WE DEFINE
FUTURE IMPACT

TECHNOLOGY
SOFTWARE
CONSULTING

Autonomous Driving
Market Intelligence
MaaS / TaaS / POV

BUSINESS
AS UNUSUAL

P3 AD Market Insights

Edition #1/2025

We analyze global autonomous driving ecosystems in Mobility-as-a-Service, Privately Owned Vehicles and Goods Transport.

Created by:

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Edition #1/2025

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P3 autonomous mobility

AD Market Insights – **CN edition**

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P3 & P3 autonomous mobility.

Short Introduction

Porftolio as unusual.

SOFTWARE

- Android Automotive
- Business Intelligence
- Cloud Migration
- Cyber Security
- Data Analytics
- Enterprise Solutions
- Financial Systems
- IT-Architecture
- Certifications

TECHNOLOGY

- Autonomous Driving
- Battery Technology
- Electric Powertrain
- Energy Solutions
- Industrialization
- Charging Infrastructure
- Operations Excellence
- Task Force Management
- Testing & Engineering

CONSULTING

- Agile Transformation
- Artificial Intelligence
- M&A Strategy
- Marketing & Design
- Sustainability
- Project Management
- "Organizational Strategy"
- Quality & Compliance
- Systems Engineering
- UX/UI Design
- Transformation

P3 advises leading international OEMs, suppliers, technology and insurance companies in the field of autonomous driving and autonomous mobility.

AUTONOMOUS MOBILITY /AS UNUSUAL

>9 years of international experience in autonomous driving consulting

>100 customers worldwide and more than 300 successful AD projects

>50 employees around the globe in the autonomous driving space

75% of the employees are engineers and software developers

We approach autonomous driving from many different perspectives. We understand the markets, know the players, but also have the technological know-how and the necessary software expertise.

Market & Strategy

- Go-to-market strategy
- Global market and competitive analysis for AD MaaS, TaaS & ownership
- MaaS & TaaS business model development incl. business case & TCO
- Competence analysis, assessment of “best-fit” partners
- (SDS) partnerships models and joint venture agreements
- AD shuttle / robotaxi and ADAS in-field testing & benchmarking

Technology & Regulation

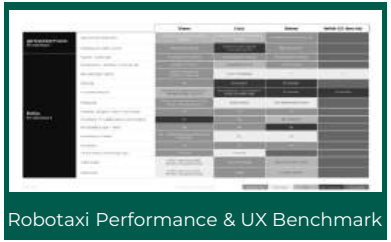
- End-to-end architecture assessment and customization
- Cybersecurity, Functional Safety & SOTIF
- Regulation Implementation (AD SMS, SUMS & CSMS for SAE L3 & L4)
- Test Strategies & Management & Tool Confidence
- Sensor set evaluation and platform fortification strategies
- Support for Homologation (Type approval ODD and operation area)

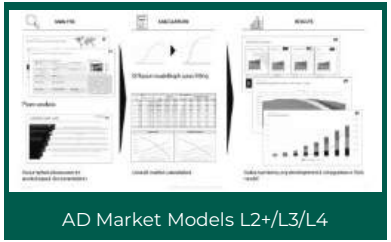
Operations & Scaling

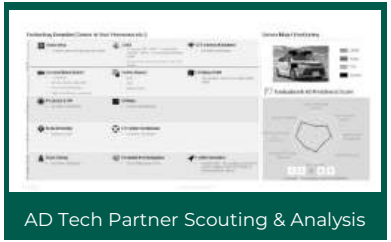
- AD Program Management incl. strategic setup, operations strategy, organizational build-up, project conduction & benchmarking
- Scaled Pilots: setup and management of runup schemes for AD pilot projects
- AD Product Lifecycle Management AD Logistics Concepts - Conceptualization of market-ready TaaS products

EXTRACT

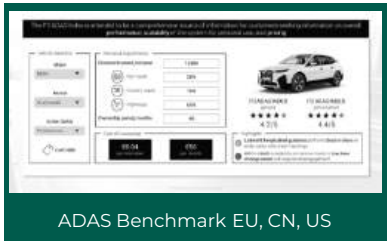
Overview | Market & Strategy Portfolio

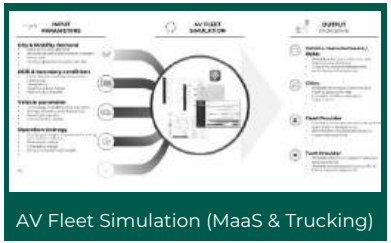

Robotaxi Performance & UX Benchmark

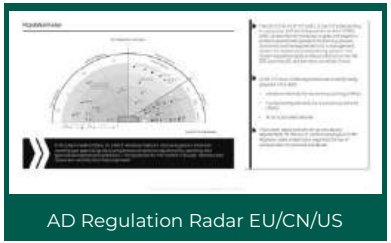

AD Market Models L2+/L3/L4

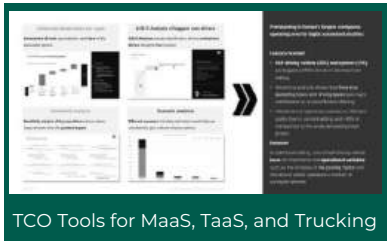

AD Tech Partner Scouting & Analysis

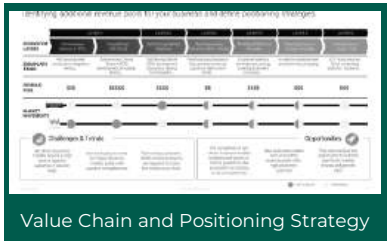
Go-to-Market Strategy


ADAS Benchmark EU, CN, US


AV Fleet Simulation (MaaS & Trucking)


AD Regulation Radar EU/CN/US


TCO Tools for MaaS, TaaS, and Trucking


Value Chain and Positioning Strategy

P3 AD market, strategy, and technology intelligence portfolio

Working closely with our Technology & Regulation and Operations & Scaling teams, we provide holistic market, competitor, and technology intelligence and strategy development for your specific needs.

P3 autonomous mobility.
Upcoming ADAS Benchmark Events & Reports.

We offer extensive ADAS Benchmark Reports for the European & Chinese market based on objective and standardized performance evaluation & market analysis.

Two-Day-ADAS Benchmark Event

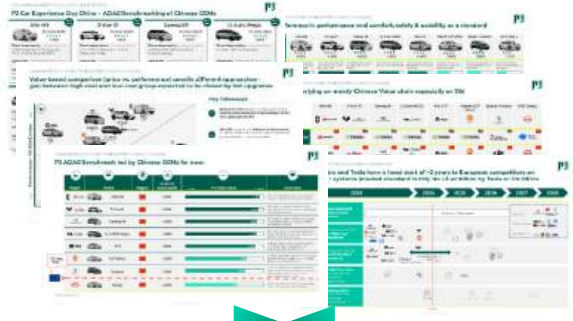
ADAS-Benchmark | **ADAS Experience Drive**

- ✓ **Extensive testing** of 8 – 10 (EU) **top notch vehicles with state-of-the-art ADAS Systems**
- ✓ **Conducted** in and for the **EU & CN market**

Standardized Benchmark Methodology

- ✓ **Over 100 standardized test cases** with objective scoring system
- ✓ All **ADAS functions** in function clusters **Driving, Parking, Guard** analyzed
- ✓ Testing in **urban**, **rural** and **highway scenarios**
- ✓ **Evaluation** in **five categories** (Performance, Perception, Comfort, Safety, Ease of Use)
- ✓ Result is **P3 ADAS Index** (1-5) overall and per category

Extensive ADAS Benchmark Report



- ✓ Comprehensive **ADAS Market** & **Competitor** Overview
- ✓ **Report** as per **P3 Evaluation** incl. detailed insights on Performance in each category
- ✓ ADAS Stack **Supply Chain** & **Cost Analysis**
- ✓ Competitor **ADAS** Future **Roadmaps**
- ✓ **Detailed Vehicle Snapshots** incl. full ADAS Stack, ADAS functions, Field of Vision,...)
- ✓ **Safety** Assessment & **Regulation**
- ✓ **Energy Consumption** analysis per Stack
- ✓ Optional: **HMI Benchmark Report**

Overview of our preliminary vehicle selection for the upcoming P3 ADAS Benchmark events and reports.

