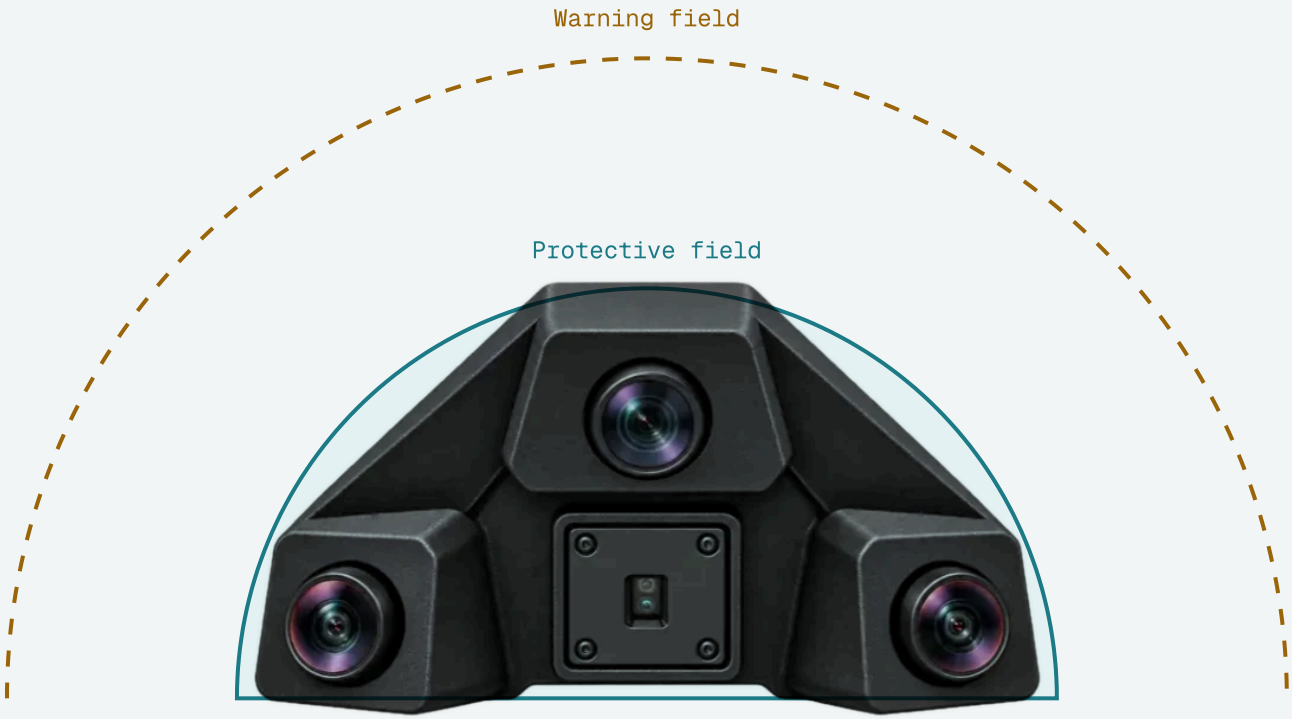


Robot safety that scales.

3D safety sensor systems for AMRs, AGVs and humanoid robots, built from automotive series components.

Automotive safety engineering for mobile robots.

TriRide Mobility is a Hamburg company that develops 3D safety sensor systems for mobile robots working near people. The founders spent two decades developing camera and LiDAR systems for the automotive industry, from prototype to series production under ISO 26262. TriRide applies the same components and methods to AMRs, AGVs and humanoid robots.

The reference product combines automotive cameras, multi-baseline stereo and an optional LiDAR in one sensor head. It is designed to replace both the 2D safety laser scanner and the additional stereo cameras found on most robots today.

43+
years in automotive camera & LiDAR industrialization

24+
large-scale programmes and projects delivered

SIL 2
and PL d as development target

IP69K
automotive-qualified camera modules

Mission

Automotive-grade safety for every robot. Scalable, affordable, ready in weeks.

Vision

Every car carries decades of safety. Every robot deserves the same.

Four product goals

1 **Availability**
Robots stop for actual risk, not for every detection. Fewer false stops mean more productive hours.

2 **Time-to-Market**
Safety for a new mounting position or vehicle in weeks, not months.

