundary type Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.46 ValidRoadBoundary

[SWS_ADI_00345]{DRAFT} ⌈

Name	ValidRoadBoundary
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RoadBoundariesStatus ObjectStatus
	RoadBoundariesInformation RoadBoundariesInformation
	RoadBoundariesPolynomials Polynomials (optional)
	RoadBoundariesPolylines Polylines (optional)
Derived from	-
Description	Represents the road boundary Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.47 RoadBoundaryVector

[SWS_ADI_00346]{DRAFT} ⌈

Name	RoadBoundaryVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ValidRoadBoundary
Derived from	-
Description	Represents a list of road boundary object information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.48 SupportedAxis

[SWS_ADI_00347]{DRAFT} ⌈

Name	SupportedAxis	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	uint8_t	
Description	To provide the information of the polynomial axis for Supported data range x {begin, end}.	
Range / Symbol	**Limit**	**Description**
kY	0x00	The signal Supported data range x {begin, end} corresponds to Y-axis polynomial line of Polynomial coefficient y {c0, c1, c2, c3}.
kZ	0x01	The signal Supported data range x {begin, end} corresponds to Z-axis polynomial line of Polynomial coefficient z {c0, c1, c2, c3}.
kYAndZ	0x02	The signal Supported data range x {begin, end} corresponds to both Y-axis polynomial line of Polynomial coefficient z {c0, c1, c2, c3} and Z-axis polynomial line of Polynomial coefficient z {c0, c1, c2, c3}.
kUnknown	0x03	Unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.49 SignClassification

[SWS_ADI_00348]{DRAFT} ⌈

Name	SignClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	SignClassificationType `SignClassificationType` (optional)
	SignClassificationTypeConfidence `ProbabilityPercentage` (optional)
	SignValue `float` (optional)
	SignValueUnit `SignValueUnit` (optional)
	SignState `SignState` (optional)
Derived from	-
Description	Represents the sign Classification Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.50 ValidSignClassificationVector

[SWS_ADI_00349]{DRAFT} ⌈

Name	ValidSignClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`SignClassification`
Derived from	-
Description	Represents a list of Sign Classification.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.3.51 SupportedDataRange

[SWS_ADI_00350]{DRAFT} ⌈

Name	SupportedDataRange
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SupportedDataRangeX `SupportedDataRangeX`
	SupportedAxis `SupportedAxis`
Derived from	-
Description	Supported data range info.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4 Static Objects Interface Definition

This section lists all the data types used in Static object interface.

9.1.4.1 GeneralLandmarkClassificationType

[SWS_ADI_00401]{DRAFT} ⌈

Name	GeneralLandmarkClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Classification of the general landmark.	
Range / Symbol	*Limit*	*Description*
kBridge	0x00	Bridge as general landmark.
kBeacon	0x01	Beacon as general landmark.
kCone	0x02	Cone as general landmark.
kBarrel	0x03	TBarrel as general landmark.
kGuidePost	0x04	Guide post as general landmark.
kLampPost	0x05	Lamp post as general landmark.
kVerticalStructure	0x06	Vertical structure as general landmark.
kOverheadObject	0x07	Overhead object as general landmark.
kRectangularStructure	0x08	Rectangular structure as general landmark.
kTunnel	0x09	Tunnel as general landmark.
kReflector	0x0A	Reflector as general landmark.
kUnknown	0x0B	The landmark class is unknown.

⌋ *(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.2 SignGeometry

[SWS_ADI_00402]{DRAFT} ⌈

Name	SignGeometry	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	The shape of the sign.	
Range / Symbol	*Limit*	*Description*
kCircle	0x00	Circle shape as sign geometry.
kTriangleTop	0x01	Triangle with tip pointing downwards as sign geometry.
kTriangleDown	0x02	Triangle with tip pointing upwards as sign geometry.
kSquare	0x03	Square shape as sign geometry.
kPole	0x04	Pole shape as sign geometry.
kRectangle	0x05	Rectangle shape as sign geometry.
kPlate	0x06	Plate with multiple traffic information.
kDiamond	0x07	Diamond shape as sign geometry.
kArrowLeft	0x08	Arrow left five edge shape as sign geometry.

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kArrowRight	0x09	Arrow right five edge shape as sign geometry.
kOctagon	0x0A	Octagon shape as sign geometry.
kUnknown	0x0B	The sign geometry is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.3   TrafficSignsInformation

[SWS_ADI_00403]{DRAFT} ⌈

Name	TrafficSignsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidSignClassifications `uint8_t` ValidMainSignClassificationsList `ValidMainSignClassificationVector` NumberOfValidLaneRelevanceClassifications `uint8_t` ValidLaneRelevanceClassificationList `ValidLaneRelevanceClassificationVector`
Derived from	-
Description	Represents the traffic sign Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.4   TrafficLightsInformation

[SWS_ADI_00404]{DRAFT} ⌈

Name	TrafficLightsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidStructureLightClassifications `uint8_t` ValidStructureLightClassificationsList `ValidStructureLightClassificationsVector`
Derived from	-
Description	Represents the traffic light Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.5 LaneRelevanceClassificationType

[SWS_ADI_00405]{DRAFT} ⌈

Name	LaneRelevanceClassificationType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Information if the sign is relevant for the ego-vehicle's lane, the nearest lane to the ego-vehicle or other relevant lanes.

Range / Symbol	*Limit*	*Description*
kOnTrack	0x00	Relevant on track of ego-vehicle.
kNextLaneLeft	0x01	Relevant for the next lane to the ego-vehicle on the left site.
kNextLaneRight	0x02	Relevant for the next lane to the ego-vehicle on the right site.
kNextNextLaneLeft	0x03	Relevant for the second next lane to the ego-vehicle on the left site.
kNextNextLaneRight	0x04	Relevant for the second next lane to the ego-vehicle on the right site.
kOnTrackAndNextLaneLeft	0x05	Relevant on track of ego-vehicle and the next left lane.
kOnTrackAndNextLaneRight	0x06	Relevant on track of ego-vehicle and the next right lane.
kMostLeftLane	0x07	Relevant for the leftest lane.
kMostRightLane	0x08	Relevant for the rightest lane.
kAllLanes	0x09	Relevant for all lanes, lane to the right and left site and on track.
kOtherLane	0x0A	Relevant for another far lane.
kUnknown	0x0B	The lane relevance is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.6 SupplementarySignClassificationType

[SWS_ADI_00406]{DRAFT} ⌈

Name	SupplementarySignClassificationType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	The type of the sign.

Range / Symbol	*Limit*	*Description*
kValidInformationBegin	0x00	Begin of valid zone.
kValidInformationEnd	0x01	End of valid zone.
kFrost	0x02	Frost sign.
kWetRoad	0x03	Wet road sign.
kDistance	0x04	Distance information.
kLimitation	0x05	Limitation information.
kUnknown	0x06	Supplementary Sign type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.7 RelativePosition

[SWS_ADI_00407]{DRAFT} ⌈

Name	RelativePosition
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	The relative position of the supplemental sign w.r.t. its main sign.

Range / Symbol	*Limit*	*Description*
kAbove	0x00	Supplementary sign is above the main sign.
kLeft	0x01	Message sign is full out of service.
kBelow	0x02	Supplementary sign is below the main sign.
kRight	0x03	Supplementary sign is right of the main sign.
kUnknown	0x04	Relative position is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.8 StructureLightClassificationType

[SWS_ADI_00408]{DRAFT} ⌈

Name	StructureLightClassificationType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	The traffic light can have different shapes.

Range / Symbol	*Limit*	*Description*
kVertical3	0x00	Three light sources vertical.
kHorizontal3	0x01	Three light sources horizontal.
kDogHouse	0x02	Multi light sources.
kUnknown	0x03	Structure is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.9 ColourClassificationType

[SWS_ADI_00409]{DRAFT} ⌈

Name	ColourClassificationType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE

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Derived from	uint8_t	
Description	Colour of light spot.	
Range / Symbol	Limit	Description
kRed	0x00	The spot colour is red.
kYellow	0x01	The spot colour is yellow.
kGreen	0x02	The spot colour is green.
kWhite	0x03	The spot colour is white.
kUnknown	0x04	The spot colour is unknown.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.10 GeneralLandmarksInformation

[SWS_ADI_00414]{DRAFT} ⌈

Name	GeneralLandmarksInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidGeneralLandmarkClassifications uint8_t
	LandmarkTypelist ValidGeneralLandmarkClassificationVector
Derived from	-
Description	Represents the ladmark type certainty Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.11 LightShapeClassificationType

[SWS_ADI_00411]{DRAFT} ⌈

Name	LightShapeClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	uint8_t	
Description	The light's shape.	
Range / Symbol	Limit	Description
kNoShape	0x00	No additional shape.
kArrowStraightAhead	0x01	Arrow straight ahead shape.
kArrowLeft	0x02	Arrow left shape.
kArrowDiagLeft	0x03	Arrow diagonal left shape.
kArrowStraightAheadLeft	0x04	Arrow straight ahead and arrow left shape.
kArrowRight	0x05	Arrow right shape.
kArrowDiagRight	0x06	Arrow diagonal right shape.

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kArrowStraightAheadRight	0x07	Arrow straight ahead and arrow right shape.
kArrowLeftRight	0x08	Arrow left and arrow right shape.
kArrowDown	0x09	Arrow down shape.
kArrowDownLeft	0x0A	Arrow U-turn left shape.
kArrowDownRight	0x0B	Arrow U-turn right shape.
kCross	0x0C	Cross figure.
kPedestrian	0x0D	Pedestrian figure.
kWalk	0x0E	Text walk figure.
kDontWalk	0x0F	Text don't walk figure.
kBicycle	0x10	Bicycle figure.
kPedestrianAndBicycle	0x11	Pedestrian and bicycle figure.
kCountdownSecond	0x12	Countdown in seconds figure.Signal Light shape value contains the value in s.
kCountdownPercent	0x13	Countdown in percent figure. Signal Light shape value contains the value in %.
kTram	0x14	Tram figure.
kBus	0x15	Bus figure.
kBusAndTram	0x16	Bus and Tram figure.
kUnknown	0x17	The light shape is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.12 LightModeClassificationType

[SWS_ADI_00410]{DRAFT} ⌈

Name	LightModeClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	The light's mode.	
Range / Symbol	**Limit**	**Description**
kContinuous	0x00	Light source is continuous on.
kBlinking	0x01	One light source is blinking
kTurnedOff	0x02	Light source is turned off.
kCounting	0x03	Light source with counting.
kUnknown	0x04	Light Mode type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.13   ValidGeneralLandmarkClassificationVector

[SWS_ADI_00413]{DRAFT} ⌈

Name	ValidGeneralLandmarkClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`GeneralLandmarkClassification`
Derived from	-
Description	Represents a list of Landmark type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.14   GeneralLandmarkClassification

[SWS_ADI_00412]{DRAFT} ⌈

Name	GeneralLandmarkClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	GeneralLandMarkType `GeneralLandmarkClassificationType`
	LandmarkClassProbability `ProbabilityPercentage`
Derived from	-
Description	Represents the general landmark type and probability.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.15   GeneralLandmarksPosition

[SWS_ADI_00415]{DRAFT} ⌈

Name	GeneralLandmarksPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Position `Point3D`
	PositionError `Point3DError`
	Orientation `Orientation3D` (optional)
	OrientationError `Orientation3DError` (optional)
	ReferencePoint `ReferencePoint` (optional)
Derived from	-
Description	Represents the landmark position.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.16 BoundingBox

[SWS_ADI_00416]{DRAFT} ⌈

Name	BoundingBox
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	BoxDimension `DimensionBox`
	BoxError `DimensionBoxError` (optional)
Derived from	-
Description	Represents the bounding box information of the static objects. This is only for camera

⌋(*RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014*)

9.1.4.17 GeneralLandmark

[SWS_ADI_00417]{DRAFT} ⌈

Name	GeneralLandmark
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	GeneralLandmarksStatus `ObjectStatus`
	LandmarksInformation `GeneralLandmarksInformation`
	GeneralLandmarksPos `GeneralLandmarksPosition`
	GeneralLandmarksBoundingBox `BoundingBox` (optional)
Derived from	-
Description	Represents the landmark Information.

⌋(*RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014*)

9.1.4.18 GeneralLandmarkVector

[SWS_ADI_00418]{DRAFT} ⌈

Name	GeneralLandmarkVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`GeneralLandmark`
Derived from	-
Description	Represents a list of Landmark.

⌋(*RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014*)

9.1.4.19 GeneralLandmarks

[SWS_ADI_00419]{DRAFT} ⌈

Name	GeneralLandmarks
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RecognisedGeneralLandmarksCapability `uint16_t` (optional)
	RecognizedGeneralLandmarksStatus `RecognizedStatus` (optional)
	NumberOfValidGeneralLandmarks `uint16_t`
	GeneralLandmarksList `GeneralLandmarkVector`
Derived from	-
Description	Represents the general landmarks Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.20 LaneRelevanceClassification

[SWS_ADI_00420]{DRAFT} ⌈

Name	LaneRelevanceClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LaneRelevanceClassificationType `LaneRelevanceClassificationType`
	LaneRelevanceClassificationTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the main sign lane relevance classification Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.21 MainSignClassification

[SWS_ADI_00421]{DRAFT} ⌈

Name	MainSignClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	MainSignClassificationType `SignClassificationType`
	SignClassificationTypeConfidence `ProbabilityPercentage`
	SignValue `float`
	MSignUnit `SignValueUnit`
	SignState `SignState`
	MSignGeometry `SignGeometry` (optional)
Derived from	-
Description	Represents the main sign Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.22 TrafficSignsPosition

[SWS_ADI_00422]{DRAFT} ⌈

Name	TrafficSignsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Position `Point3D`
	PositionError `Point3DError`
Derived from	-
Description	Represents the main sign position.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.23 SubObjectStatus

[SWS_ADI_00423]{DRAFT} ⌈

Name	SubObjectStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ExistenceProbabilityObjectLevel `ProbabilityPercentage`
	Age `uint64_t`
	NumberOfValidObservationsObjectLevel `uint32_t` (optional)
	ValidObservations `ValidObservationVector` (optional)
	TrackQuality `uint16_t` (optional)
	MeasurementStatusObjectLevel `MeasurementStatus`
Derived from	-
Description	Represents the dynamics of the static object.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.24 TrafficSignsSupplementarySignsInformation

[SWS_ADI_00424]{DRAFT} ⌈

Name	TrafficSignsSupplementarySignsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidSupplementarySignClassifications `uint8_t`
	ValidSupplementarySignClassifications `ValidSupplementarySignClassificationVector`
Derived from	-
Description	Represents the Supplementary sign type Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.25 SupplementarySignClassification

[SWS_ADI_00425]{DRAFT} ⌈

Name	SupplementarySignClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SupplementarySignClassificationType `SupplementarySignClassificationType`
	SupplementarySignClassificationTypeConfidence `ProbabilityPercentage`
	SSignValue `float`
	SSignUnit `SignValueUnit`
	SignState `SignState`
Derived from	-
Description	Represents the Supplementary sign Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.26 TrafficSignsSupplementarySignsPosition

[SWS_ADI_00426]{DRAFT} ⌈

Name	TrafficSignsSupplementarySignsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SSRelativePosition `RelativePosition`
	RelativePosOrder `uint8_t`
Derived from	-
Description	Represents the Supplementary sign position Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.27 TrafficSignsSupplementarySign

[SWS_ADI_00427]{DRAFT} ⌈

Name	TrafficSignsSupplementarySign
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TrafficSignsSupplementarySignsStatus `SubObjectStatus`
	TrafficSignsSupplementarySignsInformation `TrafficSignsSupplementarySignsInformation`
	TrafficSignsSupplementarySignsColourTone `ColourTone`
	TrafficSignsSupplementarySignsPos `TrafficSignsSupplementarySignsPosition`
Derived from	-
Description	Represents the Supplementary sign Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.28 TrafficSignsSupplementarySignVector

[SWS_ADI_00428]{DRAFT} ⌈

Name	TrafficSignsSupplementarySignVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`TrafficSignsSupplementarySign`
Derived from	-
Description	Represents a list of Supplementary sign.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.29 TrafficSignsSupplementarySigns

[SWS_ADI_00429]{DRAFT} ⌈

Name	TrafficSignsSupplementarySigns
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	NumberOfValidTrafficSupplementarySigns `uint8_t`
	SSignList `TrafficSignsSupplementarySignVector`
Derived from	-
Description	Represents the Supplementary signs Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.30 TrafficSign

[SWS_ADI_00430]{DRAFT} ⌈

Name	TrafficSign
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TrafficSignsStatus `ObjectStatus`
	TrafficSignsInformation `TrafficSignsInformation`
	ColourTone `ColourTone`
	TrafficSignsPosition `TrafficSignsPosition`
	TrafficSignsSupplementarySigns `TrafficSignsSupplementarySigns`
Derived from	-
Description	Represents the traffic sign Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.31 ValidTrafficSignVector

[SWS_ADI_00431]{DRAFT} ⌈

Name	ValidTrafficSignVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`TrafficSign`
Derived from	-
Description	Represents a list of traffic sign.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.32 TrafficSigns

[SWS_ADI_00432]{DRAFT} ⌈

Name	TrafficSigns
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RecognisedTrafficSignsCapability `uint16_t` (optional)
	RecognizedTrafficSignsStatus `RecognizedStatus` (optional)
	NumberOfValidTrafficSigns `uint16_t`
	TrafficSignsList `ValidTrafficSignVector`
Derived from	-
Description	Represents the traffic sings Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.33 StructureLightClassification

