

LeddarVision™ LVS-2+

Comprehensive Surround-View Premium ADAS L2/L2+ Highway Assist and 5-Star NCAP 2025/GSR 2022 Low-Level Fusion and Perception Software Stack

Product Overview

LVS-2+ is a comprehensive fusion and perception software stack supporting premium surround-view L2/L2+ ADAS highway assistance and 5-star NCAP 2025/GSR 2022 safety applications. LeddarVision™ low-level fusion (LLF) and perception technology enables the implementation of full surround-view to extended front-view ADAS utilizing a **single architectural approach, efficiently scaling computational power with sensor additions and reducing rework efforts with sensor changes. Based on LeddarVision™ architecture, LVS-2+ **efficiently extends** the LVS base front-view product family 1VxR sensor configuration to a **5V5R configuration**, enhancing support to **TJA and HWA applications and enabling automated lane changes, overtaking and extended speed range adaptive cruise control (ACC)**.**

LVS-2+ implements a premium fusion and perception, positioning and prediction stack handling sensors' interface, calibration and diagnostics, sensor synchronization, sensor fusion, object detection and classification, extended to include unclassified objects and events (e.g., cut-in), continuous tracking and stabilization, free space detection, road model, comprehensive traffic sign detection, highway traffic light detection, vehicle odometry interface and ego-motion localization. LVS-2+ also extends safety features support with trajectory prediction, perception decomposition, ODD analysis, sensor coverage and health monitoring.

Based on LeddarVision low-level fusion (LLF) and perception technology, LVS-2+ enables a **full surround-view L2/L2+ and highway assist ADAS offering at lower sensor and hardware cost**. LLF technology optimally combines sensor modalities, pushing the performance envelope far beyond legacy solutions and **extending object detection to over 200 m**. LVS-2+ extended **5V5R configuration** has a **single wide FoV (120°) front camera, four surround 190° FoV cameras, one medium-range front radar and four short-range front and back corner radars**. The front camera and medium-range radar extend **ACC support up to 160 km/h**. Surround cameras and rear short-range corner radars **extend support of 5-star NCAP 2025 / GSR 2022 to overtaking/reverse/dooring scenarios** and the **highway assist features enabling HWA and TJA with auto-lane change support**.

LVS-2+ superior object detection performance extends to occluded VRUs and vehicles, providing early warning in NCAP-tested scenarios (e.g., occluded cyclist tests). Superior object separation and longitudinal position measurement accuracy in highway scenarios lead to higher performing ACC implementation. Inherent sensor redundancy provides a more reliable operation in the presence of degraded (e.g., dirty lens), failing (e.g., failing camera) or conflicting sensors (e.g., false alarms from radars in the presence of guard rails' multipath) and adverse scenarios and environments (e.g., dust, blinding light, etc.).

The LVS-2+ product is part of a family of LeddarVision products targeting entry- to premium-level ADAS. A comprehensive product roadmap provides growing features support for different market segments. The LVS companion product family targets entry-level to premium front-view ADAS, with 1V2R to 1V5R sensor configuration, providing economical solutions to support GSR and 5-star NCAP 2025 with comprehensive perception features.

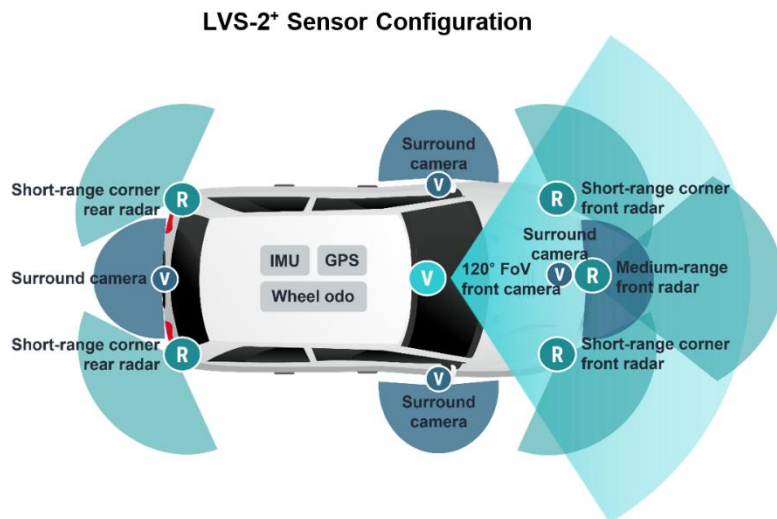
LVS-2+ is planned to support vehicle SOP in 2027.