3 **Scalability**
Each new robot needs a delta analysis, not a full qualification.

4 **Quality**
Automotive-qualified components for indoor and outdoor use.

Core competencies

Automotive hardware, 3D perception software and functional safety engineering in one team.

01

Automotive-grade sensing

Series automotive cameras from high-volume production: ASIL-B ready, IP69K, –40 to +85 °C. A LiDAR adds an independent depth cross-check.

02

Multi-baseline stereo 3D perception

Depth is measured, not estimated. 175° × 165° stereo field of view plus 240° × 165° mono. Three stereo pairs cross-check each other, so a misaligned camera is detected during operation.

03

Two-field safety architecture

A protective field based only on measured depth, plus a warning and speed field that uses object classes. This reduces false stops without weakening detection.

04

Functional safety & SEooC

Transfer of Safety Elements out of Context from ISO 26262 to IEC 61508, ISO 13849, ISO 3691-4 and ISO 10218. Target: SIL 2 / PL d.

05

FuSa AI

Software agents compile project-specific safety documentation from qualified building blocks. A safety engineer reviews and releases every output.

06

Hardware-agnostic system integration

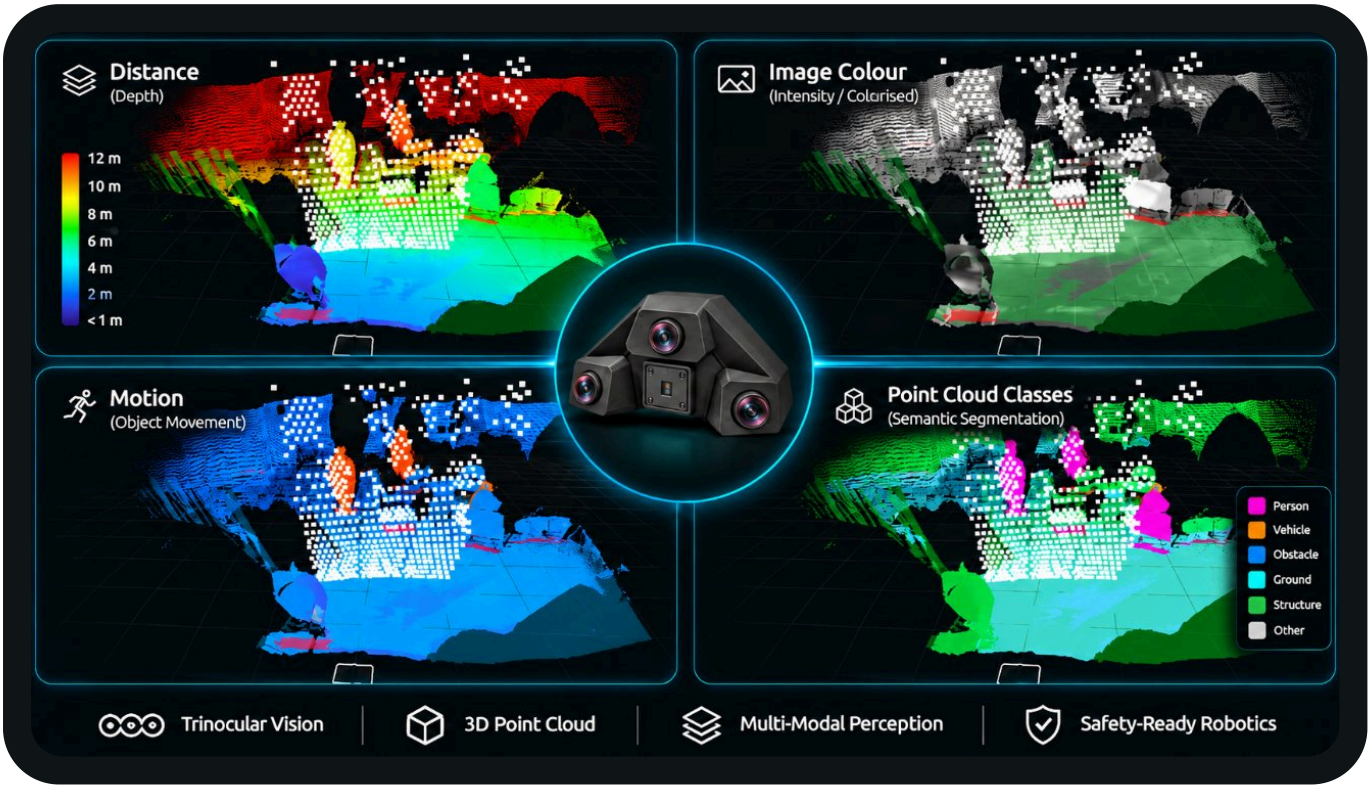
Built into the vehicle or as a single head, one to four modules. GMSL2, optional 10GbE, SDK and ROS 2.