[SWS_ADI_00433]{DRAFT} ⌈

Name	StructureLightClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	StructureLightClassificationType `StructureLightClassificationType`
	StructureLightClassificationTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the traffic light type certainty Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.34 TrafficLightsPosition

[SWS_ADI_00434]{DRAFT} ⌈

Name	TrafficLightsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	PositionObjectLevel `Point3D`
	PositionObjectLevelError `Point3DError`
	Orientation `Orientation3D` (optional)
	OrientationError `Orientation3DError` (optional)
	ReferencePoint `ReferencePoint` (optional)
	MinimumVisibilityDistance `uint16_t`
Derived from	-
Description	Represents the traffic light position.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.35   ColourClassification

[SWS_ADI_00435]{DRAFT} ⌈

Name	ColourClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ColourClassificationType `ColourClassificationType`
	ColourClassificationTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the colour type and probability.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.36   ColourClassificationVector

[SWS_ADI_00436]{DRAFT} ⌈

Name	ColourClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ColourClassification`
Derived from	-
Description	Represents a list of colour type.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.37 TrafficLightsSpotsColour

[SWS_ADI_00437]{DRAFT} ⌈

Name	TrafficLightsSpotsColour
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidColourClassifications `uint8_t`
	ValidColourClassificationVectorList `ColourClassificationVector`
	NumberOfValidLightModeClassifications `uint8_t`
	ValidLightModeClassificationVectorList `LightModeClassificationVector`
Derived from	-
Description	Represents the trafic light colour type certainty Information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.38 LightModeClassification

[SWS_ADI_00438]{DRAFT} ⌈

Name	LightModeClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LightModeClassificationType `LightModeClassificationType`
	LightModeClassificationTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the traffic light mode type and probability.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.39 LightModeClassificationVector

[SWS_ADI_00439]{DRAFT} ⌈

Name	LightModeClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`LightModeClassification`
Derived from	-
Description	Represents a list of traffic light mode type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.40 LightShapeClassification

[SWS_ADI_00440]{DRAFT} ⌈

Name	LightShapeClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LightShapeClassificationType `LightShapeClassificationType`
	LightShapeClassificationTypeConfidence `ProbabilityPercentage`
	LightShapeValue `uint8_t` (optional)
Derived from	-
Description	Represents the trafic light shape Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.41 TrafficLightsSpotsInformation

[SWS_ADI_00441]{DRAFT} ⌈

Name	TrafficLightsSpotsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidLightShapeClassifications `uint8_t`
	ValidLightShapeClassificationList `LightShapeClassificationVector`
Derived from	-
Description	Represents the trafic light spot shape Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.42 TrafficLightsSpotsPosition

[SWS_ADI_00442]{DRAFT} ⌈

Name	TrafficLightsSpotsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PositionObjectLevel `Point3D`
	PositionObjectLevelError `Point3DError` (optional)
	NumberOfValidLaneRelevanceClassifications `uint8_t`
	ValidLaneRelevanceClassificationList `ValidLaneRelevanceClassificationVector`
Derived from	-
Description	Represents the Traffic Light Spot position.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.43 TrafficLightSpot

[SWS_ADI_00443]{DRAFT} ⌈

Name	TrafficLightSpot
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TrafficLightsSpotsStatus `SubObjectStatus`
	TrafficLightsSpotsInformation `TrafficLightsSpotsInformation`
	TrafficLightsSpotsColour `TrafficLightsSpotsColour`
	TrafficLightsSpotsPosition `TrafficLightsSpotsPosition`
Derived from	-
Description	Represents the traffic light sopt Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.44 TrafficLightSpotVector

[SWS_ADI_00444]{DRAFT} ⌈

Name	TrafficLightSpotVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`TrafficLightSpot`
Derived from	-
Description	Represents a list of traffic light spot.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.45 TrafficLightSpots

[SWS_ADI_00445]{DRAFT} ⌈

Name	TrafficLightSpots
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TotalNumberOfTrafficLightSpots `uint8_t` (optional)
	TotalNumberOfTrafficLightSpotsConfidence `ProbabilityPercentage` (optional)
	NumberOfValidTrafficLightSpots `uint8_t`
	ValidTrafficSLightSpotList `TrafficLightSpotVector`
Derived from	-
Description	Represents the trafic light spots Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.46 TrafficLight

[SWS_ADI_00446]{DRAFT} ⌈

Name	TrafficLight
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	TrafficLightsStatus `ObjectStatus`
	StructureLightsInformation `TrafficLightsInformation`
	TrafficLightsPosition `TrafficLightsPosition`
	TrafficLightsBoundingBox `BoundingBox` (optional)
	TrafficLightsSpots `TrafficLightSpots`
Derived from	-
Description	Represents the traffic light Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.47 ValidTrafficLightVector

[SWS_ADI_00447]{DRAFT} ⌈

Name	ValidTrafficLightVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`TrafficLight`
Derived from	-
Description	Represents a list of traffic light.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.48 TrafficLights

[SWS_ADI_00448]{DRAFT} ⌈

Name	TrafficLights
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RecognisedTrafficLightsCapability `uint16_t` (optional)
	RecognisedTrafficLightsStatus `RecognizedStatus` (optional)
	NumberOfValidTrafficLights `uint8_t`
	TrafficLightList `ValidTrafficLightVector`
Derived from	-
Description	Represents the traffic lights Information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.49 StaticObjectInterface

[SWS_ADI_00449]{DRAFT} ⌈

Name	StaticObjectInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RoadObjectInterfaceHeader `InterfaceHeader`
	StaticObjectGeneralLandmarks `GeneralLandmarks` (optional)
	StaticObjectTrafficSigns `TrafficSigns` (optional)
	StaticObjectTrafficLights `TrafficLights` (optional)
Derived from	-
Description	Represents the static object informaiton provided by a camera,lidar, radar or Ultrasonic sensor.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.50 ValidSupplementarySignClassificationVector

[SWS_ADI_00450]{DRAFT} ⌈

Name	ValidSupplementarySignClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`SupplementarySignClassification`
Derived from	-
Description	Represents a list of Supplementary sign classification.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.51 ValidMainSignClassificationVector

[SWS_ADI_00451]{DRAFT} ⌈

Name	ValidMainSignClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`MainSignClassification`

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Derived from	-
Description	Represents a list of sign classification.

⌉*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.52 ValidLaneRelevanceClassificationVector

[SWS_ADI_00452]{DRAFT} ⌈

Name	ValidLaneRelevanceClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	LaneRelevanceClassification
Derived from	-
Description	Represents a list of lane Revelance classification.

⌉*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.53 LightShapeClassificationVector

[SWS_ADI_00453]{DRAFT} ⌈

Name	LightShapeClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	LightShapeClassification
Derived from	-
Description	Represents the list of light shape classification

⌉*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.4.54 ValidStructureLightClassificationsVector

[SWS_ADI_00454]{DRAFT} ⌈

Name	ValidStructureLightClassificationsVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	StructureLightClassification

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Derived from	-
Description	Represents the list of valid structure light classification

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5 Feature Level Interface Definition

This section lists all the data types used in Camera feature and Ultrasonic feature interfaces.

9.1.5.1 ShapeType

[SWS_ADI_00601]{DRAFT} ⌈

Name	ShapeType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Classification of the general landmark.	
Range / Symbol	Limit	Description
kPoint	0x00	Shape is a point.
kBox	0x01	Shape is a box (2 or 3 points).
kEllipse	0x02	Shape is an ellipse (2 or 3 points).
kPolygon	0x03	Shape is a polygon (3 or more points).
kPolyline	0x04	Shape is a polyline (2 or more points).
kPointCloud	0x05	Shape is a point cloud (2 or more points).
kUnknown	0x06	Shape type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.2 ShapeClassificationType

[SWS_ADI_00602]{DRAFT} ⌈

Name	ShapeClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	The classification type for the shape.	
Range / Symbol	Limit	Description

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kBackground	0x00	Shape is classified as background entity.
kForeground	0x01	Shape is classified as foreground entity.
kFlat	0x02	Shape is classified as flat entity.
kUpright	0x03	Shape is classified as upright entity.
kGround	0x04	Shape is classified as ground entity.
kBuilding	0x05	Shape is classified as building entity.
kVegetation	0x06	Shape is classified as vegetation entity.
kRoad	0x07	Shape is classified as road entity.
kNonRoad	0x08	Shape is classified as non-road entity.
kSidewalk	0x09	Shape is classified as sidewalk entity.
kPedestrian	0x0A	Shape is classified as pedestrian entity.
kVehicle	0x0B	Shape is classified as vehicle entity.
kTrafficSign	0x0C	Shape is classified as traffic sign entity.
kPedestrianFront	0x0D	Shape is classified as pedestrian front-view entity.
kPedestrianSide	0x0E	Shape is classified as pedestrian side-view entity.
kPedestrianRear	0x0F	Shape is classified as pedestrian rear-view entity.
kUnknown	0x10	Shape Class type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.3   UltrasonicFeatureClassificationType

[SWS_ADI_00603]{DRAFT} ⌈

Name	UltrasonicFeatureClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Ultrasonic feature type contains information about the current measurement of this feature.	
Range / Symbol	Limit	Description
kPoint	0x00	Defined by one point.
kLineSegment	0x01	Defined by two or more points.
kUnknown	0x02	The Ultrasonic feature type is unknown.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.4 TrilaterationStatus

[SWS_ADI_00606]{DRAFT} ⌈

Name	TrilaterationStatus
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Information if feature is trilaterated with multiple signal ways or is not trilaterated.
Range / Symbol	*Limit*	*Description*
kNormal	0x00	The 2D position {x, y} measurement is based on at least three points.
kNotTrilaterated	0x01	The 2D position {x, y} measurement is based on less than three points.
kUnknown	0x02	The trilateration status is unknown.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.5 MeasurementStatusFeature

[SWS_ADI_00607]{DRAFT} ⌈

Name	MeasurementStatusFeature
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Information about the measurement status of the feature.
Range / Symbol	*Limit*	*Description*
kInitialization	0x00	No information available.
kTracked	0x01	Not measured in this cycle.
kMeasured	0x02	Current position of this feature was measured.
kDelete	0x03	Tracking will be deleted in the next cycle.
kNew	0x04	Shape is a polyline (2 or more points).
kUnknown	0x05	The measurement status is unknown.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.6 ShapeClassification

[SWS_ADI_00608]{DRAFT} ⌈

Name	ShapeClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ShapeClassificationType `ShapeClassificationType`
	ShapeClassificationTypeConfidence `ProbabilityPercentage`

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Derived from	-
Description	Represents the shape class type information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.7 ValidShapeClassificationsVector

[SWS_ADI_00609]{DRAFT} ⌈

Name	ValidShapeClassificationsVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ShapeClassification`
Derived from	-
Description	Represents a list of shape class type information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.8 CameraFeaturesShapeInformation

[SWS_ADI_00610]{DRAFT} ⌈

Name	CameraFeaturesShapeInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidShapeClassificationsFeatureLevel `uint8_t`
	ValidShapeClassificationsList `ValidShapeClassificationsVector`
Derived from	-
Description	Represents the shape related information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.9 ShapePoint

[SWS_ADI_00611]{DRAFT} ⌈

Name	ShapePoint
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PointExistenceProbability `ProbabilityPercentage`
	Position `Point3D`
	PositionError `Point3DError`

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Derived from	-
Description	Represents the Shape points information.

⌊*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.10   ValidShapePointVector

[SWS_ADI_00612]{DRAFT} ⌈

Name	ValidShapePointVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ShapePoint
Derived from	-
Description	Represents a list of shape point information.

⌊*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.11   ShapePoints

[SWS_ADI_00613]{DRAFT} ⌈

Name	ShapePoints
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ShapeType ShapeType
	NumberOfValidShapePoints uint16_t
	ValidShapePointsList ValidShapePointVector
Derived from	-
Description	Represents the Shape points related information.

⌊*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.12   ShapeReferencePoint

[SWS_ADI_00614]{DRAFT} ⌈

Name	ShapeReferencePoint
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	PointExistenceProbability `ProbabilityPercentage`
	Position `Point3D`
	PositionError `Point3DError`
	ShapeSurfaceNormal `Point3D` (optional)
	ShapeSurfaceNormalErroor `Point3DError` (optional)
	TranslationRate `Point3D` (optional)
	TranslationRateError `Point3DError` (optional)
	RotationRate `Orientation3D` (optional)
	RotationRateError `Orientation3DError` (optional)
	ScaleChange `float` (optional)
	ScaleChangeError `float` (optional)
Derived from	-
Description	Represents the Shape reference points information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.13 ValidShapeReferencePointVector

[SWS_ADI_00615]{DRAFT} ⌈

Name	ValidShapeReferencePointVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ShapeReferencePoint`
Derived from	-
Description	Represents a list of shape Reference point information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.14 ShapeReferencePoints

[SWS_ADI_00616]{DRAFT} ⌈

Name	ShapeReferencePoints
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidShapeReferencePointsFeatureLevel `uint8_t`
	ShapeReferencePointsList `ValidShapeReferencePointVector`
Derived from	-
Description	Represents the Shape Reference points related information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.15 FeatureStatus

[SWS_ADI_00617]{DRAFT} ⌈

Name	FeatureStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ExistenceProbabilityFeatureLevel `ProbabilityPercentage`
	FeatureId `uint16_t` (optional)
	FeatureGroupingId `uint16_t` (optional)
	ObjectIdReferenceFeatureLevel `uint16_t` (optional)
	TimeStampDifferenceFeatureLevel `uint64_t`
	NumberOfValidObservationsFeatureLevel `uint8_t` (optional)
	ValidObservations `ValidObservationVector` (optional)
Derived from	-
Description	Represents the dynamics of the features.

⌋*(RS_ADI_00001, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.5.16 CameraFeature

[SWS_ADI_00618]{DRAFT} ⌈

Name	CameraFeature
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	CameraFeaturesStatus `FeatureStatus`
	CameraFeaturesShapeInformation `CameraFeaturesShapeInformation`
	CameraFeaturesShapeColourTone `ColourTone`
	CameraFeaturesShapePoints `ShapePoints`
	CameraFeaturesShapeReferencePoints `ShapeReferencePoints` (optional)
Derived from	-
Description	Represents the Camera feature information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.17 ValidCameraFeatureVector

[SWS_ADI_00619]{DRAFT} ⌈

Name	ValidCameraFeatureVector
Namespace	ara::adi::sensoritf
Kind	VECTOR

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Subelements	CameraFeature
Derived from	-
Description	Represents a list of camerqa feature information.

$\rfloor$*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.18 CameraFeatureInterface

[SWS_ADI_00620]{DRAFT} $\lceil$

Name	CameraFeatureInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	CameraFeatureInterfaceHeader InterfaceHeader
	RecognisedFeaturesCapability uint32_t (optional)
	RecognisedFeaturesStatus RecognizedStatus (optional)
	NumberOfValidFeatures uint32_t
	ValidCameraFeaturesList ValidCameraFeatureVector
Derived from	-
Description	Represents the camera feature interface information.

$\rfloor$*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.19 UltrasonicSegmentInformation

[SWS_ADI_00621]{DRAFT} $\lceil$

Name	UltrasonicSegmentInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidUltrasonicFeatureClassifications uint8_t
	ValidUltrasonicFeatureClassificationsList ValidUltrasonicFeatureClassificationVector
Derived from	-
Description	Represents the segment information.

$\rfloor$*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.20 UltrasonicFeatureClassification

[SWS_ADI_00622]{DRAFT} ⌈

Name	UltrasonicFeatureClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	UltrasonicFeatureClassificationType `UltrasonicFeatureClassificationType`
	UltrasonicFeatureClassificationTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the Ultrasonic segmengt type information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.21 SegmentPoint

[SWS_ADI_00623]{DRAFT} ⌈

Name	SegmentPoint
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Position `Point3D`
	PositionError `Point3DError`
	OrientationPitch `float` (optional)
	OrientationPitchError `float` (optional)
	Height `float` (optional)
	HeightError `float` (optional)
	VelocityUltrasonic `Point2D` (optional)
	VelocityUltrasonicError `Point2DError` (optional)
	TrilaterationStatus `TrilaterationStatus`
	MeasurementStatusFeatureLevel `MeasurementStatusFeature` (optional)
Derived from	-
Description	Represents the valid segment point information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.5.22 ValidSegmentPointVector

[SWS_ADI_00624]{DRAFT} ⌈

Name	ValidSegmentPointVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`SegmentPoint`

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Derived from	-
Description	Represents a list of segment points information.

⌋(*RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.5.23 UltrasonicSegmentPoints

[SWS_ADI_00625]{DRAFT} ⌈

Name	UltrasonicSegmentPoints
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidPoints `uint16_t`
	ValidSegmentPointsList `ValidSegmentPointVector`
Derived from	-
Description	Represents the segment points information.

⌋(*RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.5.24 UltrasonicFeature

[SWS_ADI_00626]{DRAFT} ⌈

Name	UltrasonicFeature
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	UltrasonicFeaturesStatus `FeatureStatus`
	UltrasonicFeaturesSegmentInformation `UltrasonicSegmentInformation`
	UltrasonicFeaturesSegmentPoints `UltrasonicSegmentPoints`
Derived from	-
Description	Represents the Ultrasonic feature information.

⌋(*RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.5.25 ValidUltrasonicFeatureVector

[SWS_ADI_00627]{DRAFT} ⌈

Name	ValidUltrasonicFeatureVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`UltrasonicFeature`

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Derived from	-
Description	Represents a list of Ultrasonic feature information.