March 2025
Stuttgart

- **NIO** EL6
- **BYD** Seal
- **Xpeng** P7
- **Mercedes-Benz** EQS
- **Ford** Mustang Mach E
- **Porsche** eMacan
- **VW** ID.7
- **Tesla** Model Y
- **BMW** 5 Series
- **Polestar** 4

- **Xpeng** P7+
- **Xpeng** X9 / P7i
- **NIO** ET9
- **ONVO** L60
- **Li Auto** L9 AD Pro
- **Li Auto** L9 AD Max
- **MAEXTR** S800
- **Xiaomi** SU7
- **IM Motor** LS6
- **Zeekr** 7X
- **SVW** Tiguan Pro
- **Hongqi** Tingong 08

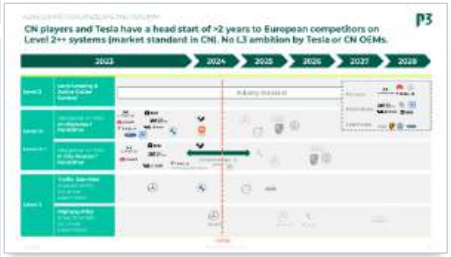
April 2025
Shanghai

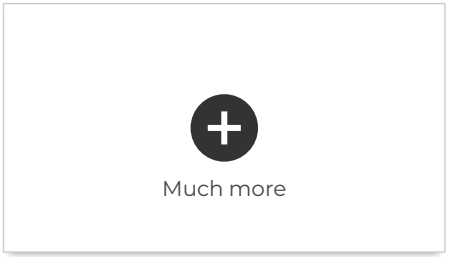
We offer our customers the **opportunity** to **add own or desired vehicles** for an additional charge.

Our comprehensive ADAS Benchmark Report comprises 50-60 slides with in-depth insights into the latest ADAS technologies.

Sneak Peak

What does the **ADAS Benchmark Report** look like?



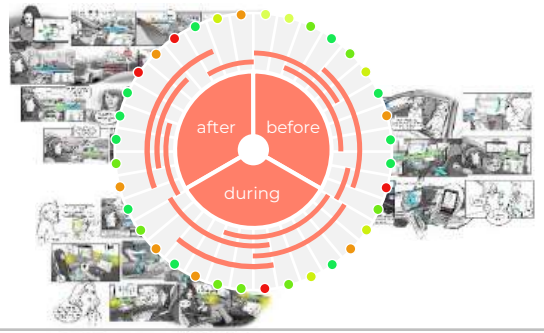


Optional Report

Starting from the most important user needs, the HMI Benchmark Report assesses the functionalities, performance and usability of current IVI systems.

Market specific user needs & user journeys

- ✓ Market specific knowledge of user needs based:
  - ✓ User & trend research
  - ✓ Customer clinics
  - ✓ Portfolio analysis



Quantitative performance and functionality assessment

- ✓ Derivation of focus topics and underlying feature sets based on user needs
- ✓ Criteria based testing for most relevant functionalities and performance indicators

Performance	Functionalities
Only examples	
Boot-up times	Remote functions
Latencies	Video streaming
Success rates	Device integration
...	...

Expert usability evaluation

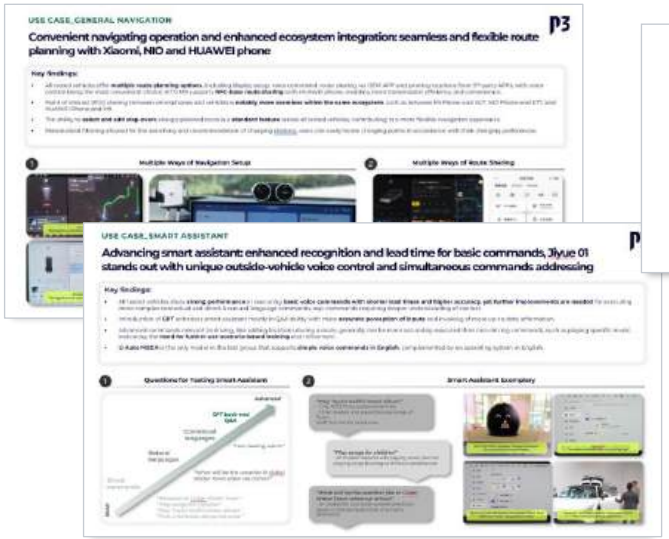
- ✓ Expert assessment of the HMI‘s usability along the seven interaction principles:
  - ✓ Suitability for the user‘s task
  - ✓ Self-descriptiveness
  - ✓ Conformity with user expectations
  - ✓ (Four other criteria)

Optional Report

Our HMI Benchmark will cover the selected highlight topics out of our quantitative and qualitative analysis.

Sneak Peak

What does the **HMI Benchmark Report** look like?



Much more

Pricing – reach out for more information.

ADAS Benchmark Report

Unit price — **Upon request**

Bundle price — **Upon request**

Buy both ADAS Benchmark Europe and China report and save money!

Includes:
- Comprehensive ADAS Market & Competitor Overview
- Report as per P3 evaluation incl. detailed insights on performance in each category
- ADAS stack supply chain & cost analysis
- Competitor future ADAS roadmaps
- Detailed vehicle snapshots incl. full ADAS stack, ADAS functions, …)
- Safety assessment & regulation
- Energy consumption analysis per stack

Optional: ***HMI & AI Benchmark Report***

Unit price — **Upon request**

Includes:
- Assessment of user needs based on user journey
- Quantitative assessment of functionalities & performance of selected highlight areas
- Qualitative usability evaluation for most important use cases
- Benchmark of in-vehicle AI assistants and tools

Optional: ***Workshops***

Unit price — **Upon request**

Potential contents:
- Derive of impacts/implications for your global ADAS strategy
- Identify areas where competitors are ahead and where you have a competitive advantage
- Identify challenges in homologation and compliance for different markets
- Discuss data-driven insights from ADAS usage to improve user experience and safety
- Adapt of the benchmark framework based on your specific needs and development of a customized ADAS index

⊕ We offer the option of adding your own or desired vehicles to our benchmarks for an additional charge. The costs are depending on the vehicle model. Feel free to reach out.

P3 autonomous mobility.
New Paper Alert.

What's new?

NEW WHITEPAPER!

The Partners for Automated Vehicle Education Europe (PAVE Europe), a coalition dedicated to fostering understanding and awareness of automated vehicle technology, is proud to announce the **publication of its white paper** 'Safer, Cleaner, More Equitable: Seizing the Opportunities of Highly Automated Vehicles'. Written by PAVE Europe's Working Group on 'Understanding, Trust and Acceptance', this comprehensive paper provides a holistic perspective on the current state of autonomous mobility, its benefits and its challenges.

