International

ISO 23150-1

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

Part 1: General information and principles

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

Partie 1: Informations générales et principes

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

This first edition of ISO 23150-1, together with ISO 23150-2 [1], ISO 23150-11 [2], ISO 23150-12 [3], ISO 23150-13 [4], ISO 23150-14 [5], ISO 23150-15 [6] and ISO 23150-20 [7], cancels and replaces ISO 23150:2023, which has been technically revised.

The main changes are as follows:

— This document forms a structural revision of ISO 23150:2023 and replaces mainly Clauses 1 to 6 and Annex B.

A list of all parts in the ISO 23150 series can be found on the ISO website.

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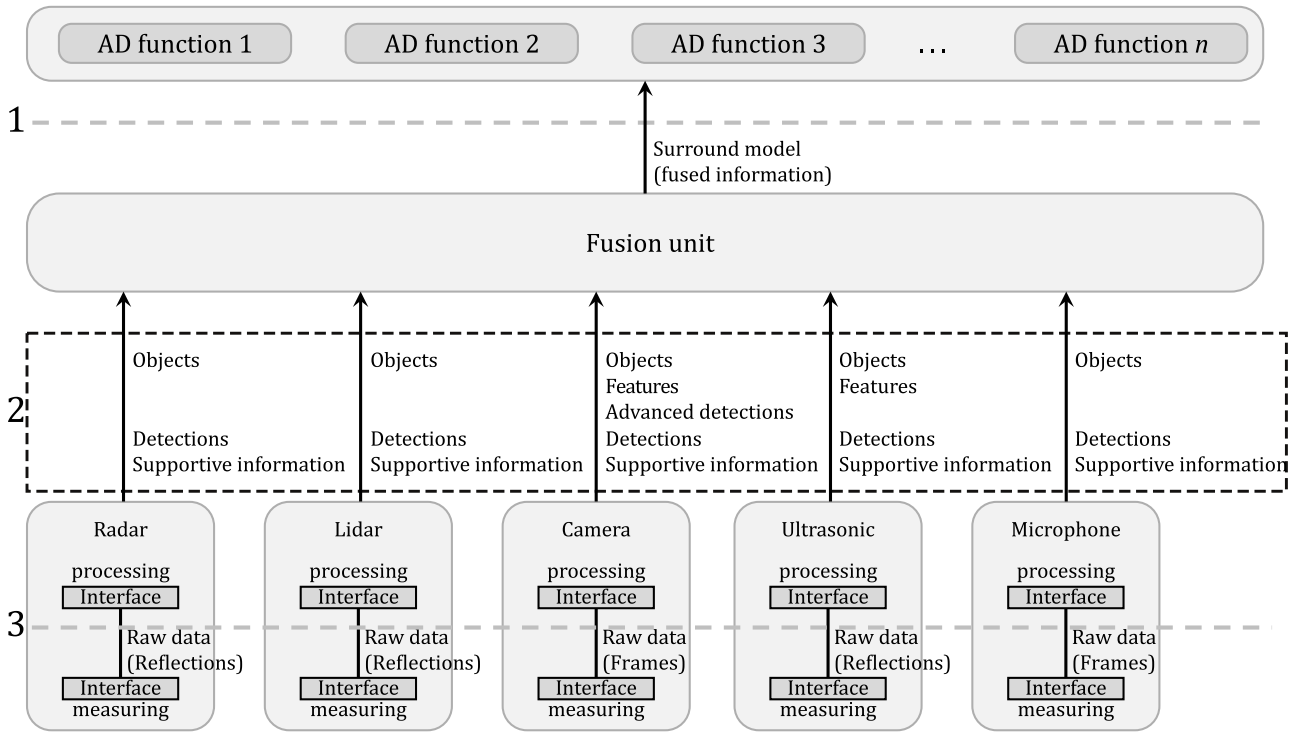
(Highly-)automated driving (AD) functions for road vehicles require a situation awareness of the surroundings of the vehicle and, preferably, a comprehensive scene understanding. For the fast and reliable recognition of real-world objects, a sensor suite is necessary to provide information for the fusion unit. Utilisation of different sensor technologies with different detection capabilities is indispensable to ensure both complementary and redundant information. The fusion unit analyses and evaluates the different sensor signals and finally generates a dynamic surround model with sufficient scene understanding.