⌋(*RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.5.26 UltrasonicFeatureInterface

[SWS_ADI_00628]{DRAFT} ⌈

Name	UltrasonicFeatureInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	UltrasonicFeatureInterfaceHeader `InterfaceHeader`
	RecognisedFeaturesCapability `uint32_t` (optional)
	RecognisedFeaturesStatus `RecognizedStatus` (optional)
	NumberOfValidFeatures `uint32_t`
	ValidUltrasonicFeaturesList `ValidUltrasonicFeatureVector`
Derived from	-
Description	Represents the Ultrasonic feature interface information.

⌋(*RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.5.27 ValidUltrasonicFeatureClassificationVector

[SWS_ADI_00629]{DRAFT} ⌈

Name	ValidUltrasonicFeatureClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`UltrasonicFeatureClassification`
Derived from	-
Description	Represents a list of Ultrasonic feature classification information.

⌋(*RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.6 Detection Level Interface Definition

This section lists all the data types used in Lidar, Radar, Camera , and Ultrasonic Detection interfaces.

9.1.6.1 Position3DSpheric

[SWS_ADI_00701]{DRAFT} ⌈

Name	Position3DSpheric
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	elevation `float`
	azimuth `float`
	distance `float` (optional)
Derived from	-
Description	Represents a 3 dimension vector, the unit will be vary according to the refering data type.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.2 Position3DSphericError

[SWS_ADI_00702]{DRAFT} ⌈

Name	Position3DSphericError
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	elevation `float`
	azimuth `float`
	distance `float` (optional)
Derived from	-
Description	Error values of the {Azimuth, Elevation, Distance} to the Position {Azimuth, Elevation, Distance}.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.3 DetectionClassificationType

[SWS_ADI_00703]{DRAFT} ⌈

Name	DetectionClassificationType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	The classification type for the shape.	
Range / Symbol	**Limit**	**Description**
kNoClassification	0x00	Detection entity is not classified.

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kNoise	0x01	Detection entity is noise.
kObstacle	0x02	Detection entity is an obstacle for vehicle.
kUnderdriveable	0x03	Detection entity is underdrivable for vehicle.
kOverdrivable	0x04	Detection entity is overdrivable for vehicle.
kNearest	0x05	Detection entity is the nearest detection of a measurement.
kStrongest	0x06	Detection entity has the strongest signal of a measurement.
kUnknown	0x07	The detection type is unknown.

⌋*(RS_ADI_00002, RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.6.4 DetectionsPosition

[SWS_ADI_00704]{DRAFT} ⌈

Name	DetectionsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	DetectionPosition `Position3DSpheric`
	DetectionPositionError `Position3DSphericError`
Derived from	-
Description	Represents the position of the detections.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.5 UltrasonicDetectionsPosition

[SWS_ADI_00705]{DRAFT} ⌈

Name	UltrasonicDetectionsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Distance `float`
	DistanceError `float`
	HeightUltrasonic `float` (optional)
	HeightUltrasonicError `float` (optional)
Derived from	-
Description	Represents the position of the detections.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.6 DetectionStatus

[SWS_ADI_00706]{DRAFT} ⌈

Name	DetectionStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ExistenceProbabilityDetectionLevel `ProbabilityPercentage`
	ObjectID `uint16_t` (optional)
	FeatureID `uint16_t` (optional)
	TimeStampDifferenceDetectionLevel `uint64_t`
Derived from	-
Description	Represents the dynamics of the detections.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.7 DetectionClassification

[SWS_ADI_00707]{DRAFT} ⌈

Name	DetectionClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	DetectionClassificationType `DetectionClassificationType` (optional)
	DetectionClassificationTypeConfidence `ProbabilityPercentage` (optional)
Derived from	-
Description	Represents the detection class type information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.8 ValidDetectionClassificationVector

[SWS_ADI_00708]{DRAFT} ⌈

Name	ValidDetectionClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`DetectionClassification`
Derived from	-
Description	Represents a list of detection class type information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.9 RadarDetectionsInformation

[SWS_ADI_00709]{DRAFT} ⌈

Name	RadarDetectionsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RadarCrossSection `float`
	RadarCrossSectionError `float` (optional)
	SignalToNoiseRatioDetectionLevel `float`
	SignalToNoiseRatioDetectionLevelError `float` (optional)
	MultiTargetProbability `ProbabilityPercentage` (optional)
	AmbiguityID `uint16_t` (optional)
	DetectionAmbiguityProbability `ProbabilityPercentage` (optional)
	FreeSpaceProbability `ProbabilityPercentage` (optional)
	NumberOfValidDetectionClassifications `uint8_t` (optional)
	ValidDetectionClassificationList `ValidDetectionClassificationVector` (optional)
Derived from	-
Description	Represents the radar detection information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.10 RadarDetection

[SWS_ADI_00710]{DRAFT} ⌈

Name	RadarDetection
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RadarDetectionsStatus `DetectionStatus`
	RadarDetectionsInformation `RadarDetectionsInformation`
	RadarDetectionsPosition `DetectionsPosition`
	RadarDetectionsDynamics `DetectionsDynamics`
Derived from	-
Description	Represents the Radar detection information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.11 ValidRadarDetectionVector

[SWS_ADI_00711]{DRAFT} ⌈

Name	ValidRadarDetectionVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`RadarDetection`
Derived from	-
Description	Represents a list of radar detection information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.12 DetectionsDynamics

[SWS_ADI_00712]{DRAFT} ⌈

Name	DetectionsDynamics
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RelativeVelocityRadialDistance `float`
	RelativeVelocityRadialDistanceError `float` (optional)
Derived from	-
Description	Represents the dynamics of the detections.

⌋*(RS_ADI_00002, RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_-00014)*

9.1.6.13 RadarDetectionsInterface

[SWS_ADI_00714]{DRAFT} ⌈

Name	RadarDetectionsInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RadarDetectionInterfaceHeader `InterfaceHeader`
	RecognisedDetectionsCapability `uint32_t` (optional)
	RecognizedDetectionsStatus `RecognizedStatus` (optional)
	NumberOfValidDetections `uint32_t`
	ValidRadarDetectionsList `ValidRadarDetectionVector`
Derived from	-
Description	Represents the radar detection interface information.

⌋*(RS_ADI_00003, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.14 LidarDetectionsInformation

[SWS_ADI_00715]{DRAFT} ⌈

Name	LidarDetectionsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Reflectivity `float`
	ReflectivityError `float` (optional)
	FreeSpaceProbability `ProbabilityPercentage` (optional)
	NumberOfValidDetectionClassifications `uint8_t` (optional)
	ValidDetectionClassificationList `ValidDetectionClassificationVector` (optional)
Derived from	-
Description	Represents the lidar detection information.

⌋*(RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.15 LidarDetection

[SWS_ADI_00716]{DRAFT} ⌈

Name	LidarDetection
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LidarDetectionStatus `DetectionStatus`
	LidarDetectionsInformation `LidarDetectionsInformation`
	LidarDetectionsPosition `LidarDetectionsPosition`
	LidarDetectionsDynamics `DetectionsDynamics`
Derived from	-
Description	Represents the lidar detection information.

⌋*(RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.16 ValidLidarDetectionVector

[SWS_ADI_00717]{DRAFT} ⌈

Name	ValidLidarDetectionVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`LidarDetection`
Derived from	-
Description	Represents a list of lidar detection information.

⌋*(RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.17 LidarDetectionsPosition

[SWS_ADI_00718]{DRAFT} ⌈

Name	LidarDetectionsPosition
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	DetectionPosition `Position3DSpheric`
	DetectionPositionError `Position3DSphericError`
	HeightLidar `float` (optional)
	HeightLidarError `float` (optional)
Derived from	-
Description	Represents the position of the detections.

⌋*(RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.18 LidarDetectionsInterface

[SWS_ADI_00719]{DRAFT} ⌈

Name	LidarDetectionsInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	LidarDetectionInterfaceHeader `InterfaceHeader`
	RecognisedDetectionsCapability `uint32_t` (optional)
	RecognizedDetectionsStatus `RecognizedStatus` (optional)
	NumberOfValidLidarDetections `uint32_t`
Derived from	-
Description	Represents the lidar detection interface information.

⌋*(RS_ADI_00002, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.19 DetectionShapeClassification

[SWS_ADI_00720]{DRAFT} ⌈

Name	DetectionShapeClassification
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ShapeClassificationTypeDetectionLevel `ShapeClassificationType`
	ShapeClassificationTypeConfidenceDetectionLevel `ProbabilityPercentage`
Derived from	-
Description	Represents the shape classification type information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.20 ValidDetectionShapeClassificationVector

[SWS_ADI_00721]{DRAFT} ⌈

Name	ValidDetectionShapeClassificationVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	DetectionShapeClassification
Derived from	-
Description	Represents a list of shape class type information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.21 CameraShapesShapeInformation

[SWS_ADI_00722]{DRAFT} ⌈

Name	CameraShapesShapeInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	FreeSpaceProbability ProbabilityPercentage (optional)
	NumberOfValidShapeClassificationsDetectionLevel uint8_t
	ValidShapeClassificationsList ValidDetectionShapeClassificationVector
	ShapeAmbiguityID uint16_t (optional)
Derived from	-
Description	Represents the Camera detection related information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.22 ShapePointDetectionLevel

[SWS_ADI_00723]{DRAFT} ⌈

Name	ShapePointDetectionLevel
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PointExistenceProbabilityDetectionLevel ProbabilityPercentage
	Position Position3DSpheric
	PositionError Position3DSphericError
Derived from	-
Description	Represents the Shape point information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.23 ValidShapePointDetectionLevelVector

[SWS_ADI_00724]{DRAFT} ⌈

Name	ValidShapePointDetectionLevelVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ShapePointDetectionLevel
Derived from	-
Description	Represents a list of shape point information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.24 CameraShapesShapePoints

[SWS_ADI_00725]{DRAFT} ⌈

Name	CameraShapesShapePoints
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	ShapeTypeDetectionLevel ShapeType
	NumberOfValidShapePointsDetectionLevel uint16_t
	ValidShapePointsDetectionLevelList ValidShapePointDetectionLevelVector
Derived from	-
Description	Represents the Shape points related information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.25 CameraShape

[SWS_ADI_00726]{DRAFT} ⌈

Name	CameraShape
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	CameraShapesStatus DetectionStatus
	CameraShapeInformation CameraShapesShapeInformation
	CameraShapesShapeColourTone ColourTone
	CameraShapePoints CameraShapesShapePoints
	CameraShapeReferencePoints CameraShapesShapeReferencePoints (optional)
Derived from	-
Description	Represents the Camera detection information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.26 ValidCameraShapeVector

[SWS_ADI_00727]{DRAFT} ⌈

Name	ValidCameraShapeVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	CameraShape
Derived from	-
Description	Represents a list of Camera detection information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.27 ShapeReferencePointDetectionLevel

[SWS_ADI_00728]{DRAFT} ⌈

Name	ShapeReferencePointDetectionLevel
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	PointExistenceProbabilityDetectionLevel ProbabilityPercentage
	Position Position3DSpheric
	PositionError Position3DSphericError
	TranslationRate Point3D (optional)
	TranslationRateError Point3DError (optional)
Derived from	-
Description	Represents the Shape reference point information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.28 ValidShapeReferencePointDetectionLevelVector

[SWS_ADI_00729]{DRAFT} ⌈

Name	ValidShapeReferencePointDetectionLevelVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	ShapeReferencePointDetectionLevel
Derived from	-
Description	Represents a list of shape reference point information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.29 CameraShapesShapeReferencePoints

[SWS_ADI_00730]{DRAFT} ⌈

Name	CameraShapesShapeReferencePoints
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidShapeReferencePointsDetectionLevel `uint16_t`
	ValidShapeReferencePointsPointsDetectionLevelList `ValidShapeReferencePointDetectionLevelVector`
Derived from	-
Description	Represents the Shape reference points related information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.30 CameraDetectionsInterface

[SWS_ADI_00731]{DRAFT} ⌈

Name	CameraDetectionsInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	CameraDetectionInterfaceHeader `InterfaceHeader`
	RecognizedDetectionsCap `uint32_t` (optional)
	RecognizedDetectionsStatus `RecognizedStatus` (optional)
	NumberOfValidShapes `uint32_t`
	ValidCameraDetectionList `ValidCameraShapeVector`
Derived from	-
Description	Represents the Camera detection interface information.

⌋*(RS_ADI_00001, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.31 UltrasonicDetectionsInformation

[SWS_ADI_00732]{DRAFT} ⌈

Name	UltrasonicDetectionsInformation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SecondSensorIdReference `float` (optional)
	Reflectivity `float` (optional)
Derived from	-
Description	Represents the Ultrasonic detection information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.32   UltrasonicDetection

[SWS_ADI_00733]{DRAFT} ⌈

Name	UltrasonicDetection
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	UltrasonicDetectionStatus `DetectionStatus`
	UltrasonicDetectionsInformation `UltrasonicDetectionsInformation`
Derived from	-
Description	Represents the Ultrasonic detection information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.33   ValidUltrasonicDetectionVector

[SWS_ADI_00734]{DRAFT} ⌈

Name	ValidUltrasonicDetectionVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`UltrasonicDetection`
Derived from	-
Description	Represents a list of Ultrasonic detection information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.6.34   UltrasonicDetectionsInterface

[SWS_ADI_00735]{DRAFT} ⌈

Name	UltrasonicDetectionsInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	UltrasonicDetectionsInterfaceHeader `InterfaceHeader`
	RecognizedDetectionsCap `uint8_t` (optional)
	RecognizedDetectionsStatus `RecognizedStatus` (optional)
	NoValidDetections `uint32_t`
	ValidUltrasonicDetectionList `ValidUltrasonicDetectionVector`
Derived from	-
Description	Represents the Ultrasonic detection interface information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7 Supportive Sensor Interfaces Definition

This section lists all the data types used in Supportive Sensor interfaces.

9.1.7.1 SegmentAzimuth

[SWS_ADI_00501]{DRAFT} ⌈

Name	SegmentAzimuth
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	FOV defined by opening angles in sensor XY-plane. (rad, rad)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.2 SegmentElevation

[SWS_ADI_00502]{DRAFT} ⌈

Name	SegmentElevation
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	FOV defined by opening angles in sensor XZ-plane. (rad, rad)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.3 AnglePoint3D

[SWS_ADI_00503]{DRAFT} ⌈

Name	AnglePoint3D
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	RadialDistance `float`
	Azimuth `float`
	Elevation `float`
Derived from	-
Description	The angle point, and the units are depending on the specific use cases.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.4   BeamDivergence

[SWS_ADI_00504]{DRAFT} ⌈

Name	BeamDivergence
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Azimuth `float`
	Elevation `float`
Derived from	-
Description	The Beam divergence {azimuth, elevation} of the sensor within the specified segment is the full width at half maximum (FWHM) of the beam (given as the angle in rad).(rad, rad)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.5   SegmentsStatus

[SWS_ADI_00505]{DRAFT} ⌈

Name	SegmentsStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SegmentAzimuthInformation `SegmentAzimuth`
	SegmentElevationInformation `SegmentElevation`
	MeasurementGridResolutionInformation `AnglePoint3D` (optional)
	BeamDivergence `BeamDivergence` (optional)
	RangeGain `ProbabilityPercentage` (optional)
	Blockage `BlockageStatus`
Derived from	-
Description	Represents the sensor performance information.

⌋*(RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.6 BlockageStatus

[SWS_ADI_00506]{DRAFT} ⌈

Name	BlockageStatus
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Defines the overall blockage of the FOV segment.