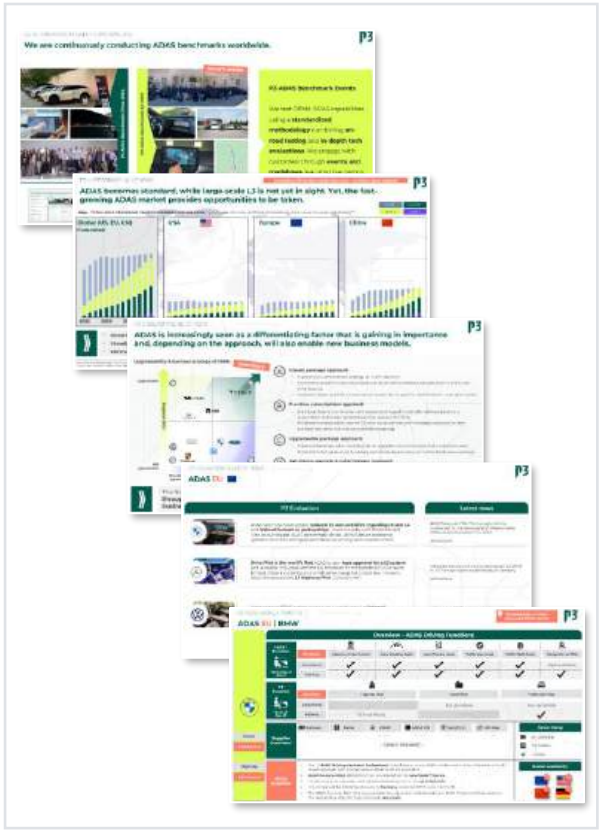
"Trust is a critical factor in the adoption of any new technology, especially one that is as impactful as automated vehicles," said Ricco Kämpfer, Leader of the 'Understanding, Trust and Acceptance' Working Group, and Senior Consultant Autonomous Mobility at P3. "This paper is designed to bridge the gap in knowledge and encourage informed discussions about how AVs can contribute to a safer, cleaner and more equitable future."

Key Highlights of the White Paper:

- A clear overview of the **current state of autonomous vehicle technology**, including its potential for improving road safety, reducing emissions, and enhancing accessibility.
- **In-depth exploration of relevant use cases** to demystify how AV technology can be integrated into current systems.
- An **educational resource for engaging communities and policymakers** in meaningful conversations about the opportunities and challenges of autonomous mobility

Click here to download the paper

What's new?



ADAS MARKET INSIGHTS #2

In 2024, the **P3 AD Market Insights** have **gotten a sibling**: The **P3 ADAS Market Insights. Now, Edition 2 is finally here!**

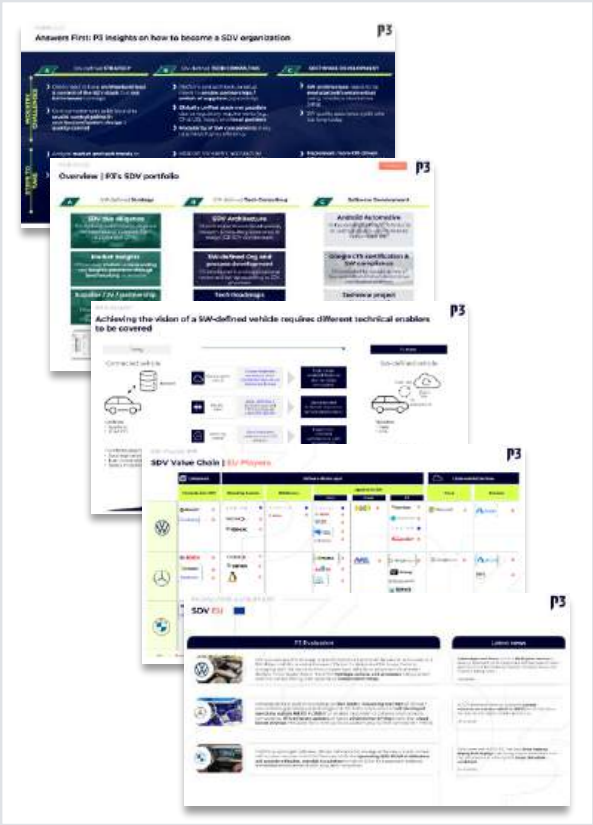
This report offers **fascinating insights into SAE Level 2/2+ and Level 3 ADAS** function packages of **global OEMs and their ADAS capabilities across North America, Europe, and China**, with focus on driving functions, revealing the strategies manufacturers are using to stay competitive in this fast-evolving market.

In this comprehensive ADAS Market Insight report, you'll find:

- ✓ Detailed **competitor analysis, including OEM ADAS functions**, **supplier** overviews, **sensor setups** and **market availability**
- ✓ An overview of **the essential components driving ADAS performance**
- ✓ Exclusive **insights into the latest company-specific news** with P3's expert assessment
- ▶ Whether you're an OEM, supplier, or just interested in the future of automotive technology, this report is a must-read!

Download the 2nd edition here

What's new?



SDV MARKET INSIGHTS!

Our very first **P3 SDV Market Insights** are finally here!

This report explores the current **landscape, advancements, and key trends** in the Software-Defined Vehicle (SDV) market, highlighting how **manufacturers** and **suppliers** are staying **competitive** in this **rapidly changing industry**. By leveraging the P3 SDV stack approach, the report provides a structured view of the **SDV supplier ecosystem** across multiple layers in North America, Europe, and Asia.

In this comprehensive SDV Market Insight report, you'll find:

- ✓ Detailed **competitor analysis**, covering **12 OEMs** and their suppliers, along with a classification of **AI applications** and **market availability**.
- ✓ A detailed **breakdown** of the **fundamental components** driving the **SDV market** forward.
- ✓ Insider perspectives on the **latest company-specific updates**, complemented by **expert evaluations** from P3.
- ▸ Whether you're an OEM, supplier, or just interested in the future of automotive technology, this report is a must-read!

Download the first edition here

What's new?

P3自动驾驶市场洞察报告

Did you know that the P3 AD Market Insights are **also available in Chinese**?

At regular intervals, we publish our comprehensive report **exclusively on WeChat**.

Here's the link to the latest version:

Part 1 on WeChat | **Part 2** on WeChat | **Part 3** on WeChat

P3 AD Market Insights.

Let's start: P3 AD Market Insights Introduction.

+3 since last report

44

Companies focusing on autonomous **MaaS**

+3 since last report

48

Companies focusing on **privately owned vehicles**

37

Companies focusing on **goods transport and TaaS**

We **analyze** global Autonomous Driving **value creation networks and ecosystems** using **Layer Models** and **provide overviews** of **MaaS, privately owned vehicles & goods transport use cases**

Based on their respective **core business**, we identify **(strategic) partnerships**, **investments** or **acquisitions** of **specific market players** and place them in the layer model. We focus on **North America**, **Asia** (China, Japan and Korea) and **Europe**

