

## Deliverable D3.1

### D3.1 Specification of the modular system architecture of the environment model

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|---------------------|-------------------|
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## Executive summary

This deliverable is part of a second set of technical reports which expand upon the common and more generic RobustSENSE architecture description given in deliverable D2.1. Deliverable D3.1 describes the data fusion layer of the platform architecture and the necessary interfaces to WP4.

Driven by the need to push the current state-of-the-art, the RobustSENSE data fusion layer aims to retain highly specific information obtained directly from the underlying physical measurement principles of a multi modal sensor suite while augmenting it with data obtained from sensor redundancy, interactions, and disparity information of the different sensor modalities. To this end a “RobustSENSE Sensor” is introduced, providing a generic approach to connect various sensor modalities to the RobustSENSE data fusion layer.

The information provided by RobustSENSE Sensors is utilized in a hierarchical stack of functional modules, which provide an initial low level fusion, followed by an encompassing high level fusion module. A key concept is the decoupling of the functional module hierarchy, which eliminates information feedback loops, from information access. Invariantly of their position in the module hierarchy, all functional modules can access all RobustSENSE Sensors as well as any low level fusion information made available by predecessor modules.

Following the common RobustSENSE architecture, all functional modules as well as the high-level fusion participate in the online system assessment process and incorporate status information from other architecture elements. This enables the data fusion layer to develop a dynamic environment model with 360° surround view through sensor data fusion around the ego-vehicle and being able to assess the spatial-temporal accuracy as well as an existence probability and a probability of the object classification (e.g. car, truck, pedestrian) of every tracked object.

The provided architecture description of the data fusion layer provides a generic framework which at the same time ensures a system-wide interoperability while enabling system- or vehicle-specific implementations. This design decision will ensure that current and future use of the RobustSENSE platform can be achieved independently of specific OEM implementation details.