Range / Symbol	Limit	Description
kFullBlockage	0x00	The sensor is completely blocked, no more feature and functionality working due to blockage condition.
kPartialBlockageHighImpact	0x01	The sensor has detected a blockage condition which has a significant impact on sensor performance (e.g. range).
kPartialBlockageMediumImpact	0x02	The sensor has detected a blockage condition which already has impact on sensor performance (e.g. range).
kPartialBlockageLowImpact	0x03	The sensor detects that a blockage condition is present or is increasing, but the degree of blockage has not yet had a significant impact on sensor performance and functionality.
kDefect	0x04	The full specified range is blocked, due to e.g. a pixel defect. This segment may overlap with other segments.
kNone	0x05	Normal mode.
kUnknown	0x06	The blockage Status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.7 FieldOfViewReduction

[SWS_ADI_00507]{DRAFT} ⌈

Name	FieldOfViewReduction
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidFieldOfViewReductionReasons `uint8_t` ValidFieldOfViewReductionReasonsList `ValidFieldOfViewReductionReasonsVector`
Derived from	-
Description	Represents the FOV reduction related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.8 FieldOfViewReductionReasonType

[SWS_ADI_00508]{DRAFT} ⌈

Name	FieldOfViewReductionReasonType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Defines the overall blockage of the FOV segment.
Range / Symbol	**Limit**	**Description**
kSnow	0x00	Range reduction due to snow.
kRain	0x01	Range reduction due to rain.
kClutter	0x02	Range reduction due to clutter.
kFlyingLeaves	0x03	Range reduction due to flying leaves.
kNightAndLights	0x04	Range reduction due to night and lights.
kShades	0x05	Range reduction due to shades.
kContrastIssues	0x06	Range reduction due to contrast issues.
kJamming	0x07	Range reduction, e.g. electromagnetic compatibility.
kDeviceInterference	0x08	Range reduction, e.g. electromagnetic compatibility.
kSand	0x09	Range reduction due to sand.
kWetRoads	0x0A	Range reduction due to wet roads.
kGhosts	0x0B	Range reduction due to ghosts.
kSnowOnSensorSurface	0x0C	Near range blockage due to snow on the sensor surface.
kWaterOnSensorSurface	0x0D	Near range blockage due to water on the sensor surface.
kSoilOnSensorSurface	0x0E	Near range blockage due to soil on the sensor surface.
kScratchesOnSensorSurface	0x0F	Near range blockage due to scratches on the sensor surface.
kUnknown	0x10	FOV Reduction type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.9 ValidFieldOfViewReductionReasonsVector

[SWS_ADI_00509]{DRAFT} ⌈

Name	ValidFieldOfViewReductionReasonsVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	FieldOfViewReductionReasons
Derived from	-
Description	Represents a list of FOV reduction reason type information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.10 FieldOfViewReductionReasons

[SWS_ADI_00510]{DRAFT} ⌈

Name	FieldOfViewReductionReasons
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	FOVReductionReasonType `FieldOfViewReductionReasonType`
	FieldOfViewReductionReasonTypeConfidence `ProbabilityPercentage`
Derived from	-
Description	Represents the FOV Reduction type information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.11 RecognizedObjectType

[SWS_ADI_00511]{DRAFT} ⌈

Name	RecognizedObjectType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Defines the overall blockage of the FOV segment.	
Range / Symbol	*Limit*	*Description*
kCar	0x00	Recognized entity is a car.
kTruck	0x01	Recognized entity is a truck.
kMotorBike	0x02	Recognized entity is a motor bike.
kBicycle	0x03	Recognized entity is a bicycle.
kPedestrian	0x04	Recognized entity is a pedestrian.
kMovingObject	0x05	Recognized entity is an unknown moving object.
kRoadBoundary	0x06	Recognized entity is a road boundary.
kRoadMarking	0x07	Recognized entity is a road marking.
kStaticObject	0x08	Recognized entity is a static object.
kTrafficSign	0x09	Recognized entity is a traffic sign.
kTrafficLight	0x0A	Recognized entity is a traffic light.
kUnknown	0x0B	The Recognized Object Type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.12 DetectionRange

[SWS_ADI_00512]{DRAFT} ⌈

Name	DetectionRange
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Min `float`
	Max `float`
Derived from	-
Description	Sensor detection range for one object type with Minimum classification rate this object type and Maximum false positive rate for this object type. (m, m)

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.13 RecognisableObjectTypes

[SWS_ADI_00513]{DRAFT} ⌈

Name	RecognisableObjectTypes
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	RecognisedObjectType `RecognizedObjectType`
	DetectionRangeInformation `DetectionRange`
	TruePositiveRate `ProbabilityPercentage` (optional)
	FalsePositiveRate `ProbabilityPercentage` (optional)
	PositivePredictiveValue `ProbabilityPercentage` (optional)
Derived from	-
Description	Represents the Object Detection Rate information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.14 ValidRecognisableObjectTypesVector

[SWS_ADI_00514]{DRAFT} ⌈

Name	ValidRecognisableObjectTypesVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`RecognisableObjectTypes`
Derived from	-
Description	Represents a list of Object Detection Rate information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.15   RealWorldObjectRecognitionCapabilities

[SWS_ADI_00515]{DRAFT} ⌈

Name	RealWorldObjectRecognitionCapabilities
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidRecognisableObjectTypes `uint8_t`
	ValidRecognisableObjectTypesList `ValidRecognisableObjectTypesVector`
Derived from	-
Description	Represents the Object Detection Rate related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.16   ReferenceTargetType

[SWS_ADI_00516]{DRAFT} ⌈

Name	ReferenceTargetType	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Provides the classification of the sensor's recognition capabilities for defined reference targets.	
Range / Symbol	Limit	Description
kPatternA	0x00	The recognised entity is a defined pattern A.
kPatternB	0x01	The recognised entity is a defined pattern B.
kPatternC	0x02	The recognised entity is a defined pattern C.
kUnknown	0x0B	The Reference Target Type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.17   ReferenceTargetTypes

[SWS_ADI_00517]{DRAFT} ⌈

Name	ReferenceTargetTypes
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	ReferenceTargetType `ReferenceTargetType` (optional)
	RadarCrossSectionReferenceTarget `float` (optional)
	ReflectivityReferenceTarget `float` (optional)
	DetectionRangeInformation `DetectionRange`
	TruePositiveRate `ProbabilityPercentage` (optional)
	RelativeRadialVelocityRange `RelativeRadialVelocityRange` (optional)
	SignalToNoiseRatioSupportiveLevel `float`
	SpatialSeparability `AnglePoint3D` (optional)
	VelocitySeparability `AnglePoint3D` (optional)
Derived from	-
Description	Represents the Reference Target Rate information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.18 ValidReferenceTargetTypesVector

[SWS_ADI_00518]{DRAFT} ⌈

Name	ValidReferenceTargetTypesVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	`ReferenceTargetTypes`
Derived from	-
Description	Represents a list of Reference Target Rate information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.19 ReferenceTargetRecognitionCapabilities

[SWS_ADI_00519]{DRAFT} ⌈

Name	ReferenceTargetRecognitionCapabilities
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidReferenceTargetTypes `uint8_t`
	ValidReferenceTargetTypesList `ValidReferenceTargetTypesVector`
Derived from	-
Description	Represents the Reference Target Rate related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.20 RelativeRadialVelocityRange

[SWS_ADI_00520]{DRAFT} ⌈

Name	RelativeRadialVelocityRange
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	Begin `float`
	End `float`
Derived from	-
Description	Describes the relative radial speed range in the sensor coordinate system.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.21 PeformanceSegment

[SWS_ADI_00521]{DRAFT} ⌈

Name	PeformanceSegment
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SegmentsStatus `SegmentsStatus`
	FieldOfViewReductionInformation `FieldOfViewReduction`
	RealWorldObjectRecognitionCapabilitiesInformation `RealWorldObjectRecognitionCapabilities` (optional)
	ReferenceTargetRecognitionCapabilitiesInforamtion `ReferenceTargetRecognitionCapabilities` (optional)
Derived from	-
Description	Represents the Performance sgement information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.22 SensorOperationMode

[SWS_ADI_00523]{DRAFT} ⌈

Name	SensorOperationMode	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Status information of the sensor.	
Range / **Symbol**	**Limit**	**Description**
kSensorMeasuringActive	0x00	Sensor is active and performs measurements.

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kSensorMeasuringDisabled	0x01	Sensor is disabled and performs no measurement at the moment.
kSensorMeasuringTestmode	0x02	Sensor is in active measurement mode, however in test mode.
kUnknown	0x03	The Sensor operation mode is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.23 SensorDefectDetected

[SWS_ADI_00524]{DRAFT} ⌈

Name	SensorDefectDetected	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Signal for a sensor defect is detected.	
Range / Symbol	*Limit*	*Description*
kSensorFullyFunctional	0x00	Sensor has no defects detected.
kNotFullyFunctionalDueTo Defect	0x01	Sensor has detected defects. Sensor can measure with limited performance.
kOutOfOrder	0x02	Sensor has detected defects and cannot perform measurements anymore.
kUnknown	0x03	The sensor defect detected is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.24 SensorDefectReason

[SWS_ADI_00525]{DRAFT} ⌈

Name	SensorDefectReason	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Signal for detailed information why the signal Sensor defect detected is notifying a sensor problem.	
Range / Symbol	*Limit*	*Description*
kNoDefectDetected	0x00	No defects detected by the sensor.
kInternalMemoryError	0x01	Sensor has detected an internal memory error.
kElectronicDefect	0x02	The sensor has detected an electronic defect.
kThermalDefect	0x03	Sensor has detected a thermal problem error.
kSurgeDefect	0x04	Sensor has detected a surge defect.
kCalibrationError	0x05	Sensor has detected a calibration error.

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kImplausibleSensor Parametrisation	0x06	Sensor has detected an implausible parametrisation.
kMechanicalDefect	0x07	Sensor has detected a mechanical defect.
kSoftwareDefect	0x08	Sensor has detected a software defect.
kComputingPowerNotSufficient	0x09	Sensor has detected a to low power supply.
kOutOfTimeSyncronisation	0x10	Sensor has detected an out of time synchronisation.
kSensorExternalDisturbed	0x11	Sensor has detected an external disturbance.
kUnknown	0x12	The sensor defect reason is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.25 ValidSensorOperationModeVector

[SWS_ADI_00526]{DRAFT} ⌈

Name	ValidSensorOperationModeVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	SensorOperationMode
Derived from	-
Description	Represents a list of input singal information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.26 StatusSupplyVoltage

[SWS_ADI_00527]{DRAFT} ⌈

Name	StatusSupplyVoltage	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	uint8_t	
Description	Signal for the current Status supply voltage status.	
Range / Symbol	*Limit*	*Description*
kWithinLimits	0x00	Supply voltage is optimal.
kLow	0x01	Supply voltage is out of valid range. Supply voltage is too low.
kPreLow	0x02	Supply voltage still in the valid range, but close to the limit and expected to leave the valid range soon.
kPreHigh	0x03	Supply voltage still in the valid range, but close to the limit and expected to leave the valid range soon.
kHigh	0x04	Supply voltage is out of valid range. Supply voltage is too high.
kUnknown	0x05	The sensor supply voltage status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.27 SensorTemperatureStatus

[SWS_ADI_00528]{DRAFT} ⌈

Name	SensorTemperatureStatus
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Signal for the current Sensor temperature status status.
Range / Symbol	*Limit*	*Description*
kUnderTemperature	0x00	No measurement updates available.
kPreUnderTemperature	0x01	Close before under temperature.
kTemperatureInLimits	0x02	Normal mode.
kPreOverTemperature	0x03	Close before over temperature.
kOverTemperature	0x04	No measurement updates available.
kUnknown	0x05	The sensor temperature status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.28 ValidPeformanceSegmentVector

[SWS_ADI_00529]{DRAFT} ⌈

Name	ValidPeformanceSegmentVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	PeformanceSegment
Derived from	-
Description	Represents a list of performance segment information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.29 SensorInputSignalType

[SWS_ADI_00530]{DRAFT} ⌈

Name	SensorInputSignalType
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Classification of the Sensor input signal - type , which defines a group of sensor input signals received by the sensor.

Range / Symbol	Limit	Description
kDynamicMotionControl	0x00	Dynamic motion control sensor input signals.
kVehicleDynamic	0x01	Vehicle dynamic sensor input signals.
kUnknown	0x02	Sensor input signal type is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.30 SensorInputSignalStatus

[SWS_ADI_00531]{DRAFT} ⌈

Name	SensorInputSignalStatus
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Enumeration if valid input signals for Sensor input signal - type are received by the sensor.

Range / Symbol	Limit	Description
kValid	0x00	Normal mode.
kImplausible	0x01	Signal in context of sensor signals is not plausible compared with other signals or internal calculations.
kMissing	0x02	Signal was never received.
kOufOfRange	0x03	Signal violated the signal range.
kTimeout	0x04	Signal was received, however not in time period as expected.
kUnknown	0x05	The sensor input signal status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.31 SensorExternalDisturbed

[SWS_ADI_00532]{DRAFT} ⌈

Name	SensorExternalDisturbed
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Signal about the disturbance of the sensor by an external source.

Range / Symbol	Limit	Description
kFullDisturbance	0x00	The sensor is completely disturbed, no more feature and functionality working due to external disturbance.
kDisturbanceHighImpact	0x01	The sensor has detected an external disturbance which has a significant impact on sensor performance.
kDisturbanceMediumImpact	0x02	The sensor has detected an external disturbance which already has impact on sensor performance.
kDisturbanceLowImpact	0x03	The sensor detects that an external disturbance is present or is increasing, but the degree of disturbance has not yet had a significant impact on sensor performance and functionality.
kNone	0x04	Normal mode.
kUnknown	0x05	The sensor external disturbed status is unknown.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.7.32 SensorTransmitPowerReduced

[SWS_ADI_00533]{DRAFT} ⌈

Name	SensorTransmitPowerReduced
Namespace	ara::adi::sensoritf
Kind	TYPE_REFERENCE
Derived from	`uint8_t`
Description	Enumeration if the sensor works with full output power.

Range / Symbol	Limit	Description
kNormalOperation	0x00	Transmit output power normal.
kOutputPowerLimited	0x01	Transmit output power reduced.
kUnknown	0x02	Sensor Transmit Power status is unknown.

⌋(*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*, *RS_ADI_00012*, *RS_ADI_00013*, *RS_ADI_00014*)

9.1.7.33 StatusSensorHeating

[SWS_ADI_00534]{DRAFT} ⌈

Name	StatusSensorHeating	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Status of the sensor heating.	
Range / Symbol	Limit	Description
kHeatingOff	0x00	No heating active.
kHeatingLevel	0x01	Sensor heating active.
kHeatingError	0x02	Sensor heating is defect.
kUnknown	0x03	The sensor heating status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.34 StatusSensorCleaning

[SWS_ADI_00535]{DRAFT} ⌈

Name	StatusSensorCleaning	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	
Description	Status of the sensor cleaning.	
Range / Symbol	Limit	Description
kCleaningIdle	0x00	Sensor cleaning is not active.
kCleaningActive	0x01	Sensor cleaning is active
kCleaningNeeded	0x02	Sensor cleaning should be performed.
kUnknown	0x03	The sensor cleaning status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.35 SensorTimeSync

[SWS_ADI_00536]{DRAFT} ⌈

Name	SensorTimeSync	
Namespace	ara::adi::sensoritf	
Kind	TYPE_REFERENCE	
Derived from	`uint8_t`	

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Description	Status of the sensor time synchronisation.	
Range / Symbol	**Limit**	**Description**
kWithinLimits	0x00	Time synchronization inside limits.
kOutOfLimits	0x01	Time synchronization time accuracy limits violated.
kTimeout	0x02	Time synchronization timeout elapsed (no valid time synchronization cycle within timeout interval).
kOffset	0x03	Time offset value. Requires: Sensor time sync offset value
kUnknown	0x04	The time synchronization status is unknown.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.36 SensorPerformanceSegments

[SWS_ADI_00537]{DRAFT} ⌈

Name	SensorPerformanceSegments
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	NumberOfValidFieldOfViewSegments `uint8_t`
	ValidPeformanceSegmentsList `ValidPeformanceSegmentVector`
Derived from	-
Description	Represents the performance segments related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.37 SensorPerformanceInterface

[SWS_ADI_00538]{DRAFT} ⌈

Name	SensorPerformanceInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SensorPerformanceInterfaceHeader `InterfaceHeader`
	SensorPerformanceSegmentsInformation `SensorPerformanceSegments`
Derived from	-
Description	Represents the sensor performance interface information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.38 InputSignalStatus

[SWS_ADI_00541]{DRAFT} ⌈

Name	InputSignalStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	InputSignalType SensorInputSignalType
	InputSingalStatus SensorInputSignalStatus
Derived from	-
Description	Represents the input signal information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.39 ValidInputSignalStatusVector

[SWS_ADI_00542]{DRAFT} ⌈

Name	ValidInputSignalStatusVector
Namespace	ara::adi::sensoritf
Kind	VECTOR
Subelements	InputSignalStatus
Derived from	-
Description	Represents a list of input singal information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.40 SensorHealthStatus

[SWS_ADI_00543]{DRAFT} ⌈

Name	SensorHealthStatus
Namespace	ara::adi::sensoritf
Kind	STRUCTURE

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Subelements	NumberOfValidSensorOperationModes `uint8_t`
	ValidSensorOperationModesList `ValidSensorOperationModeVector`
	SensorDefectDetectedInformation `SensorDefectDetected`
	SensorDefectReasonInformation `SensorDefectReason`
	SupplyVoltageStatus `StatusSupplyVoltage`
	SensorTemperatureStatus `SensorTemperatureStatus`
	NumberOfValidSensorInputSignalStatuses `uint8_t`
	ValidSenorInputSignalStatusList `ValidInputSignalStatusVector`
	SensorExternalDisturbed `SensorExternalDisturbed` (optional)
	SensorTransmitPowerReduced `SensorTransmitPowerReduced` (optional)
	SensorHeatingStatus `StatusSensorHeating` (optional)
	SensorCleaningStatus `StatusSensorCleaning` (optional)
	SensorTimeSync `SensorTimeSync` (optional)
	SensorTimeSyncOffsetValue `float` (optional)
Derived from	-
Description	Represents the sensor health related information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.1.7.41 SensorHealthInformationInterface

[SWS_ADI_00547]{DRAFT} ⌈

Name	SensorHealthInformationInterface
Namespace	ara::adi::sensoritf
Kind	STRUCTURE
Subelements	SensorHealthInformationInterfaceHeader `InterfaceHeader`
	SensorHealthStatusInformation `SensorHealthStatus` (optional)
	CalibrationInformation `Calibration` (optional)
	SensorCluster `SensorCluster` (optional)
Derived from	-
Description	Represents the sensor Health interface information.

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004, RS_ADI_00012, RS_ADI_00013, RS_ADI_00014)*

9.2 Service Interfaces

This chapter lists all provided service interfaces of the `ADI`.