All **insights are based on publicly available sources**. Project knowledge or other **undisclosed information is not considered**.
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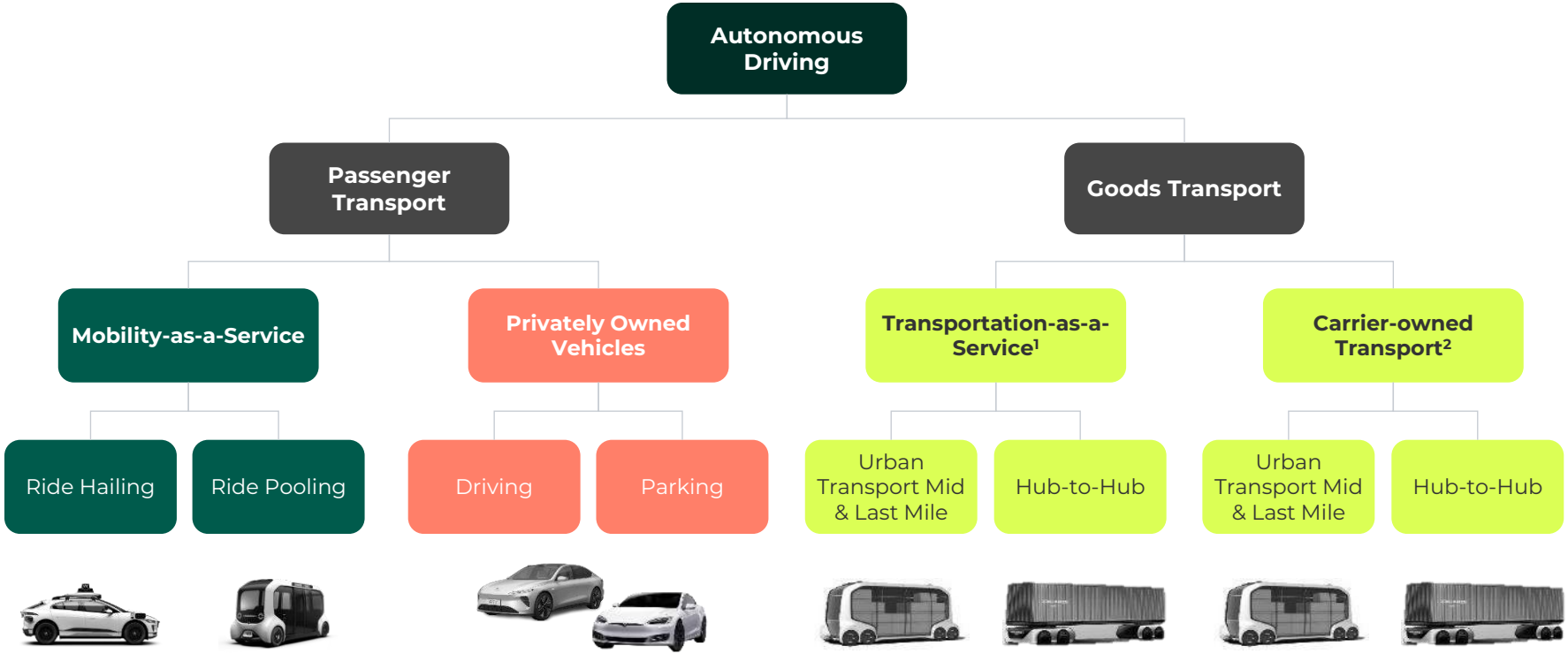
Autonomous Driving Use Cases.



1 Self-driving truck provider owns and operates the truck and offers transport / capacity on demand
2 Customer / carrier owns and operates trucks and pays a per-mile fee to the SDS / truck provider

What you'll find in this report.

1 Mobility-as-a-Service (MaaS)

MaaS | **Intro**

MaaS | **NAR**

MaaS | **Asia**

MaaS | **Europe**

2 Privately Owned Vehicles (POV)

POV | **Intro**

POV | **NAR**

POV | **Asia**

POV | **Europe**

3 Goods Transport & Transport-as-a-Service (TaaS)

Goods Transport & TaaS | **Intro**

Goods Transport & TaaS | **NAR**

Goods Transport & TaaS | **Asia**

Goods Transport & TaaS | **Europe**

Mobility-as-a-Service.

Intro | Use Cases & Layer Description

MaaS | Use Cases

			Gated Area	Highway	Urban	Suburban	Rural
			Airport, factories, yards, harbors, ...	Highways, freeways, ...	City center, designated streets, ...	Federal highway, residential areas, ...	Rural roads, gravel road, ...
Ride Hailing	SM		-	Robotaxi			
	M		-	Robotaxi			
Ride Pooling	SM		low speed autonomous shuttle (<25km/h)	-	low speed autonomous shuttle (<25km/h)		
	M		(private) robo shuttle	robo shuttle			
	L		(private) robo shuttle	robo shuttle			
	XL		(private) robo bus	robo bus			

MaaS | Layer Model Description

Layer 1 Automated Driving System (ADS)		Layer 2 AD Vehicle		Layer 3 Fleet Operations		Layer 4 Mobility Platform	Layer 5 Enablers
HW-Stack Chips / SoC / ECU	**SW-Stack Virtual Driver**	**AD Vehicle**	**ADS & AD Vehicle Operations Functions**	**Maintenance & Repair, Financing, Asset Ownership**	**AD Fleet Control Center**	**Mobility Platform & Passenger App**	**Cloud, V2X, others**

The **Automated Driving System (ADS)** encompasses SW and HW required to achieve Level 4 autonomy.
The HW-Stack involves activities such as hardware development, production, testing, automotive approval, and safety compliance.
The SW-Stack focuses on self-driving software development and includes activities such as testing & simulation, ODD (Operational Design Domain) management, SDS licensing, mapping, sensor data processing, E2E integration, and safety compliance.

AD Vehicles are considered L4 ready vehicle platforms. This layer centers on the development and design and include tasks such as platform & system architecture, regulatory compliance, safety concept, homologation, logistics, and production.

ADS & AD Vehicle Operations Functions describe all functions and interfaces required for AD-MaaS specific tasks performed by the AD Fleet Control Center and Remote Operator such as remote vehicle control, cabin and rider monitoring, operator & emergency call and remote ADS control/assistance.

Fleet Operations covers operational activities for AV fleets. Tasks include maintenance, service and repair, financing, concessions, charging, training, cleaning or parts supply.

Moreover, AD Fleet Control Center tasks include the execution of ADS & AD Vehicle Operations Functions (e.g., cabin and rider monitoring or remote ADS assistance) in a fleet management tool / user interface.
It also includes typical fleet management tasks such as mission management, health monitoring or maintenance & charging scheduling of the AV fleet.

The **Mobility Platform** is the rider frontend. It is point of sale and provider of the primary communication and interaction channel with the user. Tasks include booking, pricing, payment as well as vehicle assignment and dynamic routing (fleet intelligence features). Rider experience (e.g., music, entertainment) may also covered by mobility platforms.

Enablers especially include cloud infrastructure and data centers for processing and storing large amounts of AV data. Furthermore, particularly in China, V2X is a key pillar in pilot zones, enabling faster AV deployment and collaborative decision-making

MaaS | Layer Model Description

Layer 1 Automated Driving System (ADS)		Layer 2 AD Vehicle		Layer 3 Fleet Operations		Layer 4 Mobility Platform	Layer 5 Enablers
HW-Stack Chips / SoC / ECU	**SW-Stack Virtual Driver**	**AD Vehicle**	**ADS & AD Vehicle Operations Functions**	**Maintenance & Repair, Financing, Asset Ownership**	**AD Fleet Control Center**	**Mobility Platform & Passenger App**	**Cloud, V2X, others**
HW Development	SW Development	Design & development	Remote vehicle control	Hub Setup	Execution of ADS & AD Vehicle Operations Functions in UI	Rider App	V2X
HW Production	Testing & Simulation	Quality assurance	Rider authentication	Financing / Insurance		Booking	3rd party HD maps
Sensor Integration	ODD Management	Redundancy	Cabin & rider monitoring	Concessions	AD Vehicle Real-Time Tracking and Monitoring	Pricing	Cloud Infrastructure
Automotive approval	SDS Licensing	X-by-Wire	Departure control	Charging	Incident Management	Payment	
Sensor testing & approval	SW Testing & Approval	Regulatory compliance	Rider interfaces & assistance	Maintenance, Service, Repair	AD vehicle Maintenance Scheduling	Dynamic Routing & Optimization	
Sensor fusion	Mapping	Homologation	Operator & emergency call	Small Repair	AD Vehicle Charging Scheduling	Demand Prediction	
Calibration and Integration Support	Verification & Validation	After sales / aftermarket	ADS mission control	Washing & Cleaning	Emergency Response Coordination	Pooling Algorithms	
Safety & Compliance	E2E Integration	Safety concept	Telemetry, Monitoring & Diagnostics	Parts supply	AD Vehicle Mission Dispatch	API / Integration	...
...	Sensor Integration and Data Processing	AD requirements	Remote ADS Assistance	In/De-fleeting	Safety Driver Management	Customer Support	
	Safety & Compliance	Logistics	Remote ADS Troubleshooting	Training	Data Analytics and Reporting	3rd Party connection	
	...	Production	Data Management	In-field support	Customer interaction	Data Analytics	
		Battery & charging concept	E2E integration	...	...	...	
		...	...				