Target Applications

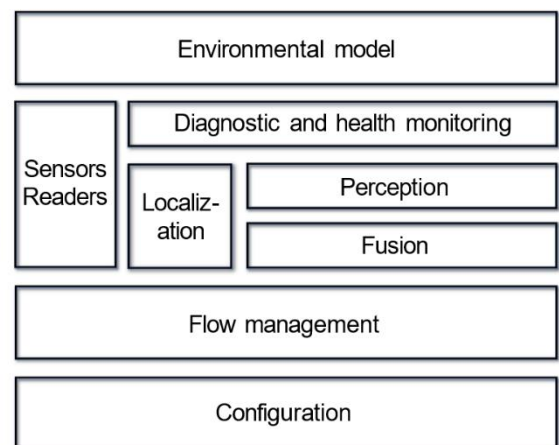
- Full surround-view L2/L2+ ADAS and highway assist applications
- Safety: GSR 2022 and 5-star NCAP 2025 (SA, VRU), including AEB C2C & VRU, AEB evasive, FCW, LDW, LKA, ELK, BSD, LCA, LCDAS, RCW, RCTA, FCTA, SAS, TLR and TSR.
- Driving: L2/L2+ highway assist, including ACC (up to 160 km/h), LCC, ALCA, TJA and HWA (including auto-lane change support).

Hardware Platform

- Sensor configuration: 5V5R
- Front camera: 120° FoV
- Surround cameras: Four 190° FoV
- Front radar: One medium-range radar (Continental ARS510 or similar)
- Corner radars: Four short-range corner radars (Continental SRR520 or similar)
- SoC: Targeting TI's TDA4 family



Software Functional Diagram



Software Stack Features

Fusion	Radar-camera low-level fusion Offline and online camera-to-camera radar-to-camera calibration and diagnostics
Perception	Dynamic and static 3D object detection and classification, including vehicles and VRUs, extended to surround lanes Road model: complete road model, including ego-lane and up to two adjacent L/R lanes based on lane line detection (solid, dashed, color) and road edges; road edge modeling Speed traffic sign detection (SAS/ISA support) Object continuous tracking and stabilization, 15 FPS output
Premium perception	Unclassified object detection Event detection (e.g., cut-in) Free space detection Traffic sign and highway traffic light detection

Premium prediction	Detected objects trajectory prediction
Positioning	Ego-motion, GPS, IMU and vehicle dynamics-based odometry (wheels)
Premium positioning	Global localization with HD Map input
Premium safety	Detection of global scene attributes to support ODD analysis Sensor coverage and health monitoring Perception decomposition
Supported ODDs	Weather: clear, light rain, fog, snow, wet road, snow on the road Illumination: day / lowlight / night with streetlights Road topography and conditions: highway, poor road marking visibility, high lane curvatures. Highway special lanes, including entrances, exits, toll, service and ramps. ODD extended to cover 5-star NCAP 2025 test scenarios
Environmental model	Objects (3D, classification), free space, road model, ego-motion data in vehicle coordinates (in global coordinates – TBD) and diagnostics (TBD)
Operating system	Linux

Targeted Perception Key Performance Indicators (KPIs)

Object detection	<p>Vehicles (CIPV): Typ. range >200 m</p> <p>Vehicles (rear, ego-direction, NOC): Typ. range >150 m, recall 95%</p> <p>Vehicles (rear view): Typ. range 100 m (dynamic only, behind ego-vehicle)</p> <p>VRUs (ego-path): Typ. range 60 m</p> <p>Vehicles and VRUs (vehicle sides, highway): Typ. range 10 m</p> <p>Unclassified objects (on L/C/R lanes): TBD</p> <p>Ultra-low FPR on objects in AEB collision relevant zone to support safety features with perception decomposition</p>
Object measurements	<p>Vehicle (rear, ego-direction, NOC) accuracy: Typ. std longitudinal position error <1.5%, lateral position error <0.5 m, longitudinal and lateral speed error <1 m/sec, heading error 2 deg @ 150 m</p>
Road model	<p>CIPV assignment to ego-lane up to 200 m</p> <p>Non-occluded surrounding vehicles assignment up to 100 m</p>
Traffic sign detection	Numerical type signs with recall >95%, precision >99%
Traffic light detection	TBD
NCAP 2025 test scenarios	Perception shall support gaining >90% score of SA and VRU relevant tests.

LVS-2+ Features Roadmap Schedule

- Extended ODD: 2025
- Comprehensive TSR/TLR: 2025
- Premium perception: 2025

Certifications

- ASPICE: Developed according to ASPICE L2, targeted by Q2 2025.
- ISO 26262 / ASIL-B certification targeted.

Availability

- "A" sample: Available since Q4 2022
- "B" sample: Q4 2023
- "C" sample: 2026
- Target vehicles: SOP 2027