9.2.1 Sensor Interfaces Port

[SWS_ADI_01000]{DRAFT} ⌈

Name	SensorInterface		
Kind	ProvidedPort	Interface	`SensorInterface`
Description			
Variation			

⌋ (*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*)

9.2.2 Object level Interfaces

[SWS_ADI_01001]{DRAFT} ⌈

Name	PotentiallyMovingObjectsService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	CapVector	
	Description	The capability vector of the service indicates the presence of the optional signals of the event.
	Type	`CapabilityVector`
	Variation	
	Direction	OUT

Events	PotentiallyMovingObjectInterfaceEvent
Description	The potentially moving object list is reported by a sensor in a measurement cycle.
Type	`PotentiallyMovingObjectInterface`

⌋ (*RS_ADI_00001*, *RS_ADI_00002*, *RS_ADI_00003*, *RS_ADI_00004*)

[SWS_ADI_01002]{DRAFT} ⌈

Name	RoadObjectsService
NameSpace	ara::adi::sensoritf

Method	Capability
Description	Get the capability vector of the service.
FireAndForget	false
Parameter	capVector

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	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	RoadObjectInterfaceEvent
Description	The road object list is reported by a sensor in a measurement cycle.
Type	RoadObjectInterface

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004)*

[SWS_ADI_01003]{DRAFT} ⌈

Name	StaticObjectsService
NameSpace	ara::adi::sensoritf

Method	Capability
Description	Get the capability vector of the service.
FireAndForget	false
Parameter	capVector
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	StaticObjectInterfaceEvent
Description	The static object list is reported by a sensor in a measurement cycle.
Type	StaticObjectInterface

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004)*

9.2.3 Feature level Interfaces

[SWS_ADI_01004]{DRAFT} ⌈

Name	CameraFeaturesService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	CameraFeatureInterfaceEvent
Description	The camera feature list is reported by a sensor during one measurement cycle.
Type	CameraFeatureInterface

⌋*(RS_ADI_00001)*

[SWS_ADI_01005]{DRAFT} ⌈

Name	UltrasonicFeaturesService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	UltrasonicFeatureInterfaceEvent
Description	The Ultrasonic Feature list is reported by a sensor in a measurement cycle.
Type	UltrasonicFeatureInterface

⌋*(RS_ADI_00004)*

9.2.4 Detection level Interfaces

[SWS_ADI_01006]{DRAFT} ⌈

Name	RadarDetectionsService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	RadarDetectionsInterfaceEvent
Description	The radar detection list is reported by a sensor in a measurement cycle.
Type	RadarDetectionsInterface

⌋*(RS_ADI_00003)*

[SWS_ADI_01007]{DRAFT} ⌈

Name	LidarDetectionsService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	LidarDetectionsInterfaceEvent
Description	The Lidar detection list is reported by a sensor in a measurement cycle.
Type	LidarDetectionsInterface

⌋*(RS_ADI_00002)*

[SWS_ADI_01008]{DRAFT} ⌈

Name	CameraDetectionsService
NameSpace	ara::adi::sensoritf

Method	Capability
Description	Get the capability vector of the service.
FireAndForget	false

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Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	CameraDetectionsEvent
Description	The camera detection list is reported by a sensor in a measurement cycle.
Type	CameraDetectionsInterface

⌋*(RS_ADI_00001)*

[SWS_ADI_01009]{DRAFT} ⌈

Name	UltrasonicDetectionsService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	UltrasonicDetectionsInterfaceEvent
Description	The Ultrasonic Detection list is reported by a sensor in a measurement cycle.
Type	UltrasonicDetectionsInterface

⌋*(RS_ADI_00004)*

9.2.5 Supportive Interfaces

[SWS_ADI_01010]{DRAFT} ⌈

Name	SensorPerformanceService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	SensorPerformanceInterfaceEvent
Description	The sensor performance information is reported by a sensor.
Type	SensorPerformanceInterface

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004)*

[SWS_ADI_01011]{DRAFT} ⌈

Name	SensorHealthInformationService
NameSpace	ara::adi::sensoritf

Method	Capability	
Description	Get the capability vector of the service.	
FireAndForget	false	
Parameter	capVector	
	Description	The capability vector of the servie indicates the presence of the optional signals of the event.
	Type	CapabilityVector
	Variation	
	Direction	OUT

Events	SensorHealthInformationInterfaceEvent
Description	The sensor health information is reported by a sensor.
Type	SensorHealthInformationInterface

⌋*(RS_ADI_00001, RS_ADI_00002, RS_ADI_00003, RS_ADI_00004)*

10 Capability Configuration

10.1 Object Level Service

10.1.1 PMObjectsService Capability Vector

The table below includes the capability bit setting for the optional elements for PMObjectsService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in PMObjectService	Option
1	Interface ID(A.1.4)	InterfaceId	Autosar Service
2	Cycle Counter(A.1.6.1)	CycleCounter	ara com
3	Interface cycle time(A.1.7)	InterfaceCycleTime	ara com
4	Interface cycle time variation(A.1.8)	InterfaceCycleTimeVariation	ara com
5	Information vehicle coordinate system(Table 46)	InformationVehicleCoordinateSystem	0
6	Information sensor pose(Table 46)	InformationSensorPose	0
7	Sensor origin point x(A.1.22)	SensorOriginPointX	ara com
8	Sensor origin point y(A.1.22)	SensorOriginPointY	ara com
9	Sensor origin point z(A.1.22)	SensorOriginPointZ	ara com
10	Sensor origin point x error(A.1.23)	SensorOriginPointXError	ara com
11	Sensor origin point y error(A.1.23)	SensorOriginPointYError	ara com
12	Sensor origin point z error(A.1.23)	SensorOriginPointZError	ara com
13	Sensor origin point x x error (A.1.23)	SensorOriginPointXXError	ara com
14	Sensor origin point x y error(A.1.23)	SensorOriginPointXYError	ara com
15	Sensor origin point x z error(A.1.23)	SensorOriginPointXZError	ara com
16	Sensor origin point y x error(A.1.23)	SensorOriginPointYXError	ara com
17	Sensor origin point y y error A.1.23)	SensorOriginPointYYError	ara com
18	Sensor origin point y z error (A.1.23)	SensorOriginPointYZError	ara com
19	Sensor origin point z x error(A.1.23)	SensorOriginPointZXError	ara com
20	Sensor origin point z y error (A.1.23)	SensorOriginPointZYError	ara com
21	Sensor origin point z z error (A.1.23)	SensorOriginPointZZError	ara com
22	Sensor orientation yaw(A.1.24)	SensorOrientationYaw	ara com
23	Sensor orientation pitch(A.1.24)	SensorOrientationPitch	ara com
24	Sensor orientation roll(A.1.24)	SensorOrientationRoll	ara com
25	Sensor orientation yaw error(A.1.25)	SensorOrientationYawError	ara com
26	Sensor orientation pitch error(A.1.25)	SensorOrientationPitchError	ara com
27	Sensor orientation roll error(A.1.25)	SensorOrientationRollError	ara com
28	Sensor orientation yaw yaw error (A.1.25)	SensorOrientationYawYawError	ara com
29	Sensor orientation yaw pitch error (A.1.25)	SensorOrientationYawPitchError	ara com
30	Sensor orientation yaw roll error (A.1.25)	SensorOrientationYawRollError	ara com
31	Sensor orientation pitch yaw error (A.1.25)	SensorOrientationPitchYawError	ara com
32	Sensor orientation pitch pitch error (A.1.25)	SensorOrientationPitchPitchError	ara com
33	Sensor orientation pitch roll error (A.1.25)	SensorOrientationPitchRollError	ara com
34	Sensor orientation roll yaw error (A.1.25)	SensorOrientationRollYawError	ara com

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Bit	Reference Singal in ISO23150	Reference Element in PMObjectService	Option
35	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
36	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
37	Calibration(Table 48)	`Calibration`	0
38	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
39	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
40	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
41	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
42	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
43	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
44	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
45	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
46	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
47	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
48	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
49	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
50	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
51	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
52	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
53	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
54	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
55	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
56	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
57	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
58	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
59	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
60	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
61	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
62	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
63	Sensor cluster(Table 48)	`SensorCluster`	0
64	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
65	Colour model type(A.1.15)	`ColourModelType`	ara com
66	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
67	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
68	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com

Bit	Reference Singal in ISO23150	Reference Element in PMObjectService	Option
69	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
70	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
71	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
72	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
73	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
74	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
75	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
76	Recognised potentially moving objects capability(A.1.10.1)	`RecognisedPotentiallyMovingObjectsCapability`	ara com
77	Recognised potentially moving objects status(A.1.11.1)	`RecognisedPotentiallyMovingObjectsStatus`	ara com
78	Object grouping ID(A.2.3)	`ObjectGroupingId`	ara com
79	Number of valid observations object level(A.2.5)	`NumberOfValidObservationsObjectLevel`	Autosar vector
80	Time stamp reference object level(A.2.6)	`TimeStampReferenceObjectLevel`	ara com
81	Observation status object level(A.2.7)	`ObservationStatusObjectLevel`	ara com
82	Track quality(A.2.8)	`TrackQuality`	ara com
83	Position object level z(A.2.13)	`PositionObjectLevelZ`	ara com
84	Position object level z error(A.2.14)	`PositionObjectLevelZError`	ara com
85	Orientation yaw(A.2.15)	`OrientationYaw`	ara com
86	Orientation pitch(A.2.15)	`OrientationPitch`	ara com
87	Orientation roll(A.2.15)	`OrientationRoll`	ara com
88	Orientation yaw error(A.2.16)	`OrientationYawError`	ara com
89	Orientation pitch error(A.2.16)	`OrientationPitchError`	ara com
90	Orientation roll error(A.2.16)	`OrientationRollError`	ara com
91	Reference point(A.2.17)	`ReferencePoint`	ara com
92	Road level(A.2.18)	`RoadLevel`	ara com
93	Bounding box(Table 9)	`PotentiallyMovingObjectsBoundingBox`	0
94	Bounding box extent height(A.2.19)	`BoundingBoxExtentHeight`	ara com
95	Bounding box extent length error(A.2.20)	`BoundingBoxExtentLengthError`	ara com
96	Bounding box extent width error(A.2.20)	`BoundingBoxExtentWidthError`	ara com
97	Bounding box extent height error(A.2.20)	`BoundingBoxExtentHeightError`	ara com
98	Bounding box ground clearance(A.2.21)	`BoundingBoxGroundClearance`	ara com
99	Included geometric structures(A.2.22)	`IncludedGeometricStructures`	ara com
100	Velocity x object level(A.2.23)	`VelocityXObjectLevel`	ara com
101	Velocity y object level(A.2.23)	`VelocityYObjectLevel`	ara com
102	Velocity z object level(A.2.23)	`VelocityZObjectLevel`	ara com
103	Velocity x object level error(A.2.24)	`VelocityXObjectLevelError`	ara com
104	Velocity y object level error(A.2.24)	`VelocityYObjectLevelError`	ara com
105	Velocity z object level error(A.2.24)	`VelocityZObjectLevelError`	ara com
106	Acceleration x(A.2.25)	`AccelerationX`	ara com
107	Acceleration y(A.2.25)	`AccelerationY`	ara com
108	Acceleration z(A.2.25)	`AccelerationZ`	ara com
109	Acceleration x error(A.2.26)	`AccelerationXError`	ara com
110	Acceleration y error(A.2.26)	`AccelerationYError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in PMObjectService	Option
111	Acceleration z error(A.2.26)	`AccelerationZError`	ara com
112	Instantaneous centre of rotation x(A.2.27)	`InstantaneousCentreOfRotationX`	ara com
113	Instantaneous centre of rotation y(A.2.27)	`InstantaneousCentreOfRotationY`	ara com
114	Instantaneous centre of rotation x error(A.2.28)	`InstantaneousCentreOfRotationXError`	ara com
115	Instantaneous centre of rotation y error(A.2.28)	`InstantaneousCentreOfRotationYError`	ara com
116	Rotation rate at instantaneous centre of rotation yaw(A.2.29)	`RotationRateAtInstantaneousCentreOfRotationYaw`	ara com
117	Rotation rate at instantaneous centre of rotation yaw error(A.2.30)	`RotationRateAtInstantaneousCentreOfRotationYawError`	ara com
118	Movement status(A.2.31)	`MovementStatus`	ara com
119	Lights(Table 9)	`PotentiallyMovingObjectsLights`	0
120	Person(Table 9)	`PotentiallyMovingObjectsPerson`	0
121	Person pose yaw error(A.2.38)	`PersonPoseYawError`	ara com
122	Person pose pitch error(A.2.38)	`PersonPosePitchError`	ara com
123	Person pose roll error(A.2.38)	`PersonPoseRollError`	ara com
124	Lane related information(Table 9)	`PotentiallyMovingObjectsLaneRelatedInformation`	0
125	Angle between object edge and lane left edge right lane(A.2.40)	`AngleBetweenObjectEdgeAndLaneLeftEdgeRightLane`	ara com
126	Angle between object edge and lane right edge left lane(A.2.40)	`AngleBetweenObjectEdgeAndLaneRightEdgeLeftLane`	ara com
127	Angle between object edge and lane left edge right lane error(A.2.41)	`AngleBetweenObjectEdgeAndLaneLeftEdgeRightLaneError`	ara com
128	Angle between object edge and lane right edge left lane error(A.2.41)	`AngleBetweenObjectEdgeAndLaneRightEdgeLeftLaneError`	ara com
129	Percentage side lane left(A.2.42)	`PercentageSideLaneLeft`	ara com
130	Percentage side lane right(A.2.42)	`PercentageSideLaneRight`	ara com
131	Motion related information(Table 9)	`PotentiallyMovingObjectsMotionRelatedInformation`	0
132	Camera sensor technology specific(Table 9)	`PotentiallyMovingObjectsCameraSensorTechnologySpecific`	0
133	Radar sensor technology specific(Table 9)	`PotentiallyMovingObjectsRadarSensorTechnologySpecific`	0
134	Lidar sensor technology specific(Table 9)	`PotentiallyMovingObjectsLidarSensorTechnologySpecific`	0

Table 10.1: Capability Vector of PMObjectService

10.1.2 RObjectsService Capability Vector

The table below includes the capability bit setting for the optional elements for RObjectService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in RObjectsService	Option
1	Interface ID(A.1.4)	InterfaceId	Autosar Service
2	Cycle counter(A.1.6.1)	CycleCounter	ara com
3	Interface cycle time(A.1.7)	InterfaceCycleTime	ara com
4	Interface cycle time variation(A.1.8)	InterfaceCycleTimeVariation	ara com
5	Information vehicle coordinate system(Table 46)	InformationVehicleCoordinateSystem	0
6	Information sensor pose(Table 46)	InformationSensorPose	0
7	Sensor origin point x(A.1.22)	SensorOriginPointX	ara com
8	Sensor origin point y(A.1.22)	SensorOriginPointY	ara com
9	Sensor origin point z(A.1.22)	SensorOriginPointZ	ara com
10	Sensor origin point x error(A.1.23)	SensorOriginPointXError	ara com
11	Sensor origin point y error(A.1.23)	SensorOriginPointYError	ara com
12	Sensor origin point z error(A.1.23)	SensorOriginPointZError	ara com
13	Sensor origin point x x error (A.1.23)	SensorOriginPointXXError	ara com
14	Sensor origin point x y error (A.1.23)	SensorOriginPointXYError	ara com
15	Sensor origin point x z error (A.1.23)	SensorOriginPointXZError	ara com
16	Sensor origin point y x error (A.1.23)	SensorOriginPointYXError	ara com
17	Sensor origin point y y error (A.1.23)	SensorOriginPointYYError	ara com
18	Sensor origin point y z error (A.1.23)	SensorOriginPointYZError	ara com
19	Sensor origin point z x error (A.1.23)	SensorOriginPointZXError	ara com
20	Sensor origin point z y error (A.1.23)	SensorOriginPointZYError	ara com
21	Sensor origin point z z error (A.1.23)	SensorOriginPointZZError	ara com
22	Sensor orientation yaw(A.1.24)	SensorOrientationYaw	ara com
23	Sensor orientation pitch(A.1.24)	SensorOrientationPitch	ara com
24	Sensor orientation roll(A.1.24)	SensorOrientationRoll	ara com
25	Sensor orientation yaw error(A.1.25)	SensorOrientationYawError	ara com
26	Sensor orientation pitch error(A.1.25)	SensorOrientationPitchError	ara com
27	Sensor orientation roll error(A.1.25)	SensorOrientationRollError	ara com
28	Sensor orientation yaw yaw error (A.1.25)	SensorOrientationYawYawError	ara com
29	Sensor orientation yaw pitch error (A.1.25)	SensorOrientationYawPitchError	ara com
30	Sensor orientation yaw roll error (A.1.25)	SensorOrientationYawRollError	ara com
31	Sensor orientation pitch yaw error (A.1.25)	SensorOrientationPitchYawError	ara com
32	Sensor orientation pitch pitch error (A.1.25)	SensorOrientationPitchPitchError	ara com
33	Sensor orientation pitch roll error (A.1.25)	SensorOrientationPitchRollError	ara com
34	Sensor orientation roll yaw error (A.1.25)	SensorOrientationRollYawError	ara com
35	Sensor orientation roll pitch error (A.1.25)	SensorOrientationRollPitchError	ara com
36	Sensor orientation roll roll error (A.1.25)	SensorOrientationRollRollError	ara com
37	Calibration(Table 48)	Calibration	0
38	Calibration process state(A.5.42)	CalibrationProcessState	ara com
39	Sensor origin point correction x(A.5.43)	SensorOriginPointCorrectionX	ara com
40	Sensor origin point correction y(A.5.43)	SensorOriginPointCorrectionY	ara com
41	Sensor origin point correction z(A.5.43)	SensorOriginPointCorrectionZ	ara com
42	Sensor origin point correction x error(A.5.44)	SensorOriginPointCorrectionXError	ara com
43	Sensor origin point correction y error(A.5.44)	SensorOriginPointCorrectionYError	ara com
44	Sensor origin point correction z error(A.5.44)	SensorOriginPointCorrectionZError	ara com
45	Sensor origin translation correction limit xbegin(A.5.45)	SensorOriginTranslationCorrection-LimitXbegin	ara com