Mobility-as-a-Service. NAR.

Partnering & Value Chain, Level 4 Target & Latest News

MaaS NAR

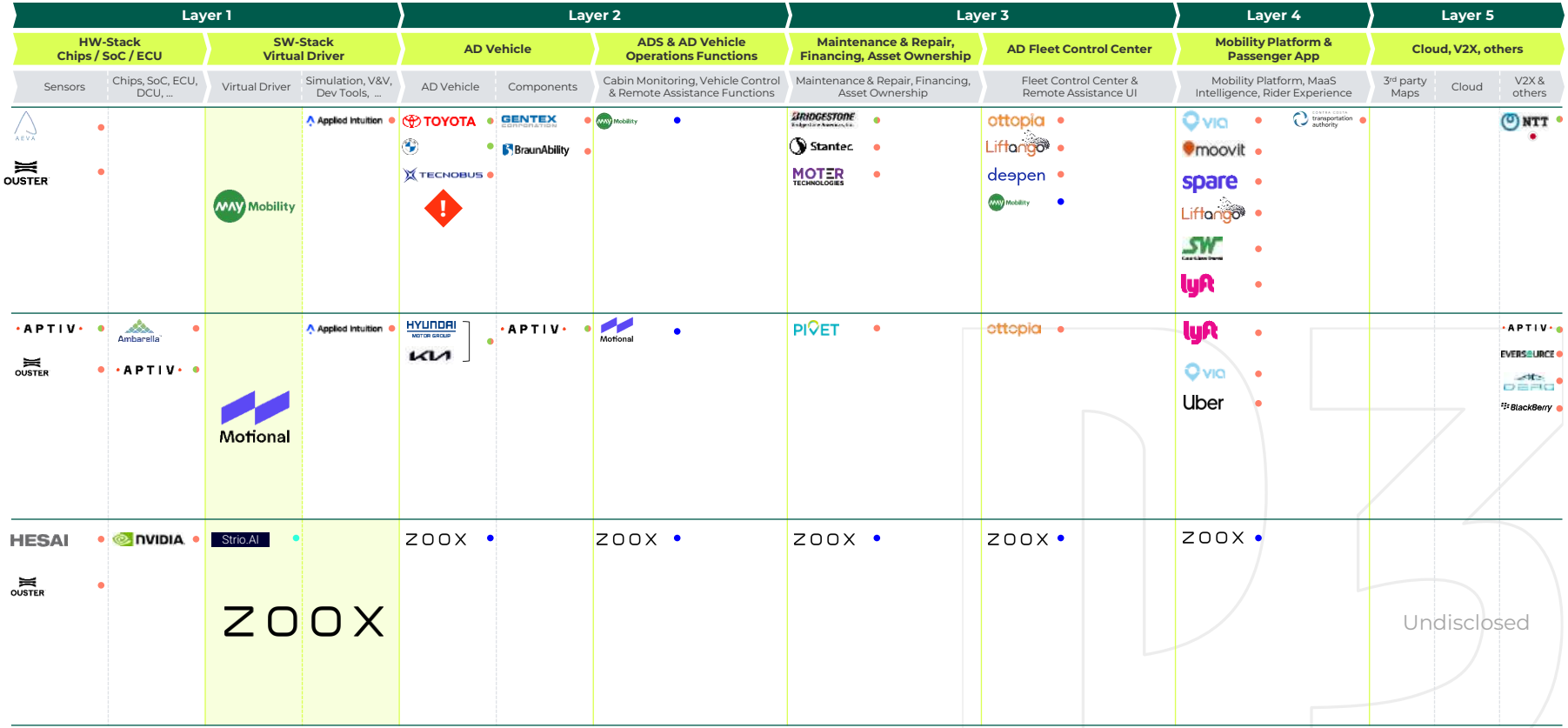
Layer 1		Layer 2		Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle	ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
Sensors	Chips, SoC, ECU, DCU, ...	Virtual Driver	Simulation, V&V, Dev Tools, ...	AD Vehicle	Components	Cabin Monitoring, Vehicle Control & Remote Assistance Functions	Maintenance & Repair, Financing, Asset Ownership	Fleet Control Center & Remote Assistance UI	Mobility Platform, MaaS Intelligence, Rider Experience	3rd party Maps	Cloud	V2X & others
WAYMO	SAMSUNG, NVIDIA	WAYMO		STELLANTIS, JAGUAR, ZEEKR, HYUNDAI		ZEEKR, WAYMO	AVIS, AutoNation, Swiss Re, transdev, moove, NISSAN, !	WAYMO, autofleet	WAYMO, Uber, GO, !	Undisclosed		
STROBE, Qualcomm, Astyx, NVIDIA, OUSTER		voyage		gm, HONDA		cruise	cruise	cruise	cruise, lyft, uber	Microsoft		
INNOVIZ, mobileye	mobileye	mobileye		NIO, HOLON, SCHAEFFLER, Commercial Vehicles, MAN		ADMT, HOLON	DB, holo, beep, SIXT, BMW, Marubeni, !	MOIA, holo, moovit, beep	MOIA, moovit, Ruter#, lyft	Undisclosed		

Primary focus on Europe and West Asia

By the end of 2024, **General Motors announced that it would cease funding the development of Cruise's commercial robotaxi business.** Instead, the company plans to integrate its self-driving car subsidiary with its ongoing efforts to advance driver-assistance systems

Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update | Partner outside US

MaaS NAR



Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside US

MaaS NAR

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
Sensors	Chips, SoC, ECU, DCU, ...	Virtual Driver	Simulation, V&V, Dev Tools, ...	AD Vehicle	Components	Cabin Monitoring, Vehicle Control & Remote Assistance Functions	Maintenance & Repair, Financing, Asset Ownership	Fleet Control Center & Remote Assistance UI	Mobility Platform, MaaS Intelligence, Rider Experience	3rd party Maps	Cloud	V2X & others
OUSTER, FLIR	NVIDIA	ADASTEC		KARSAN, VMC		ADASTEC	VW	ottopia, APPLIED AUTONOMY	Kolumbus, västtrafik		aws	AECOM, beyless
AVRIDE	NVIDIA	AVRIDE		HYUNDAI MOTOR GROUP		Undisclosed	Undisclosed	Undisclosed	Uber	Undisclosed		
Aurora, blackmore, OURS, DENSO, HESAI	NVIDIA	Uber ATG, Aurora		TOYOTA, HYUNDAI MOTOR GROUP		Aurora	TOYOTA	Aurora	Uber		aws	

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside US

MaaS NAR

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
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OUSTER, LeddarTech	Horizon Robotics	COAST		COAST		COAST	COAST	COAST	Undisclosed			Cities
SICK, OUSTER, DENSO	intel	PERRONE ROBOTICS	WIND, aicas	PERRONE ROBOTICS, rampini, LIGHTNING MOTORS, tropos		PERRONE ROBOTICS	SUSTAINABILITY, First Transit	Liftango, guidenk, First Transit	Liftango			verizon
	NVIDIA	WAYMO, Motional, AVRIDE, Aurora, WeRide	NVIDIA	Vehicles of ADS and OEM partners			Uber	Undisclosed	Uber		NVIDIA	