While current partly-automated functions utilise only particular objects (for example, vehicles, pedestrians, road markings) to generate a simple surround model, it is necessary for future highly-automated driving functions to merge not only the recognised objects but also to include other sensor-specific properties and characteristics of these objects for the generation of a coherent surround model of the surroundings. To minimise the development efforts for the sensors and the fusion unit and to maximise the re-usability of development and validation efforts for the different functions on the sensor and fusion unit side, a standardised logical interface layer between the sensor suite and the fusion unit and a standardised logical interface layer to the sensor suite are worthwhile and beneficial for both the sensor supplier and the system supplier.



Key

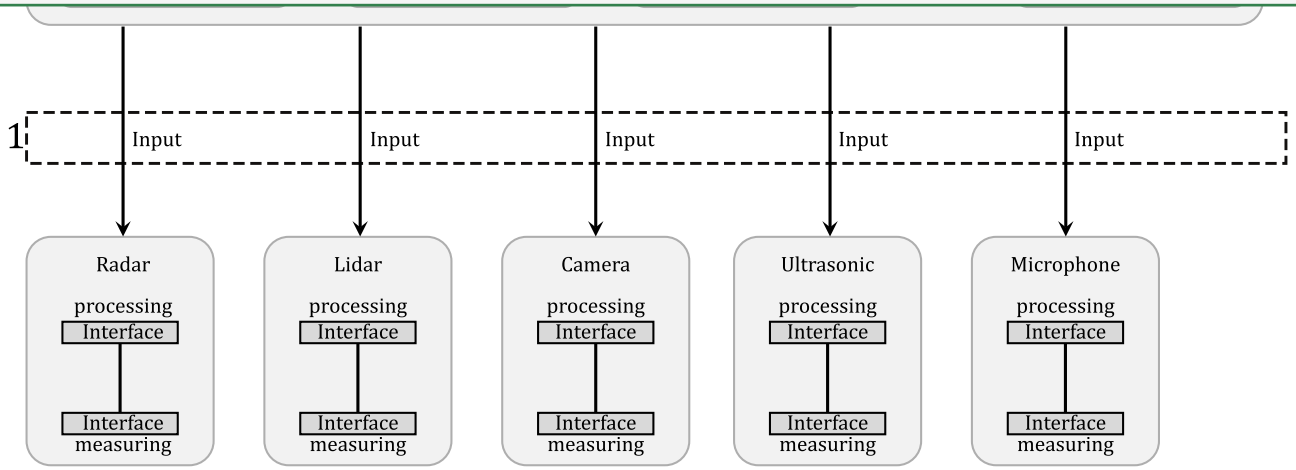
1 logical interface layer between the fusion unit and AD functions

2 logical interface layer between a single sensor as well as a single-sensor cluster and the fusion unit

3 interface layer on raw data level of a sensor's sensing element(s) and its processing

Figure 1 — Architecture: sensors/sensor clusters → fusion unit → AD functions

The logical interface layer between a single sensor as well as a single-sensor cluster and the fusion unit (see Figure 1, key 2) addresses the encapsulation of technical complexity as well as objects including free-space, features, advanced detections and detections to enable object-level, feature-level, advanced detection-level and detection-level fusion. Additional supportive information of the sensor as well as the sensor cluster will supplement the data for the fusion unit.



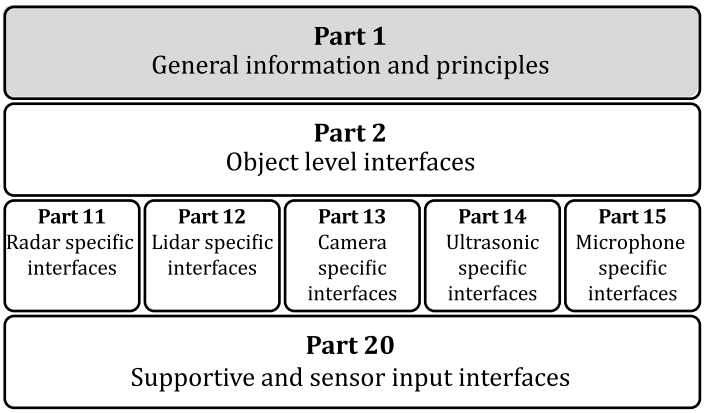
Key

1 logical interface layer between other in-vehicle electronic control units (ECUs) (for example, odometry) and a single sensor or a single-sensor cluster

Figure 2 — Architecture: ECUs' sensor input → sensors/sensor clusters

The logical interface layer between an electronic control unit and a single sensor as well as a single-sensor cluster (see Figure 2, key 1) addresses the input of a single sensor as well as a single sensor-cluster.

Figure 3 shows the schematic and contextual relationships between the documents relating to logical interfaces of the ISO 23150 series.



Key

Scope of this document

Figure 3 — Relationship of the ISO 23150 series