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Bit	Reference Singal in ISO23150	Reference Element in RObjectsService	Option
46	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
47	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
48	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
49	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
50	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
51	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
52	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
53	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
54	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
55	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
56	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
57	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
58	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
59	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
60	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
61	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
62	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
63	Sensor cluster(Table 48)	`SensorCluster`	0
64	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
65	Motion type(A.1.14)	`MotionType`	ara com
66	Colour model type(A.1.15)	`ColourModelType`	ara com
67	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
68	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
69	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
70	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
71	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
72	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
73	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
74	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
75	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
76	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
77	Road surface(Table 12)	`RoadSurface`	0
78	Road surface roughness(A.2.52)	`RoadSurfaceRoughness`	ara com
79	Number of valid road surface condition classifications(A.2.53)	`NumberOfValidRoadSurfaceCondition-Classifications`	Autosar vector

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Bit	Reference Singal in ISO23150	Reference Element in RObjectsService	Option
80	Road surface condition classification type(A.2.54)	`RoadSurfaceConditionClassification-Type`	ara com
81	Road surface condition classification type confidence(A.2.55)	`RoadSurfaceConditionClassification-TypeConfidence`	ara com
82	Track quality(A.2.8)	`TrackQuality`	ara com
83	Measurement status object level(A.2.9)	`MeasurementStatusObjectLevel`	ara com
84	Road markings(Table 12)	`RoadMarkings`	0
85	Recognized road markings capability(A.1.10.2)	`RecognizedRoadMarkingsCapability`	ara com
86	Recognized road markings status(A.1.11.2)	`RecognizedRoadMarkingsStatus`	ara com
87	Object grouping ID(A.2.3)	`ObjectGroupingId`	ara com
88	Number of valid observations object level(A.2.5)	`NumberOfValidObservationsObjectLevel`	Autosar vector
89	Time stamp reference object level(A.2.6)	`TimeStampReferenceObjectLevel`	ara com
90	Observation status object level(A.2.7)	`ObservationStatusObjectLevel`	ara com
91	Track quality(A.2.8)	`TrackQuality`	ara com
92	Road object lane association(A.2.59)	`RoadObjectLaneAssociation`	ara com
93	Road object lane association confidence(A.2.60)	`RoadObjectLaneAssociationConfidence`	ara com
94	Arrow orientation(A.2.61)	`ArrowOrientation`	ara com
95	Arrow direction(A.2.62)	`ArrowDirection`	ara com
96	Number of valid sign classifications(A.2.63)	`NumberOfValidSignClassifications`	Autosar vector
97	Sign classification type(A.2.64)	`SignClassificationType`	ara com
98	Sign classification type confidence(A.2.65)	`SignClassificationTypeConfidence`	ara com
99	Sign value(A.2.66)	`SignValue`	ara com
100	Sign value unit(A.2.67)	`SignValueUnit`	ara com
101	Sign state(A.2.68)	`SignState`	ara com
102	Colour tone(Table xxx)	`ColourTone`	0
103	Colour tone confidence object level(A.2.70)	`ColourToneConfidenceObjectLevel`	ara com
104	Polynomials(Table 12)	`RoadMarkingsPolynomials`	0
105	Polynomial coefficient z c0(A.2.76)	`PolynomialCoefficientZC0`	ara com
106	Polynomial coefficient z c1(A.2.76)	`PolynomialCoefficientZC1`	ara com
107	Polynomial coefficient z c2(A.2.76)	`PolynomialCoefficientZC2`	ara com
108	Polynomial coefficient z c3(A.2.76)	`PolynomialCoefficientZC3`	ara com
109	Polynomial y error(A.2.77)	`PolynomialYError`	ara com
110	Polynomial z error(A.2.78)	`PolynomialZError`	V1 ara com (optimizeable API)
111	Width polynomial(A.2.80)	`WidthPolynomial`	ara com
112	Width polynomial error(A.2.81)	`WidthPolynomialError`	ara com
113	Width polynomial confidence(A.2.82)	`WidthPolynomialConfidence`	ara com
114	Height polynomial(A.2.83)	`HeightPolynomial`	ara com
115	Height polynomial error(A.2.84)	`HeightPolynomialError`	ara com
116	Height polynomial confidence(A.2.85)	`HeightPolynomialConfidence`	ara com
117	Number of valid data ranges(A.2.86)	`NumberOfValidDataRanges`	Autosar vector
118	Supported data range x begin(A.2.87)	`SupportedDataRangeXBegin`	ara com
119	Supported data range x end(A.2.87)	`SupportedDataRangeXEnd`	ara com
120	Supported axis(A.2.88)	`SupportedAxis`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in RObjectsService	Option
121	Polylines(Table 12)	RoadMarkingsPolylines	0
122	Vertex point z(A.2.92)	VertexPointZ	ara com
123	Vertex point z error(A.2.93)	VertexPointZError	ara com
124	Vertex point confidence x(A.2.94)	VertexPointConfidenceX	ara com
125	Vertex point confidence y(A.2.94)	VertexPointConfidenceY	ara com
126	Vertex point confidence z(A.2.94)	VertexPointConfidenceZ	ara com
127	Width vertex(A.2.95)	WidthVertex	ara com
128	Width vertex error(A.2.96)	WidthVertexError	ara com
129	Width vertex confidence(A.2.97)	WidthVertexConfidence	ara com
130	Height vertex(A.2.98)	HeightVertex	ara com
131	Height vertex error(A.2.99)	HeightVertexError	ara com
132	Height vertex confidence(A.2.100)	HeightVertexConfidence	ara com
133	Road boundaries(Table 12)	RoadBoundaries	0
134	Recognised road boundaries capability (A.1.10.3)	RecognisedRoadBoundariesCapability	ara com
135	Recognised road boundaries status(A.1.11.3)	RecognisedRoadBoundariesStatus	ara com
136	Object grouping ID(A.2.3)	ObjectGroupingId	ara com
137	Number of valid observations object level(A.2.5)	NumberOfValidObservationsObjectLevel	Autosar vector
138	Time stamp reference object level(A.2.6)	TimeStampReferenceObjectLevel	ara com
139	Observation status object level(A.2.7)	ObservationStatusObjectLevel	ara com
140	Track quality(A.2.8)	TrackQuality	ara com
141	Road object lane association(A.2.59)	RoadObjectLaneAssociation	ara com
142	Road object lane association confidence(A.2.60)	RoadObjectLaneAssociationConfidence	ara com
143	Colour tone(Table xxx)	ColourTone	0
144	Colour tone confidence object level(A.2.70)	ColourToneConfidenceObjectLevel	ara com
145	Polynomials(Table 12)	RoadBoundariesPolynomials	0
146	Polynomial coefficient z c0(A.2.76)	PolynomialCoefficientZC0	ara com
147	Polynomial coefficient z c1(A.2.76)	PolynomialCoefficientZC1	ara com
148	Polynomial coefficient z c2(A.2.76)	PolynomialCoefficientZC2	ara com
149	Polynomial coefficient z c3(A.2.76)	PolynomialCoefficientZC3	ara com
150	Polynomial y error(A.2.77)	PolynomialYError	ara com
151	Polynomial z error(A.2.78)	PolynomialZError	V1 ara com (optimizeable API)
152	Width polynomial(A.2.80)	WidthPolynomial	ara com
153	Width polynomial error(A.2.81)	WidthPolynomialError	ara com
154	Width polynomial confidence(A.2.82)	WidthPolynomialConfidence	ara com
155	Height polynomial(A.2.83)	HeightPolynomial	ara com
156	Height polynomial error(A.2.84)	HeightPolynomialError	ara com
157	Height polynomial confidence(A.2.85)	HeightPolynomialConfidence	ara com
158	Number of valid data ranges(A.2.86)	NumberOfValidDataRanges	Autosar vector
159	Supported data range x begin(A.2.87)	SupportedDataRangeXBegin	ara com
160	Supported data range x end(A.2.87)	SupportedDataRangeXEnd	ara com
161	Supported axis(A.2.88)	SupportedAxis	ara com
162	Polylines(Table 12)	RoadBoundariesPolylines	0

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Bit	Reference Singal in ISO23150	Reference Element in RObjectsService	Option
163	Vertex point z(A.2.92)	`VertexPointZ`	ara com
164	Vertex point z error(A.2.93)	`VertexPointZError`	ara com
165	Vertex point confidence x(A.2.94)	`VertexPointConfidenceX`	ara com
166	Vertex point confidence y(A.2.94)	`VertexPointConfidenceY`	ara com
167	Vertex point confidence z(A.2.94)	`VertexPointConfidenceZ`	ara com
168	Width vertex(A.2.95)	`WidthVertex`	ara com
169	Width vertex error(A.2.96)	`WidthVertexError`	ara com
170	Width vertex confidence(A.2.97)	`WidthVertexConfidence`	ara com
171	Height vertex(A.2.98)	`HeightVertex`	ara com
172	Height vertex error(A.2.99)	`HeightVertexError`	ara com
173	Height vertex confidence(A.2.100)	`HeightVertexConfidence`	ara com

Table 10.2: Capability Vector of RObjectsService

10.1.3 SObjectsService Capability Vector

The table below includes the capability bit setting for the optional elements for SObjectsService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in SObjectsService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Cycle counter(A.1.6.1)	`CycleCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x(A.1.22)	`SensorOriginPointX`	ara com
8	Sensor origin point y(A.1.22)	`SensorOriginPointY`	ara com
9	Sensor origin point z(A.1.22)	`SensorOriginPointZ`	ara com
10	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
11	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
12	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
13	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
14	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
15	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
16	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
17	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
18	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
19	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
20	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
21	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SObjectsService	Option
22	Sensor orientation yaw(A.1.24)	`SensorOrientationYaw`	ara com
23	Sensor orientation pitch(A.1.24)	`SensorOrientationPitch`	ara com
24	Sensor orientation roll(A.1.24)	`SensorOrientationRoll`	ara com
25	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
26	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
27	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
28	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
29	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
30	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
31	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
32	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
33	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
34	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
35	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
36	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
37	Calibration(Table 48)	`Calibration`	0
38	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
39	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
40	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
41	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
42	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
43	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
44	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
45	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrectionLimitXbegin`	ara com
46	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrectionLimitXend`	ara com
47	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrectionLimitYbegin`	ara com
48	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrectionLimitYend`	ara com
49	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrectionLimitZbegin`	ara com
50	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrectionLimitZend`	ara com
51	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
52	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
53	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
54	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
55	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
56	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
57	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
58	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SObjectsService	Option
59	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimit-Pitchbegin`	ara com
60	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimit-Pitchend`	ara com
61	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRoll-begin`	ara com
62	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRol-lend`	ara com
63	Sensor cluster(Table 48)	SensorCluster	0
64	Tracking motion model(A.1.13)	TrackingMotionModel	ara com
65	Motion type(A.1.14)	MotionType	ara com
66	Colour model type(A.1.15)	ColourModelType	ara com
67	Information ambiguity domain(Table 30)	InformationAmbiguityDomain	0
68	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
69	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
70	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
71	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
72	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
73	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
74	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
75	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
76	Interface applicability(A.1.20)	InterfaceApplicability	ara com
77	General landmarks(Table 12)	GeneralLandmarks	0
78	Recognised general landmarks capability(A.2.48)	`RecognisedGeneralLandmarksCapabil-ity`	ara com
79	Recognised general landmarks status(A.2.49)	`RecognisedGeneralLandmarksStatus`	ara com
80	Object grouping ID(A.2.53)	`ObjectGroupingId`	ara com
81	Number of valid observations object level(A.2.54)	`NumberOfValidObservationsOb-jectLevel`	Autosar vector
82	Time stamp reference object level()	`TimeStampReferenceObjectLevel`	ara com
83	Observation status object level(A.2.8)	`ObservationStatusObjectLevel`	ara com
84	Track quality()	`TrackQuality`	ara com
85	Position object level z(A.2.6)	`PositionObjectLevelZ`	ara com
86	Position object level z error(A.2.8)	`PositionObjectLevelZError`	ara com
87	Orientation yaw(A.2.9)	`OrientationYaw`	ara com
88	Orientation pitch()	`OrientationPitch`	ara com
89	Orientation roll(Table 12)	`OrientationRoll`	ara com
90	Orientation yaw error(A.2.56)	`OrientationYawError`	ara com
91	Orientation pitch error()	`OrientationPitchError`	ara com
92	Orientation roll error(A.2.57)	`OrientationRollError`	ara com
93	Reference point(A.2.58)	ReferencePoint	ara com
94	Bounding box(A.2.60)	`GeneralLandmarksBoundingBox`	0
95	Bounding box extent height(A.2.63)	`BoundingBoxExtentHeight`	ara com
96	Bounding box extent length error()	`BoundingBoxExtentLengthError`	ara com
97	Bounding box extent width error(A.2.64)	`BoundingBoxExtentWidthError`	ara com
98	Bounding box extent height error(A.2.65)	`BoundingBoxExtentHeightError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SObjectsService	Option
99	Traffic signs()	TrafficSigns	0
100	Recognised traffic signs capability(Table xxx)	RecognisedTrafficSignsCapability	ara com
101	Recognised traffic signs status()	RecognisedTrafficSignsStatus	ara com
102	Object grouping ID()	ObjectGroupingId	ara com
103	Number of valid observations object level(A.2.71)	NumberOfValidObservationsObjectLevel	Autosar vector
104	Time stamp reference object level(A.2.72)	TimeStampReferenceObjectLevel	ara com
105	Observation status object level(A.2.73)	ObservationStatusObjectLevel	ara com
106	Track quality(A.2.74)	TrackQuality	ara com
107	Sign geometry(A.2.78)	SignGeometry	ara com
108	Number of valid lane relevance classifications(A.2.79)	NumberOfValidLaneRelevanceClassifications	Autosar vector
109	Lane relevance classification type(A.2.81)	LaneRelevanceClassificationType	ara com
110	Lane relevance classification type confidence(A.2.82)	LaneRelevanceClassificationTypeConfidence	ara com
111	Colour tone(A.2.85)	TrafficSignsColourTone	global struct
112	(A.2.87)		
113	Position object level z(Table 12)	PositionObjectLevelZ	ara com
114	Position object level z error(A.2.72)	PositionObjectLevelZError	ara com
115	Number of valid observations object level(A.2.92)	NumberOfValidObservationsObjectLevel	Autosar vector
116	Time stamp reference object level(A.2.92)	TimeStampReferenceObjectLevel	ara com
117	Observation status object level(A.2.93)	ObservationStatusObjectLevel	ara com
118	Track quality(A.2.93)	TrackQuality	ara com
119	Colour tone()	TrafficSignsSupplementarySignsColourTone	global struct
120	Colour tone confidence object level(A.1.11.3)	ColourToneConfidenceObjectLevel	ara com
121	Traffic lights(A.2.6)	TrafficLights	0
122	Recognised traffic lights capability(A.2.7)	RecognisedTrafficLightsCapability	ara com
123	Recognised traffic lights status()	RecognisedTrafficLightsStatus	ara com
124	Object grouping ID()	ObjectGroupingId	ara com
125	Number of valid observations object level(A.2.103)	NumberOfValidObservationsObjectLevel	Autosar vector
126	Time stamp reference object level(A.2.60)	TimeStampReferenceObjectLevel	ara com
127	Observation status object level(Table xxx)	ObservationStatusObjectLevel	ara com
128	Track quality(A.2.69)	TrackQuality	ara com
129	Position object level z(A.2.76)	PositionObjectLevelZ	ara com
130	Position object level z error(A.2.76)	PositionObjectLevelZError	ara com
131	Orientation yaw(A.2.77)	OrientationYaw	ara com
132	Orientation pitch(A.2.78)	OrientationPitch	ara com
133	Orientation roll(A.2.79)	OrientationRoll	ara com
134	Orientation yaw error(A.2.79)	OrientationYawError	ara com
135	Orientation pitch error(A.2.80)	OrientationPitchError	ara com
136	Orientation roll error(A.2.81)	OrientationRollError	ara com
137	Reference point(A.2.82)	ReferencePoint	ara com
138	Bounding box(A.2.85)	TrafficLightsBoundingBox	0

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Bit	Reference Singal in ISO23150	Reference Element in SObjectsService	Option
139	Bounding box extent length(A.2.86)	`BoundingBoxExtentLength`	ara com
140	Bounding box extent length error(A.2.87)	`BoundingBoxExtentLengthError`	ara com
141	Bounding box extent width error(A.2.88)	`BoundingBoxExtentWidthError`	ara com
142	Bounding box extent height error()	`BoundingBoxExtentHeightError`	ara com
143	Total number of traffic light spots(Table 12)	`TotalNumberOfTrafficLightSpots`	Autosar vector
144	Total number of traffic light spots confidence(A.2.89)	`TotalNumberOfTrafficLightSpotsCon-fidence`	Autosar vector
145	Number of valid observations object level(A.2.92)	`NumberOfValidObservationsOb-jectLevel`	Autosar vector
146	Time stamp reference object level(A.2.93)	`TimeStampReferenceObjectLevel`	ara com
147	Observation status object level(A.2.93)	`ObservationStatusObjectLevel`	ara com
148	Track quality(A.2.94)	`TrackQuality`	ara com
149	Light shape value(A.2.100)	`LightShapeValue`	ara com
150	Colour()	`TrafficLightsSpotsColour`	0
151	Position object level z()	`PositionObjectLevelZ`	ara com
152	Position object level z error()	`PositionObjectLevelZError`	ara com
153	Number of valid lane relevance classifications()	`NumberOfValidLaneRelevanceClassifi-cations`	Autosar vector
154	Lane relevance classification type()	`LaneRelevanceClassificationType`	ara com
155	Lane relevance classification type confidence()	`LaneRelevanceClassificationTypeCon-fidence`	ara com