NEW - Comeback

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

MaaS NAR

	Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
	HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
	Sensors	Chips, SoC, ECU, DCU, ...	Virtual Driver	Simulation, V&V, Dev Tools, ...	AD Vehicle	Components	Cabin Monitoring, Vehicle Control & Remote Assistance Functions	Maintenance & Repair, Financing, Asset Ownership	Fleet Control Center & Remote Assistance UI	Mobility Platform, MaaS Intelligence, Rider Experience	3rd party Maps	Cloud	V2X & others
NEW	Covered by ADS & OEM partners		mobileye Mobility Motional		Vehicles of ADS and OEM partners			flexdrive	flexdrive	lyft			

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

MaaS NAR

At a glance	Latest news	L4 target
Waymo's virtual driver is the world's **most experienced one.** The fully driverless I-PACE fleet in Phoenix, SF and LA impresses with a **terrific system performance**. In our view and bases on our benchmark rides, Waymo is **currently ahead of competition** in the AV space. Meanwhile, Waymo seems to be able to accelerate scaling by integrating E2E modules.	Waymo to test in 10 new cities in 2025, starting with Las Vegas and San Diego. (29.01.2025) Update Read	L4 achieved in Phoenix by **2020**.
By the end of 2024, General Motors announced that it would cease funding the development of Cruise's commercial robotaxi business. Instead, the company plans to integrate its self-driving car subsidiary with its ongoing efforts to advance driver-assistance systems	Cruise to slash workforce by nearly 50% after GM cuts funding to robotaxi operations. (04.02.2025) Update Read	L4 achieved in SF by **2022**.
Mobileye is **testing its AV fleet in various locations around the globe**, including complex European traffic. **Initial pilot projects with various vehicle partners** are underway and will allow the L4 capabilities and MaaS features to be further developed and tested. Mobileye is currently the only well-known AV company with a **clear focus on Europe**.	Lyft to launch Mobileye-powered robotaxis 'as soon as 2026,' starting with Dallas. (10.02.2025) Update Read	Not announced
May's fleet is already **available to the general public** in many cities. The **SDS is designed for multiple vehicle platforms** and used in the Toyota Sienna Autono-MaaS vehicles, among others. By end of 2024, May launched the first autonomous e-Palette deployment at a Toyota Motor factory in Japan announced a 30-seater bus cooperation by 2025.	May Mobility now offers autonomous driverless rides in Peachtree Corners, Georgia. (12.02.2025) Update Read	L4 achieved in Sun City by late **2023**.

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS NAR

At a glance	Latest news	L4 target
JV of Hyundai and Aptiv, while the latter reduced its common equity interest from 50% to about 15% by end of March 2024. In this course, **Hyundai has agreed to invest nearly $1 billion in Motional by 2024**. The demise of Motional has thus been averted for the time being.	Motional's all-electric IONIQ 5 robotaxis test highway speeds autonomously at Hyundai's proving grounds. (08.01.2025) Update Read	**2026**
Zoox is **meanwhile testing its SPV on public roads in the Bay Area and Vegas**. In late 2024, Zoox announced to start offering rides starting with employees. First deployments will be in the SoMa neighborhood of San Francisco, and on the Las Vegas Strip. At present, however, operations appear to be taking place on **fixed routes** only.	Zoox custom robotaxis are finally coming to San Francisco and Las Vegas. (30.10.2024) Read	Large scale production in **2026**.
Unlike most MaaS providers, ADASTEC is not focusing on robotaxis but developing an **AV stack for transit buses**, which marks a USP in the market. ADASTEC has **deployed buses in several locations** including the US and Europe. Scalability of the system in dense, urban traffic still needs to be proven.	ADASTEC Corp. and Beyless partner to advance connectivity solutions in automated public transportation. (31.01.2025) Update Read	**2026**
Avride is the **rebranded, international division** of the robotaxi and delivery robot company **Yandex Self-Driving Group**. While international assets have been separated from Yandex assets, Avride is testing AVs in diverse ODDs across the globe, focusing on safety. **Uber will be a key partner for MaaS and delivery**.	Uber taps Yandex spinout Avride for autonomous delivery and ride-hail partnership. (03.10.2024) Read	Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS NAR

At a glance	Latest news	L4 target
While Aurora shifted its **focus primarily** to **self-driving trucks** some time ago, it has been **quiet about its robotaxis**. We believe: the **company needs a working business case**, otherwise it will become a victim of market consolidation. MaaS is therefore probably not part of the business anymore.	Self-driving vehicle company Aurora cuts 3% of its workforce. (24.01.2024) Read	Not announced
The company provides MaaS solutions for cities, theme parks, campuses, airports, rail yards, and other private sites. In the meantime, **COAST seems to be focusing primarily on use cases other than passenger transport** (e.g., harvesting, ports).	COAST Autonomous announces collaboration with the city of Winter Haven, Florida to explore deployment of autonomous transportation solutions. (30.03.2022) Read	Not announced
Perrone been **developing autonomous vehicle solutions since 2003**. Apart from its low-speed shuttles, Perrone claims to have **outfitted over 30 vehicles types with its retrofit kit**. Despite its experience, we don't believe Perrone will become a leading market player.	Perrone Robotics to deploy fleet of Autonomous Ford E-Transit vans for Detroit's 'Connect' program, a two-way 10-mile autonomous vehicle shuttle route. (02.04.2024) Read	Not announced
Uber's self-driving unit was sold to Aurora in 2020. Instead of developing its own autonomous driving technology, Uber now forms **partnerships with a variety of leading robotaxi companies worldwide**, granting them access to a **massive customer base**. Thus, Uber is celebrating its comeback in the P3 AD Market Insights..	Waymo just popped up on the Uber app in Austin ahead of robotaxi launch. (05.02.2025) Read	Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS NAR

At a glance

Lyft's self-driving unit was sold to Toyota's Woven Planet in 2021. Similar to Uber, Lyft **established partnerships with various AV providers** - and in combination with it's Flexdrive subsidiary, it now has a **clearer value proposition for additional and existing partners**.

Latest news

Motoring down the AV superhighway.

(18.02.2025)