Applications

AMR | Pallet AGV | Humanoid robots | Docking | Outdoor robotics

One sensor head, four data layers

Each 3D point carries distance, colour, motion and an object class. The robot can tell a person from a pallet and react accordingly.



Protective field

Uses measured depth only.

Warning field

Object classes and motion decide when the robot slows down.

Hardware

Replaces the 2D scanner and separate stereo cameras.

3D Safety Fusion Box

Passive 3D stereo safety sensor for AMRs and AGVs with automotive series cameras. Protective field and perception in one device.



Target specification · preliminary

Detailed technical data

Features	
Technology	Passive 3D stereo, multi-baseline, with LiDAR
Protective field range	4.0 m (body, 200 mm) · 3.0 m (leg, 70 mm) · 2.0 m (arm, 40 mm)
Warning field range	10 m
Field of view	175° × 165° (3D Stereo) / 240° × 165° (2D Mono)
Response time	≤ 100 ms
Simultaneously monitored fields	3 per field set (1 protective, 2 warning); ≥ 32 field sets
Safety-related parameters	
Safety integrity level	SIL 2 (IEC 61508)
Category	Category 3 (ISO 13849-1)
Performance level	PL d (ISO 13849-1)
PFH_D	$< 1 \times 10^{-7}$ /h
Architecture	2oo3D over 3 stereo pairs, 1oo2D with LiDAR (HFT 1)
Functions	
Protective field switching	✓ (by vehicle speed, steering angle)
Self-monitoring of camera alignment	✓
Deterministic (Safety) + AI (Comfort)	✓
Measured data output	✓ Point Cloud+, BEV, Moving Objects with TTC
Depth and image sensors	
Image sensors	2 × 3 MP fisheye 200°, 1 × 8 MP 120°; automotive series
Depth range	0.2 m … 15 m
Depth precision	≤ 1 % at 2 m, ≤ 2 % at 4 m, ≤ 3 % at 8 m
Frame rate	≥ 15 Hz (goal 30 Hz)
Interfaces	
Interface	Camera: GMSL2, LiDAR: USB-C
Data interface	10GbE via sensor aggregator (optional)
Software	SDK, ROS 2 driver
Electrical and ambient data	
Supply voltage	Compute unit: 24 V DC (16.8 V … 30 V); cameras: 12 V via GMSL2 (PoC); LiDAR: 5 V via USB-C
Power consumption	≤ 40 W system, incl. cameras and LiDAR (25 W compute mode)
Enclosure rating	IP65 / IP67
Ambient operating temperature	–40 °C … +85 °C (Cameras) - -20°C …+55°C (LIDAR)
Ambient light immunity	3 klx, operation up to 40 klx

From automotive series development to robotics

Roots

The founders spent two decades on automotive camera, LiDAR and sensor-fusion development and took 24+ programmes into series production.

2025

TriRide Mobility founded in Hamburg.

2026

First multi-camera sensor head with a running 3D stereo pipeline.

VISION 2026

Prototype presented at VISION Stuttgart on the Sony booth.

Today

Evaluation kits available. Installation on a customer vehicle or trolley takes one day.

2027 (planned)

Pilot projects with industrial customers. Safety documentation prepared for series integration.



Reference sensor head: three automotive cameras and LiDAR

TriRide Mobility

Contact

TriRide Mobility UG (haftungsbeschränkt)
Randstraße 1
22525 Hamburg, Germany
Amtsgericht Hamburg, HRB 194777

Özgür Nurettin Püskül, Founder & CEO
sales@triride.net
www.triride.net