Table 10.3: Capability Vector of SObjectsService

10.2 Feature Level Service

10.2.1 CameraFeatureService Capability Vector

The table below includes the capability bit setting for the optional elements for CameraFeatureService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in CameraFeatureService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Cycle counter(A.1.6.1)	`CycleCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x(A.1.22)	`SensorOriginPointX`	ara com
8	Sensor origin point y(A.1.22)	`SensorOriginPointY`	ara com
9	Sensor origin point z(A.1.22)	`SensorOriginPointZ`	ara com
10	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in CameraFeatureService	Option
11	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
12	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
13	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
14	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
15	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
16	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
17	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
18	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
19	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
20	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
21	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
22	Sensor orientation yaw(A.1.24)	`SensorOrientationYaw`	ara com
23	Sensor orientation pitch(A.1.24)	`SensorOrientationPitch`	ara com
24	Sensor orientation roll(A.1.24)	`SensorOrientationRoll`	ara com
25	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
26	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
27	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
28	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
29	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
30	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
31	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
32	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
33	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
34	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
35	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
36	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
37	Calibration(Table 48)	`Calibration`	0
38	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
39	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
40	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
41	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
42	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
43	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
44	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
45	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrectionLimitXbegin`	ara com
46	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrectionLimitXend`	ara com
47	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrectionLimitYbegin`	ara com
48	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrectionLimitYend`	ara com
49	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrectionLimitZbegin`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in CameraFeatureService	Option
50	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
51	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
52	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
53	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
54	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
55	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
56	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
57	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
58	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
59	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
60	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
61	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
62	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
63	Sensor cluster(Table 48)	SensorCluster	0
64	Tracking motion model(A.1.13)	TrackingMotionModel	ara com
65	Motion type(A.1.14)	MotionType	ara com
66	Information ambiguity domain(Table 30)	InformationAmbiguityDomain	0
67	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
68	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
69	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
70	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
71	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
72	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
73	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
74	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
75	Interface applicability(A.1.20)	InterfaceApplicability	ara com
76	Camera features(Table 12)	`CameraFeatures`	0
77	Recognised features capability(A.2.48)	`RecognisedFeaturesCapability`	ara com
78	Recognised features status(A.2.49)	`RecognisedFeaturesStatus`	ara com
79	Feature ID(A.2.52)	`FeatureId`	ara com
80	Feature grouping ID(A.2.53)	`FeatureGroupingId`	ara com
81	Object ID reference feature level()	`ObjectIdReferenceFeatureLevel`	ara com
82	Number of valid observations feature level(A.2.55)	`NumberOfValidObservationsFeatureLevel`	Autosar vector
83	Time stamp reference feature level(A.2.8)	`TimeStampReferenceFeatureLevel`	ara com
84	Observation status feature level(A.2.9)	`ObservationStatusFeatureLevel`	ara com
85	Colour tone confidence feature level(A.2.6)	`ColourToneConfidenceFeatureLevel`	ara com
86	Shape reference points(A.2.63)	`CameraFeaturesShapeReferencePoints`	0

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Bit	Reference Singal in ISO23150	Reference Element in CameraFeatureService	Option
87	Shape surface normal x(A.2.69)	`ShapeSurfaceNormalX`	ara com
88	Shape surface normal y()	`ShapeSurfaceNormalY`	ara com
89	Shape surface normal z(A.2.70)	`ShapeSurfaceNormalZ`	ara com
90	Shape surface normal x error()	`ShapeSurfaceNormalXError`	ara com
91	Shape surface normal y error()	`ShapeSurfaceNormalYError`	ara com
92	Shape surface normal z error()	`ShapeSurfaceNormalZError`	ara com
93	Translation rate x feature level(Table 12)	`TranslationRateXFeatureLevel`	ara com
94	Translation rate y feature level(A.2.71)	`TranslationRateYFeatureLevel`	ara com
95	Translation rate z feature level()	`TranslationRateZFeatureLevel`	ara com
96	Translation rate x feature level error(A.2.72)	`TranslationRateXFeatureLevelError`	ara com
97	Translation rate y feature level error(A.2.73)	`TranslationRateYFeatureLevelError`	ara com
98	Translation rate z feature level error()	`TranslationRateZFeatureLevelError`	ara com
99	Rotation rate yaw(A.2.74)	`RotationRateYaw`	ara com
100	Rotation rate pitch()	`RotationRatePitch`	ara com
101	Rotation rate roll(A.2.75)	`RotationRateRoll`	ara com
102	Rotation rate yaw error(A.2.75)	`RotationRateYawError`	ara com
103	Rotation rate pitch error(A.2.75)	`RotationRatePitchError`	ara com
104	Rotation rate roll error(A.2.75)	`RotationRateRollError`	ara com
105	Scale change feature level(A.2.76)	`ScaleChangeFeatureLevel`	ara com
106	Scale change feature level error(A.2.76)	`ScaleChangeFeatureLevelError`	ara com

Table 10.4: Capability Vector of CameraFeatureService

10.2.2 USSFeatureService Capability Vector

The table below includes the capability bit setting for the optional elements for USSFeatureService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in USSFeatureService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Cycle counter(A.1.6.1)	`CycleCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x(A.1.22)	`SensorOriginPointX`	ara com
8	Sensor origin point y(A.1.22)	`SensorOriginPointY`	ara com
9	Sensor origin point z(A.1.22)	`SensorOriginPointZ`	ara com
10	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
11	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
12	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in USSFeatureService	Option
13	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
14	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
15	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
16	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
17	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
18	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
19	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
20	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
21	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
22	Sensor orientation yaw(A.1.24)	`SensorOrientationYaw`	ara com
23	Sensor orientation pitch(A.1.24)	`SensorOrientationPitch`	ara com
24	Sensor orientation roll(A.1.24)	`SensorOrientationRoll`	ara com
25	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
26	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
27	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
28	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
29	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
30	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
31	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
32	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
33	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
34	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
35	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
36	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
37	Calibration(Table 48)	`Calibration`	0
38	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
39	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
40	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
41	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
42	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
43	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
44	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
45	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
46	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
47	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
48	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
49	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
50	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
51	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
52	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in USSFeatureService	Option
53	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
54	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
55	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
56	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
57	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
58	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
59	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
60	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
61	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
62	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
63	Sensor cluster(Table 48)	`SensorCluster`	0
64	Information Interface extension(Table 30)	`InformationInterfaceExtension`	0
65	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
66	Motion type(A.1.14)	`MotionType`	ara com
67	Colour model type(A.1.15)	`ColourModelType`	ara com
68	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
69	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
70	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
71	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
72	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
73	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
74	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
75	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
76	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
77	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
78	Recognised features capability(A.2.48)	`RecognisedFeaturesCapability`	ara com
79	Recognised features status(A.2.49)	`RecognisedFeaturesStatus`	ara com
80	Feature ID(A.2.52)	`FeatureId`	ara com
81	Object ID reference feature level(A.2.53)	`ObjectIdReferenceFeatureLevel`	ara com
82	Number of valid observations feature level(A.2.54)	`NumberOfValidObservationsFeatureLevel`	Autosar vector
83	Time stamp reference feature level()	`TimeStampReferenceFeatureLevel`	ara com
84	Observation status feature level(A.2.8)	`ObservationStatusFeatureLevel`	ara com
85	Position feature level z(A.2.6)	`PositionFeatureLevelZ`	ara com
86	Position feature level z error(A.2.8)	`PositionFeatureLevelZError`	ara com
87	Orientation feature level pitch(A.2.9)	`OrientationFeatureLevelPitch`	ara com
88	Orientation feature level pitch error()	`OrientationFeatureLevelPitchError`	ara com
89	Height feature level(Table 12)	`HeightFeatureLevel`	ara com
90	Height feature level error(A.2.56)	`HeightFeatureLevelError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in USSFeatureService	Option
91	Velocity x feature level()	`VelocityXFeatureLevel`	ara com
92	Velocity x feature level error(A.2.58)	`VelocityYObjectLevelError`	ara com
93	Measurement status feature level(A.2.61)	`MeasurementStatusFeatureLevel`	ara com

Table 10.5: Capability Vector of USSFeatureService

10.3 Detection Level Service

10.3.1 RadarDetectionService Capability Vector

The table below includes the capability bit setting for the optional elements for RadarD-etectionService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in RadarDetectionService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Cycle counter(A.1.6.1)	`CycleCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
8	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
9	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
10	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
11	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
12	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
13	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
14	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
15	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
16	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
17	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
18	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
19	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
20	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
21	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
22	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
23	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
24	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
25	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
26	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
27	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in RadarDetectionService	Option
28	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
29	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
30	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
31	Calibration(Table 48)	`Calibration`	0
32	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
33	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
34	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
35	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
36	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
37	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
38	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
39	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
40	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
41	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
42	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
43	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
44	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
45	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
46	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
47	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
48	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
49	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
50	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
51	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYaw-begin`	ara com
52	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLim-itYawend`	ara com
53	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimit-Pitchbegin`	ara com
54	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimit-Pitchend`	ara com
55	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRoll-begin`	ara com
56	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRol-lend`	ara com
57	Sensor cluster(Table 48)	`SensorCluster`	0
58	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
59	Motion type(A.1.14)	`MotionType`	ara com
60	Colour model type(A.1.15)	`ColourModelType`	ara com
61	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in RadarDetectionService	Option
62	Radial velocity ambiguity domain end(A.1.16)	RadialVelocityAmbiguityDomainEnd	ara com
63	Range ambiguity domain begin(A.1.17)	RangeAmbiguityDomainBegin	ara com
64	Range ambiguity domain end(A.1.17)	RangeAmbiguityDomainEnd	ara com
65	Angle azimuth ambiguity domain begin(A.1.18)	AngleAzimuthAmbiguityDomainBegin	ara com
66	Angle azimuth ambiguity domain end(A.1.18)	AngleAzimuthAmbiguityDomainEnd	ara com
67	Angle elevation ambiguity domain begin(A.1.19)	AngleElevationAmbiguityDomainBegin	ara com
68	Angle elevation ambiguity domain end(A.1.19)	AngleElevationAmbiguityDomainEnd	ara com
69	Interface applicability(A.1.20)	InterfaceApplicability	ara com
70	Recognised detections capability(A.2.48)	RecognisedDetectionsCapability	ara com
71	Recognised detections status(A.2.49)	RecognisedDetectionsStatus	ara com
72	Object ID reference detection level(A.2.52)	ObjectIdReferenceDetectionLevel	ara com
73	Feature ID reference(A.2.53)	FeatureIdReference	ara com
74	Radar cross section error(A.2.8)	RadarCrossSectionError	ara com
75	Signal to noise ratio detection level error()	SignalToNoiseRatioDetectionLevelError	ara com
76	Multi target probability(Table 12)	MultiTargetProbability	ara com
77	Ambiguity ID(A.1.10.2)	AmbiguityId	ara com
78	Detection ambiguity probability(A.1.11.2)	DetectionAmbiguityProbability	ara com
79	Free space probability(A.1.12.2)	FreeSpaceProbability	ara com
80	Number of valid detection classifications()	NumberOfValidDetectionClassifications	Autosar vector
81	Detection classification type(A.2.1)	DetectionClassificationType	ara com
82	Detection classification type confidence(A.2.2)	DetectionClassificationTypeConfidence	ara com
83	Position elevation(A.2.7)	PositionElevation	ara com
84	Position elevation error(A.2.9)	PositionElevationError	ara com
85	Relative velocity radial distance error()	RelativeVelocityRadialDistanceError	ara com

Table 10.6: Capability Vector of RadarDetectionService

10.3.2 LidarDetectionService Capability Vector

The table below includes the capability bit setting for the optional elements for LidarDetectionService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in LidarDetectionService	Option
1	Interface ID(A.1.4)	InterfaceId	Autosar Service
2	Cycle counter(A.1.6.1)	CycleCounter	ara com
3	Interface cycle time(A.1.7)	InterfaceCycleTime	ara com
4	Interface cycle time variation(A.1.8)	InterfaceCycleTimeVariation	ara com
5	Information vehicle coordinate system(Table 46)	InformationVehicleCoordinateSystem	0
6	Information sensor pose(Table 46)	InformationSensorPose	0

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Bit	Reference Singal in ISO23150	Reference Element in LidarDetectionService	Option
7	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
8	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
9	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
10	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
11	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
12	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
13	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
14	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
15	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
16	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
17	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
18	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
19	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
20	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
21	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
22	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
23	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
24	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
25	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
26	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
27	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
28	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
29	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
30	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
31	Calibration(Table 48)	`Calibration`	0
32	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
33	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
34	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
35	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
36	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
37	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
38	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
39	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
40	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
41	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
42	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
43	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
44	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
45	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
46	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in LidarDetectionService	Option
47	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
48	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
49	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
50	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
51	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
52	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
53	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
54	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
55	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
56	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
57	Sensor cluster(Table 48)	`SensorCluster`	0
58	Information Interface extension(Table 30)	`InformationInterfaceExtension`	0
59	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
60	Motion type(A.1.14)	`MotionType`	ara com
61	Colour model type(A.1.15)	`ColourModelType`	ara com
62	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
63	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
64	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
65	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
66	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
67	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
68	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
69	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
70	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
71	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
72	Recognised detections capability(A.1.10.8)	`RecognisedDetectionsCapability`	ara com
73	Recognised detections status(A.1.11.8)	`RecognisedDetectionsStatus`	ara com
74	Object ID reference detection level(A.4.2)	`ObjectIdReferenceDetectionLevel`	ara com
75	Feature ID reference(A.4.3)	`FeatureIdReference`	ara com
76	Reflectivity error(A.4.23)	`ReflectivityError`	ara com
77	Free space probability(A.4.12)	`FreeSpaceProbability`	ara com
78	Number of valid detection classifications(A.4.13)	`NumberOfValidDetectionClassifications`	Autosar vector
79	Detection classification type(A.4.14)	`DetectionClassificationType`	ara com
80	Detection classification type confidence(A.4.15)	`DetectionClassificationTypeConfidence`	ara com
81	Height lidar(A.4.20)	`HeightLidar`	ara com
82	Height lidar error(A.4.21)	`HeightLidarError`	ara com
83	Dynamics(Table 33)	`LidarDetectionsDynamics`	was in 715

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Bit	Reference Singal in ISO23150	Reference Element in LidarDetectionService	Option
84	Relative velocity radial distance error(A.4.19)	`RelativeVelocityRadialDistanceError`	ara com

Table 10.7: Capability Vector of LidarDetectionService

10.3.3 CameraDetectionService Capability Vector

The table below includes the capability bit setting for the optional elements for CameraDetectionService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in CameraDetectionService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Cycle counter(A.1.6.1)	`CycleCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
8	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
9	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
10	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
11	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
12	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
13	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
14	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
15	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
16	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
17	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
18	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
19	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
20	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
21	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
22	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
23	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
24	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
25	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
26	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
27	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
28	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
29	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
30	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
31	Calibration(Table 48)	`Calibration`	0

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Bit	Reference Singal in ISO23150	Reference Element in CameraDetectionService	Option
32	Calibration process state(A.5.42)	CalibrationProcessState	ara com
33	Sensor origin point correction x(A.5.43)	SensorOriginPointCorrectionX	ara com
34	Sensor origin point correction y(A.5.43)	SensorOriginPointCorrectionY	ara com
35	Sensor origin point correction z(A.5.43)	SensorOriginPointCorrectionZ	ara com
36	Sensor origin point correction x error(A.5.44)	SensorOriginPointCorrectionXError	ara com
37	Sensor origin point correction y error(A.5.44)	SensorOriginPointCorrectionYError	ara com
38	Sensor origin point correction z error(A.5.44)	SensorOriginPointCorrectionZError	ara com
39	Sensor origin translation correction limit xbegin(A.5.45)	SensorOriginTranslationCorrection-LimitXbegin	ara com
40	Sensor origin translation correction limit xend(A.5.45)	SensorOriginTranslationCorrection-LimitXend	ara com
41	Sensor origin translation correction limit ybegin(A.5.45)	SensorOriginTranslationCorrection-LimitYbegin	ara com
42	Sensor origin translation correction limit yend(A.5.45)	SensorOriginTranslationCorrection-LimitYend	ara com
43	Sensor origin translation correction limit zbegin(A.5.45)	SensorOriginTranslationCorrection-LimitZbegin	ara com
44	Sensor origin translation correction limit zend(A.5.45)	SensorOriginTranslationCorrection-LimitZend	ara com
45	Sensor orientation correction yaw(A.5.46)	SensorOrientationCorrectionYaw	ara com
46	Sensor orientation correction pitch(A.5.46)	SensorOrientationCorrectionPitch	ara com
47	Sensor orientation correction roll(A.5.46)	SensorOrientationCorrectionRoll	ara com
48	Sensor orientation correction yaw error(A.5.47)	SensorOrientationCorrectionYawError	ara com
49	Sensor orientation correction pitch error(A.5.47)	SensorOrientationCorrectionPitchError	ara com
50	Sensor orientation correction roll error(A.5.47)	SensorOrientationCorrectionRollError	ara com
51	Sensor pose angle correction limit yawbegin(A.5.48)	SensorPoseAngleCorrectionLimitYawbegin	ara com
52	Sensor pose angle correction limit yawend(A.5.48)	SensorPoseAngleCorrectionLimitYawend	ara com
53	Sensor pose angle correction limit pitchbegin(A.5.48)	SensorPoseAngleCorrectionLimitPitchbegin	ara com
54	Sensor pose angle correction limit pitchend(A.5.48)	SensorPoseAngleCorrectionLimitPitchend	ara com
55	Sensor pose angle correction limit rollbegin(A.5.48)	SensorPoseAngleCorrectionLimitRollbegin	ara com
56	Sensor pose angle correction limit rollend(A.5.48)	SensorPoseAngleCorrectionLimitRollend	ara com
57	Sensor cluster(Table 48)	SensorCluster	0
58	Tracking motion model(A.1.13)	TrackingMotionModel	ara com
59	Motion type(A.1.14)	MotionType	ara com
60	Information ambiguity domain(Table 30)	InformationAmbiguityDomain	0
61	Radial velocity ambiguity domain begin(A.1.16)	RadialVelocityAmbiguityDomainBegin	ara com
62	Radial velocity ambiguity domain end(A.1.16)	RadialVelocityAmbiguityDomainEnd	ara com
63	Range ambiguity domain begin(A.1.17)	RangeAmbiguityDomainBegin	ara com
64	Range ambiguity domain end(A.1.17)	RangeAmbiguityDomainEnd	ara com
65	Angle azimuth ambiguity domain begin(A.1.18)	AngleAzimuthAmbiguityDomainBegin	ara com