Read

L4 target

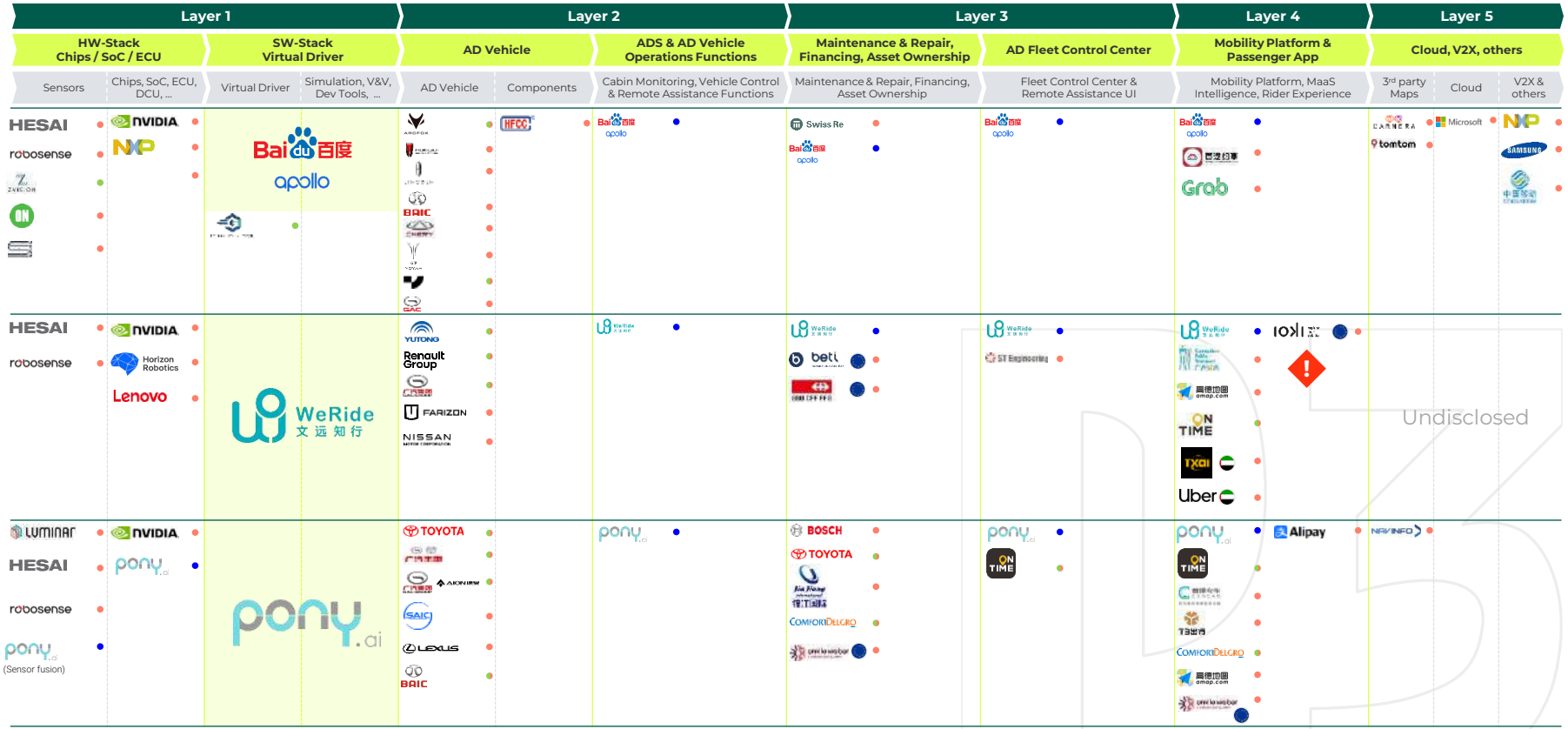
Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

Mobility-as-a-Service. Asia.

Partnering & Value Chain, Level 4 Target & P3 Assessment

MaaS ASIA


Layer 1
HW-Stack Chips / SoC / ECU
SW-Stack Virtual Driver
Layer 2
AD Vehicle
ADS & AD Vehicle Operations Functions
Layer 3
Maintenance & Repair, Financing, Asset Ownership
AD Fleet Control Center
Layer 4
Mobility Platform & Passenger App
Layer 5
Cloud, V2X, others
Sensors
Chips, SoC, ECU, DCU, ...
Virtual Driver
Simulation, V&V, Dev Tools, ...
AD Vehicle
Components
Cabin Monitoring, Vehicle Control & Remote Assistance Functions
Maintenance & Repair, Financing, Asset Ownership
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3rd party Maps
Cloud
V2X & others
HESAI
robosense
NVIDIA
NXP
Baidu 百度 apollo
HFCC
Swiss Re
Grab
TomTom
Microsoft
Samsung
HESAI
robosense
NVIDIA
Horizon Robotics
Lenovo
WeRide 文远知行
YUTONG
Renault Group
FARIZON
NISSAN
beti
ON TIME
Uber
Undisclosed
LUMINAR
HESAI
robosense
pony.ai
(Sensor fusion)
NVIDIA
pony.ai
TOYOTA
BOSCH
ComfortDelGro
LEXUS
BAIC
Alipay
Core Business
Partnership or supplier deal
Investment
Acquisition
Parent / Subsidiary
Update
Partner outside Asia

MaaS ASIA

Layer 1				Layer 2		Layer 3		Layer 4	Layer 5		
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autox, HESAI, arbe, robosense, dji, SiLC	NVIDIA	autox		FCA, HiPhi, HONDA, BYD, SAIC, GWM		autox	autox	autox	autox, 高德		Alibaba.com
OUSTER, HESAI, Valeo, Baraja	NVIDIA, Valeo	DiDi Autonomous Driving		BAIC, TOYOTA, AIONIRIS, XPENG	GOODYEAR	DiDi, DEEPMIRROR	DiDi	DiDi	DiDi		NVIDIA, INCHTEK
OUSTER, ZVISION, robosense	NVIDIA	DEEPROUTE.AI		DFM, SAIC		Undisclosed	Undisclosed	曹操专车 CAOCAO	曹操专车 CAOCAO		Microsoft, Alibaba.com

Focus on L2+ and L3

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

MaaS ASIA

Layer 1		Layer 2		Layer 3		Layer 4	Layer 5		
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	Horizon Robotics	WeRide QCRAFT		Not relevant		Not relevant	Not relevant		Not relevant			
Not relevant		WeRide pony.ai		CRRC WeRide pony.ai ONTIME integrates 3rd party fleets		Undisclosed	Undisclosed	ON TIME		Undisclosed		
HESAI	DENSO OTSL TIER IV	TIER IV		pix moving TOYOTA TORAY	TIER IV Astemo	TIER IV	AMANE	TIER IV	NIHON KOTSU	Undisclosed		

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

MaaS ASIA

Layer 1				Layer 2		Layer 3		Layer 4	Layer 5		
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LUMINAR, HESAI, ZVISION, ZF, robosense	TTTech	pony.ai, autox, momenta, ...		SAIC		cerence	Undisclosed	Undisclosed		DEEPMAP, mobileye		
robosense	NVIDIA	pony.ai, Baidu		HONGQI, FAW GROUP		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed		
TIER IV		TIER IV	TIER IV	pix moving, elaphe, TIER IV, ...		Undisclosed		Undisclosed		Undisclosed		

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

MaaS ASIA

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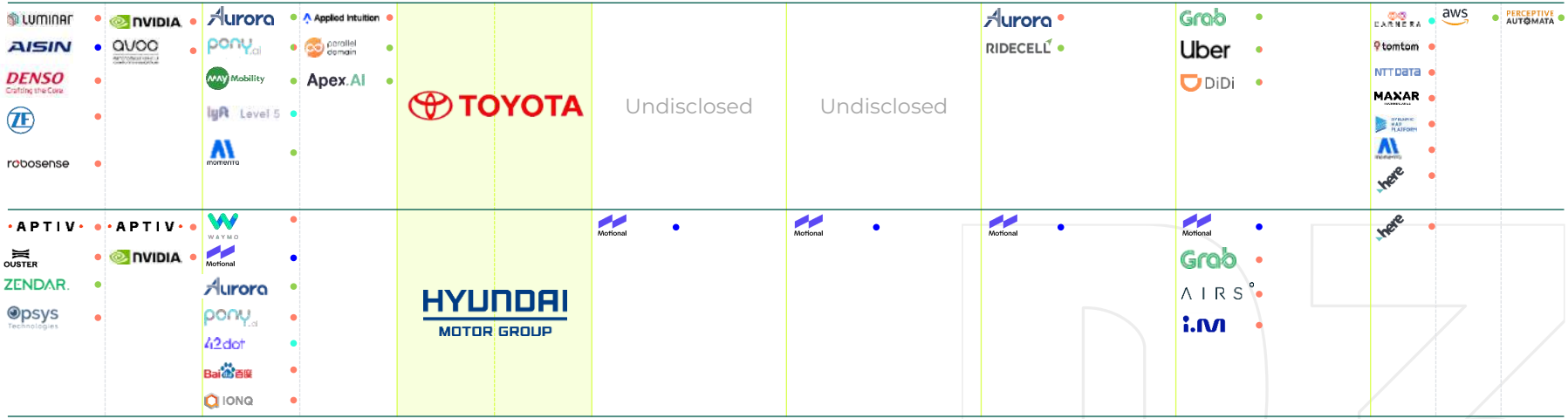
LUMINAR	NISSAN, Applied Intuition	NISSAN		Undisclosed		Undisclosed	Undisclosed	Undisclosed	EasyRide	Undisclosed		
Covered by WeRide's suppliers	WeRide	YUTONG	WeRide	WiTricity	WeRide	WeRide	Undisclosed					
SAMSUNG, 42dot	42dot	HYUNDAI, 42dot	Undisclosed	Undisclosed	42dot, GEOTAB, HYUNDAI		Undisclosed					

