

# LeddarVision™ LVF-E

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

### Product Overview

LVF-E is a comprehensive fusion and perception software stack supporting entry-level ADAS safety and highway assistance L2/L2+ applications. **Based on LeddarVision low-level fusion (LLF) and perception technology, LVF-E enables the entry-level ADAS offering at the lowest sensor and hardware cost.** LLF technology optimally combines sensor modalities, pushing the performance envelope far beyond legacy solutions, doubling supported object detection range to over 150 meters, thus **supporting GSR 2022 and 5-star NCAP 2025** requirements with 1V2R configuration, having only a **single wide FoV (120°)** class front camera and **two short-range front corner radars**. The LVF-E software stack is targeting low-cost ECU based on TI's TDA4-Mid processor with limited 8 TOPS deep-learning acceleration.

LVF-E implements a complete stack handling sensors' interface, calibration and synchronization, sensor fusion, object detection and classification, continuous tracking and stabilization, road model, speed traffic sign detection, vehicle odometry interface and ego-motion localization, providing a comprehensive environmental model and API to entry-level L2/L2+ ADAS applications.

LVF-E's superior object detection performance further 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) and adverse scenarios and environments (e.g., dust, blinding light, etc.).

The LVF-E product is part of a family of base front-view ADAS products. A comprehensive product roadmap provides growing features and support for different market segments. LVF-H companion product targets premium front-view ADAS, extends sensor support to 1V5R sensor configuration, adding two back corner radars for extended 5-star NCAP support (overtaking/reverse/dooring scenarios), enhanced highway assistance support (semi-automated lane change), a front medium-range radar and 120° FoV class camera for extended range and ACC and premium perception, positioning and prediction features.

The LVF-E production sample ("B" sample), powered by TI's TDA4-Mid processor, was released in June 2023 and targets vehicle SOP for 2026.

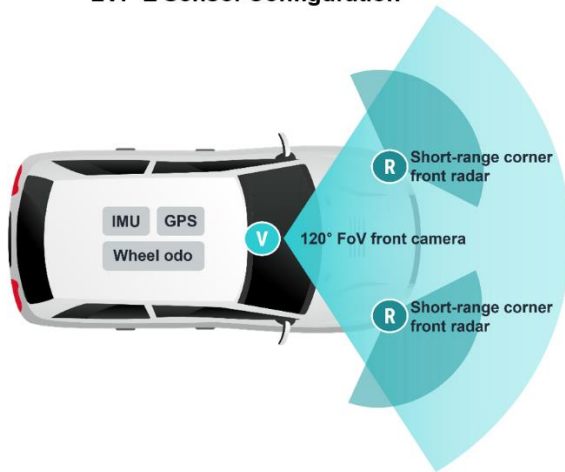
### Target Applications

- Cost-effective entry-level ADAS
- Safety: GSR 2022 and 5-star NCAP 2025 (SA, VRU), including AEB C2C & VRU, FCW, LDW, FCTA, TLR, TSR, SAS, ELK and LKA. Excluding NCAP overtaking/reverse/dooring scenarios.
- Driving: L2/L2+ highway assist, including ACC (up to 130 km/h), LCC, TJA and HWA. Excluding lane change support.

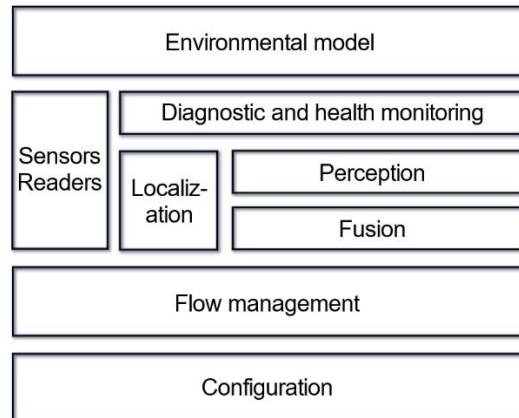
### Hardware Platform

- Sensor configuration: 1V2R
- Front camera: 120° FoV
- Front radars: Two short-range corner radars (Continental SRR520, upgraded 200 m ver. or similar)
- SoC/memory: TI TDA4-Mid processor, 8 GB
- ECU: TBD

LVF-E Sensor Configuration



Software Functional Diagram



### Software Stack Features

Fusion	Radar-camera low-level fusion Offline radar-to-camera calibration
Perception	Dynamic and static 3D object detection and classification, including vehicles and VRUs Road model: L/C/R lanes based on lane line detection (solid, dashed, color), traffic island and road edge detection Speed traffic sign detection (SAS/ISA support) Object continuous tracking and stabilization, 15 FPS output
Positioning	Ego-motion, GPS, IMU and vehicle dynamics-based odometry (wheels)
Supported ODDs	Weather/illumination: day / low light / night with streetlights, light rain 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), road model and ego-motion data in vehicle coordinates
Operating system	Linux

### Targeted Perception Key Performance Indicators (KPIs)

Object detection	Vehicles (CIPV): Typ. range >150 m, recall 99% Vehicles (rear, ego-direction, NOC): Typ. range >150 m, recall 95% VRUs (pedestrians, NOC): Typ. range 40 m Low FPR on objects in AEB collision relevant zone to support safety features
Object measurements	Vehicle (rear, ego-direction, NOC) accuracy: Typ. std longitudinal position error <1.5 m, lateral position error <0.5 m, longitudinal and lateral speed error <1 m/sec, heading error 2 deg @ 150 m
Road model	CIPV assignment to ego-lane up to 150 m
NCAP 2025 test scenarios	Perception shall support gaining >90% score of SA and VRU relevant tests.

## LVF-E Features Roadmap Schedule

- TI TDA4-Mid platform: 2023
- TSR for SAS/ISA support: 2023
- Road model: 2023
- Extended ODD: 2025

## Certifications

- ASPICE: Developed according to ASPICE L2, targeted by Q2 2025.
- ISO 26262/ASIL B: Ready for ADAS SAE L2, targeted by Q3 2025.

## Availability

- "A" sample: Available since Q2 2022
- "B" sample: Available since Q2 2023
- Target vehicles: SOP 2026