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Bit	Reference Singal in ISO23150	Reference Element in CameraDetectionService	Option
66	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
67	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
68	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
69	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
70	Recognised detections capability(A.1.10.8)	`RecognisedDetectionsCapability`	ara com
71	Recognised detections status(A.1.11.8)	`RecognisedDetectionsStatus`	ara com
72	Object ID reference detection level(A.4.2)	`ObjectIdReferenceDetectionLevel`	ara com
73	Feature ID reference(A.4.3)	`FeatureIdReference`	ara com
74	Free space probability(A.4.12)	`FreeSpaceProbability`	ara com
75	Shape ambiguity ID(A.4.27)	`ShapeAmbiguityId`	ara com
76	Colour tone confidence detection level(A.4.29)	`ColourToneConfidenceDetectionLevel`	ara com
77	Position radial distance(A.4.16)	`PositionRadialDistance`	ara com
78	Position radial distance error(A.4.17)	`PositionRadialDistanceError`	ara com
79	Shape reference points(Table 36)	`CameraShapesShapeReferencePoints`	0
80	Position radial distance(A.4.16)	`PositionRadialDistance`	ara com
81	Position radial distance error(A.4.17)	`PositionRadialDistanceError`	ara com
82	Translation rate x detection level(A.4.34)	`TranslationRateXDetectionLevel`	ara com
83	Translation rate y detection level(A.4.34)	`TranslationRateYDetectionLevel`	ara com
84	Translation rate z detection level(A.4.34)	`TranslationRateZDetectionLevel`	ara com
85	Translation rate x detection level error(A.4.35)	`TranslationRateXDetectionLevelError`	ara com
86	Translation rate y detection level error(A.4.35)	`TranslationRateYDetectionLevelError`	ara com
87	Translation rate z detection level error(A.4.35)	`TranslationRateZDetectionLevelError`	ara com

Table 10.8: Capability Vector of CameraDetectionService

10.3.4 USSDetectionService Capability Vector

The table below includes the capability bit setting for the optional elements for USSDetectionService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in USSDetectionService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Cycle counter(A.1.6.1)	`CycleCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
8	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
9	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in USSDetectionService	Option
10	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
11	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
12	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
13	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
14	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
15	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
16	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
17	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
18	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
19	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
20	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
21	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
22	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
23	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
24	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
25	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
26	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
27	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
28	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
29	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
30	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
31	Calibration(Table 48)	`Calibration`	0
32	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
33	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
34	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
35	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
36	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
37	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
38	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
39	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
40	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
41	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
42	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
43	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
44	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
45	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
46	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
47	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
48	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in USSDetectionService	Option
49	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
50	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
51	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
52	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
53	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
54	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
55	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
56	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
57	Sensor cluster(Table 48)	`SensorCluster`	0
58	Information Interface extension(Table 30)	`InformationInterfaceExtension`	0
59	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
60	Motion type(A.1.14)	`MotionType`	ara com
61	Colour model type(A.1.15)	`ColourModelType`	ara com
62	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
63	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
64	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
65	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
66	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
67	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
68	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
69	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
70	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
71	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
72	Recognised detections capability(A.1.10.8)	`RecognisedDetectionsCapability`	ara com
73	Recognised detections status(A.1.11.8)	`RecognisedDetectionsStatus`	ara com
74	Object ID reference detection level(A.4.2)	`ObjectIdReferenceDetectionLevel`	ara com
75	Feature ID reference(A.4.3)	`FeatureIdReference`	ara com
76	Second sensor ID reference(A.4.36)	`SecondSensorIdReference`	ara com
77	Reflectivity(A.4.22)	`Reflectivity`	ara com
78	Height ultrasonic(A.4.39)	`HeightUltrasonic`	ara com
79	Height ultrasonic error(A.4.40)	`HeightUltrasonicError`	ara com

Table 10.9: Capability Vector of USSDetectionService

10.4 Supportive Service

10.4.1 SensorPerformanceService Capability Vector

The table below includes the capability bit setting for the optional elements for Sensor-PerformanceService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in SensorPerformance-Service	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Message counter(A.1.6.2)	`MessageCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com
5	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
6	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
7	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
8	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
9	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
10	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
11	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
12	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
13	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
14	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
15	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
16	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
17	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
18	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
19	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
20	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
21	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
22	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
23	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
24	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
25	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
26	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
27	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
28	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
29	Calibration(Table 48)	`Calibration`	0
30	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
31	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
32	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
33	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
34	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
35	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
36	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SensorPerformance-Service	Option
37	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
38	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
39	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
40	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
41	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com
42	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
43	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
44	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
45	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
46	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
47	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
48	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
49	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
50	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
51	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
52	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
53	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
54	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
55	Sensor cluster(Table 48)	`SensorCluster`	0
56	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
57	Motion type(A.1.14)	`MotionType`	ara com
58	Colour model type(A.1.15)	`ColourModelType`	ara com
59	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
60	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
61	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
62	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
63	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
64	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
65	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
66	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
67	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
68	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
69	Information sensor surrounding(Table 46)	`InformationSensorSurrounding`	0
70	Vanishing point azimuth error(A.1.27)	`VanishingPointAzimuthError`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SensorPerformance-Service	Option
71	Vanishing point elevation error(A.1.27)	`VanishingPointElevationError`	ara com
72	Measurement grid resolution radial distance(A.5.3)	`MeasurementGridResolutionRadialDistance`	ara com
73	Measurement grid resolution azimuth(A.5.3)	`MeasurementGridResolutionAzimuth`	ara com
74	Measurement grid resolution elevation(A.5.3)	`MeasurementGridResolutionElevation`	ara com
75	Beam divergence azimuth(A.5.4)	`BeamDivergenceAzimuth`	ara com
76	Beam divergence elevation(A.5.4)	`BeamDivergenceElevation`	ara com
77	Range gain(A.5.5)	`RangeGain`	ara com
78	Field of view reduction(Table 46)	`FieldOfViewReduction`	0
79	Real world object recognition capabilities (Table 46)	`RealWorldObjectRecognitionCapabilities`	0
80	True positive rate(A.5.13)	`TruePositiveRate`	ara com
81	False positive rate(A.5.14)	`FalsePositiveRate`	ara com
82	Positive predictive value(A.5.15)	`PositivePredictiveValue`	ara com
83	Reference target recognition capabilities(Table 46)	`ReferenceTargetRecognitionCapabilities`	0
84	Reference target type(A.5.17)	`ReferenceTargetType`	ara com
85	Radar cross section reference target(A.5.18)	`RadarCrossSectionReferenceTarget`	ara com
86	Reflectivity reference target(A.5.19)	`ReflectivityReferenceTarget`	ara com
87	True positive rate(A.5.13)	`TruePositiveRate`	ara com
88	Relative radial velocity range begin(A.5.20)	`RelativeRadialVelocityRangeBegin`	ara com
89	Relative radial velocity range end(A.5.20)	`RelativeRadialVelocityRangeEnd`	ara com
90	Spatial separability radial distance(A.5.22)	`SpatialSeparabilityRadialDistance`	ara com
91	Spatial separability azimuth(A.5.22)	`SpatialSeparabilityAzimuth`	ara com
92	Spatial separability elevation(A.5.22)	`SpatialSeparabilityElevation`	ara com
93	Velocity separability radial distance(A.5.23)	`VelocitySeparabilityRadialDistance`	ara com
94	Velocity separability azimuth(A.5.23)	`VelocitySeparabilityAzimuth`	ara com
95	Velocity separability elevation(A.5.23)	`VelocitySeparabilityElevation`	ara com

Table 10.10: Capability Vector of SensorPerformanceService

10.4.2 SensorHealthService Capability Vector

The table below includes the capability bit setting for the optional elements for SensorHealthService, which also refers to ISO 23150.The Bit setting to 1 means the presence of the optional element, while 0 means absent.

Bit	Reference Singal in ISO23150	Reference Element in SensorHealthService	Option
1	Interface ID(A.1.4)	`InterfaceId`	Autosar Service
2	Message counter(A.1.6.2)	`MessageCounter`	ara com
3	Interface cycle time(A.1.7)	`InterfaceCycleTime`	ara com
4	Interface cycle time variation(A.1.8)	`InterfaceCycleTimeVariation`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SensorHealthService	Option
5	Information vehicle coordinate system(Table 46)	`InformationVehicleCoordinateSystem`	0
6	Information sensor pose(Table 46)	`InformationSensorPose`	0
7	Sensor origin point x error(A.1.23)	`SensorOriginPointXError`	ara com
8	Sensor origin point y error(A.1.23)	`SensorOriginPointYError`	ara com
9	Sensor origin point z error(A.1.23)	`SensorOriginPointZError`	ara com
10	Sensor origin point x x error (A.1.23)	`SensorOriginPointXXError`	ara com
11	Sensor origin point x y error (A.1.23)	`SensorOriginPointXYError`	ara com
12	Sensor origin point x z error (A.1.23)	`SensorOriginPointXZError`	ara com
13	Sensor origin point y x error (A.1.23)	`SensorOriginPointYXError`	ara com
14	Sensor origin point y y error (A.1.23)	`SensorOriginPointYYError`	ara com
15	Sensor origin point y z error (A.1.23)	`SensorOriginPointYZError`	ara com
16	Sensor origin point z x error (A.1.23)	`SensorOriginPointZXError`	ara com
17	Sensor origin point z y error (A.1.23)	`SensorOriginPointZYError`	ara com
18	Sensor origin point z z error (A.1.23)	`SensorOriginPointZZError`	ara com
19	Sensor orientation yaw error(A.1.25)	`SensorOrientationYawError`	ara com
20	Sensor orientation pitch error(A.1.25)	`SensorOrientationPitchError`	ara com
21	Sensor orientation roll error(A.1.25)	`SensorOrientationRollError`	ara com
22	Sensor orientation yaw yaw error (A.1.25)	`SensorOrientationYawYawError`	ara com
23	Sensor orientation yaw pitch error (A.1.25)	`SensorOrientationYawPitchError`	ara com
24	Sensor orientation yaw roll error (A.1.25)	`SensorOrientationYawRollError`	ara com
25	Sensor orientation pitch yaw error (A.1.25)	`SensorOrientationPitchYawError`	ara com
26	Sensor orientation pitch pitch error (A.1.25)	`SensorOrientationPitchPitchError`	ara com
27	Sensor orientation pitch roll error (A.1.25)	`SensorOrientationPitchRollError`	ara com
28	Sensor orientation roll yaw error (A.1.25)	`SensorOrientationRollYawError`	ara com
29	Sensor orientation roll pitch error (A.1.25)	`SensorOrientationRollPitchError`	ara com
30	Sensor orientation roll roll error (A.1.25)	`SensorOrientationRollRollError`	ara com
31	Calibration(Table 48)	`Calibration`	Q This should be in the header or in the body for Sensor Health information
32	Calibration process state(A.5.42)	`CalibrationProcessState`	ara com
33	Sensor origin point correction x(A.5.43)	`SensorOriginPointCorrectionX`	ara com
34	Sensor origin point correction y(A.5.43)	`SensorOriginPointCorrectionY`	ara com
35	Sensor origin point correction z(A.5.43)	`SensorOriginPointCorrectionZ`	ara com
36	Sensor origin point correction x error(A.5.44)	`SensorOriginPointCorrectionXError`	ara com
37	Sensor origin point correction y error(A.5.44)	`SensorOriginPointCorrectionYError`	ara com
38	Sensor origin point correction z error(A.5.44)	`SensorOriginPointCorrectionZError`	ara com
39	Sensor origin translation correction limit xbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitXbegin`	ara com
40	Sensor origin translation correction limit xend(A.5.45)	`SensorOriginTranslationCorrection-LimitXend`	ara com
41	Sensor origin translation correction limit ybegin(A.5.45)	`SensorOriginTranslationCorrection-LimitYbegin`	ara com
42	Sensor origin translation correction limit yend(A.5.45)	`SensorOriginTranslationCorrection-LimitYend`	ara com
43	Sensor origin translation correction limit zbegin(A.5.45)	`SensorOriginTranslationCorrection-LimitZbegin`	ara com

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Bit	Reference Singal in ISO23150	Reference Element in SensorHealthService	Option
44	Sensor origin translation correction limit zend(A.5.45)	`SensorOriginTranslationCorrection-LimitZend`	ara com
45	Sensor orientation correction yaw(A.5.46)	`SensorOrientationCorrectionYaw`	ara com
46	Sensor orientation correction pitch(A.5.46)	`SensorOrientationCorrectionPitch`	ara com
47	Sensor orientation correction roll(A.5.46)	`SensorOrientationCorrectionRoll`	ara com
48	Sensor orientation correction yaw error(A.5.47)	`SensorOrientationCorrectionYawError`	ara com
49	Sensor orientation correction pitch error(A.5.47)	`SensorOrientationCorrectionPitchError`	ara com
50	Sensor orientation correction roll error(A.5.47)	`SensorOrientationCorrectionRollError`	ara com
51	Sensor pose angle correction limit yawbegin(A.5.48)	`SensorPoseAngleCorrectionLimitYawbegin`	ara com
52	Sensor pose angle correction limit yawend(A.5.48)	`SensorPoseAngleCorrectionLimitYawend`	ara com
53	Sensor pose angle correction limit pitchbegin(A.5.48)	`SensorPoseAngleCorrectionLimitPitchbegin`	ara com
54	Sensor pose angle correction limit pitchend(A.5.48)	`SensorPoseAngleCorrectionLimitPitchend`	ara com
55	Sensor pose angle correction limit rollbegin(A.5.48)	`SensorPoseAngleCorrectionLimitRollbegin`	ara com
56	Sensor pose angle correction limit rollend(A.5.48)	`SensorPoseAngleCorrectionLimitRollend`	ara com
57	Sensor cluster(Table 48)	`SensorCluster`	0
58	Information Interface extension(Table 30)	`InformationInterfaceExtension`	0
59	Tracking motion model(A.1.13)	`TrackingMotionModel`	ara com
60	Motion type(A.1.14)	`MotionType`	ara com
61	Colour model type(A.1.15)	`ColourModelType`	ara com
62	Information ambiguity domain(Table 30)	`InformationAmbiguityDomain`	0
63	Radial velocity ambiguity domain begin(A.1.16)	`RadialVelocityAmbiguityDomainBegin`	ara com
64	Radial velocity ambiguity domain end(A.1.16)	`RadialVelocityAmbiguityDomainEnd`	ara com
65	Range ambiguity domain begin(A.1.17)	`RangeAmbiguityDomainBegin`	ara com
66	Range ambiguity domain end(A.1.17)	`RangeAmbiguityDomainEnd`	ara com
67	Angle azimuth ambiguity domain begin(A.1.18)	`AngleAzimuthAmbiguityDomainBegin`	ara com
68	Angle azimuth ambiguity domain end(A.1.18)	`AngleAzimuthAmbiguityDomainEnd`	ara com
69	Angle elevation ambiguity domain begin(A.1.19)	`AngleElevationAmbiguityDomainBegin`	ara com
70	Angle elevation ambiguity domain end(A.1.19)	`AngleElevationAmbiguityDomainEnd`	ara com
71	Interface applicability(A.1.20)	`InterfaceApplicability`	ara com
72	Sensor externally disturbed(A.5.33)	`SensorExternallyDisturbed`	ara com
73	Sensor transmit power reduced(A.5.34)	`SensorTransmitPowerReduced`	ara com
74	Status sensor heating(A.5.35)	`StatusSensorHeating`	ara com
75	Status sensor cleaning(A.5.36)	`StatusSensorCleaning`	ara com
76	Sensor time sync(A.5.37)	`SensorTimeSync`	ara com
77	Sensor time sync offset value(A.5.38)	`SensorTimeSyncOffsetValue`	ara com

Table 10.11: Capability Vector of SensorHealthService