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

MaaS ASIA



Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

MaaS ASIA

At a glance	Latest news	L4 target
Baidu Apollo has accumulated **more than 130m km,** holds **permits for first fully driverless taxi service** in CN and **processed >7m autonomous ride orders** by April 2024. Baidu is an absolute heavyweight in the Chinese AD market and among the strongest robotaxi players in China.	Baidu's Apollo Go robotaxi service sets sights on global expansion. (19.02.2025) Update Read	L4 reached in Guangzhou by **2021**
WeRide was the **first company in CN** to operate a fleet with **>100 vehicles** for AD testing and was permitted to fest **fully driverless** both in **China** and the **USA**. Considering >20mn autonomous kilometers, WeRide is among the strongest AD players. By beginning of 2025, WeRide announced the 3rd deployment in Europe, showing their ambitions in this market.	WeRide's latest robotaxi GXR to start first fully unmanned commercial operations in Beijing. (24.02.2025) Update Read	L4 reached in Guangzhou by **2022**
Pony.ai is an **industry leader in the development and commercialization of robotaxi services** in China and is currently preparing to enter the European market. Pony.ai has formed partnerships with leading OEMs, including Toyota, SAIC, and GAC Group. Pony.ai is among the strongest AD players.	Pony.ai launches paid robotaxi services in Guangzhou, offering new autonomous travel options to key transit hubs. (21.02.2025) Update Read	L4 reached in Beijing and Guangzhou by **2023**
AutoX's **focus is on China and the Asia Pacific markets**. However, it also holds a permit to **transport passengers** on **public roads** in California. Based on our robotaxi rides, we currently see a lower level of maturity compared to other robotaxi competitors. Also, other competitors are more progressive in the AV race.	AutoX's RoboTaxis allowed for unmanned passenger transport service in Shanghai. (08.07.2024) Read	L4 reached in Shenzhen by **2021**

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS ASIA

At a glance	Latest news	L4 target
Following an 18-month suspension by the Chinese authorities, Didi was permitted to sign up new users by 2023. Its **active user base was >500m** in 2023. This means great market power - however, it has become **quiet around DiDi's AV division**.	DiDi Autonomous Driving, GAC AION's joint venture to launch first L4 commercial Robotaxi in 2025. (07.04.2024) Read	**2025**
DeepRoute pursues a **mapless approach**. In the meantime, DeepRoute has covered **10 million autonomous kilometers** on public roads by 09/23 and holds permission to carry passengers in China. The current focus seems to be rather on L2+ ADAS than robotaxis.	DeepRoute.ai secures $100 million in C1 funding round. (05.11.2024) Read	**2025**
Horizon Robotics is particularly strong in the POV segment, with many OEM and Tier 1 partnerships regarding their Journey chips as well as smart driving solutions.. Horizon only has a **small footprint in the robotaxi / MaaS segment**, while NVIDIA is the dominant market player.	WeRide and Horizon Robotics signed a strategic cooperation memorandum of understanding. (07.11.2023) Read	Not announced
ONTIME (Ruqi Mobility) was founded by GAC Group and Tencent. Its business scope in terms of robotaxis is an **operation platform including remote supervision, remote management, remote control and remote evaluation**. ONTIME integrates fleets from partners such as GAC and Pony.ai and had a fleet of >280 vehicles by December 2023.	OnTime joins cross-city pilot intelligent connected vehicle program in Guangdong. (30.12.2024) Update Read	Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS ASIA

At a glance	Latest news	L4 target
TIER IV is a Japan-based company **specializing in Autoware-based AD solutions**. The company aims to make autonomous mobility technology scalable and accessible, collaborating globally to **advance AVs for different industries**. TIER IV participates in projects such as METI aimed at deploying robotaxis for transportation and autonomous trucks for logistics.	TIER IV secures permit for Level 4 autonomous driving in Nagano Prefecture. (10.01.2025) Update Read	Not announced
By August 2022, SAIC accumulated **400,000km of automated driving testing** in China. SAIC has **partnered will well-known SDS providers**, such as Momenta and Pony.ai, to develop self-driving vehicles.	SAIC Motor set to launch autonomous driving services in Shanghai by August. (25.07.2024) Read	**2025**
FAW's focus is primarily on privately owned vehicles. However, **its EV brand Hongqi** and its **3rd-generation robotaxi** rides on the same platform as its mass-produced vehicle to achieve economies of scale. FAW **co-developed the Hongqi robotaxi with Baidu** and additionally **invested in tech company Pony.ai.**	Hongqi's 3rd-gen L4 Robotaxi allowed for unmanned road tests in Beijing. (10.07.2024) Read	Not announced
PIX Moving shares the vision of rebuilding the city with a special form of vehicles called **Moving Spaces**. These **multi-functional pods** can serve as moving working spaces or vending machines, among others. Great concept for technology-driven Asian markets and beyond.	PIX Moving and SODA.Auto announce strategic partnership to accelerate autonomous vehicle development. (04.09.2024) Read	Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS ASIA

At a glance	Latest news	L4 target
Nissan plans to offer **autonomous mobility services starting in Japan by 2027**, working closely with third parties such as local authorities and PTAs and relying on its **inhouse-developed, autonomous-drive system**. Initial trials started in 2024 with the goal so have 20 supervised demonstration vehicles on the roads between 2025 and 2026.	Nissan demos autonomous driving on streets of Yokohama. (14.06.2024) Read	**2027**
Yutong is China's top bus manufacturer and the world's largest one. For the AD MaaS Case, Yutong provides its **purpose-built electric robobus**, which is already operating driverless on public roads in cooperation with SDS provider WeRide. Yutong **will thus remain true to its core business.**	WiTricity and YuTong Bus revolutionize public Transportation with Wireless Charging for Autonomous E-Buses. (10.02.2023) Read	L4 reached by **2022** jointly with WeRide.
Acquired by Hyundai Motor Group in 2022, 42dot is the **groups' global software center**. 42dot and Hyundai showcased SDV technologies under development to lead to a '**Software-defined Everything' (SDx) ecosystem beyond mobility** at CES 2024.	Geotab, Kia, and 42dot join forces to drive the future of fleet management. (12.09.2024) Read	Not announced
In the AD MaaS space, Toyota is **focusing primarily on partnerships, investments and acquisitions**. The extensive portfolio includes, for example, Lyft Level 5, Momenta, Pony.ai or May Mobility. Toyota and Pony.ai are developing a robotaxi fleet of about 1,000 vehicles.	Pony.ai teams up with Toyota China, GAC Toyota on Robotaxi development. (04.08.2023) Read	**2024**

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS ASIA

At a glance

Hyundai and Aptiv jointly established **Motional** to develop robotaxis. Moreover, the **acquisition of 42dot** is **intended to strengthen capabilities**. We are curious to what extent Hyundai, apart from Motional, will therefore position itself in the AD business in the future.

Latest **news**

Waymo and Hyundai enter multi-year, strategic partnership.

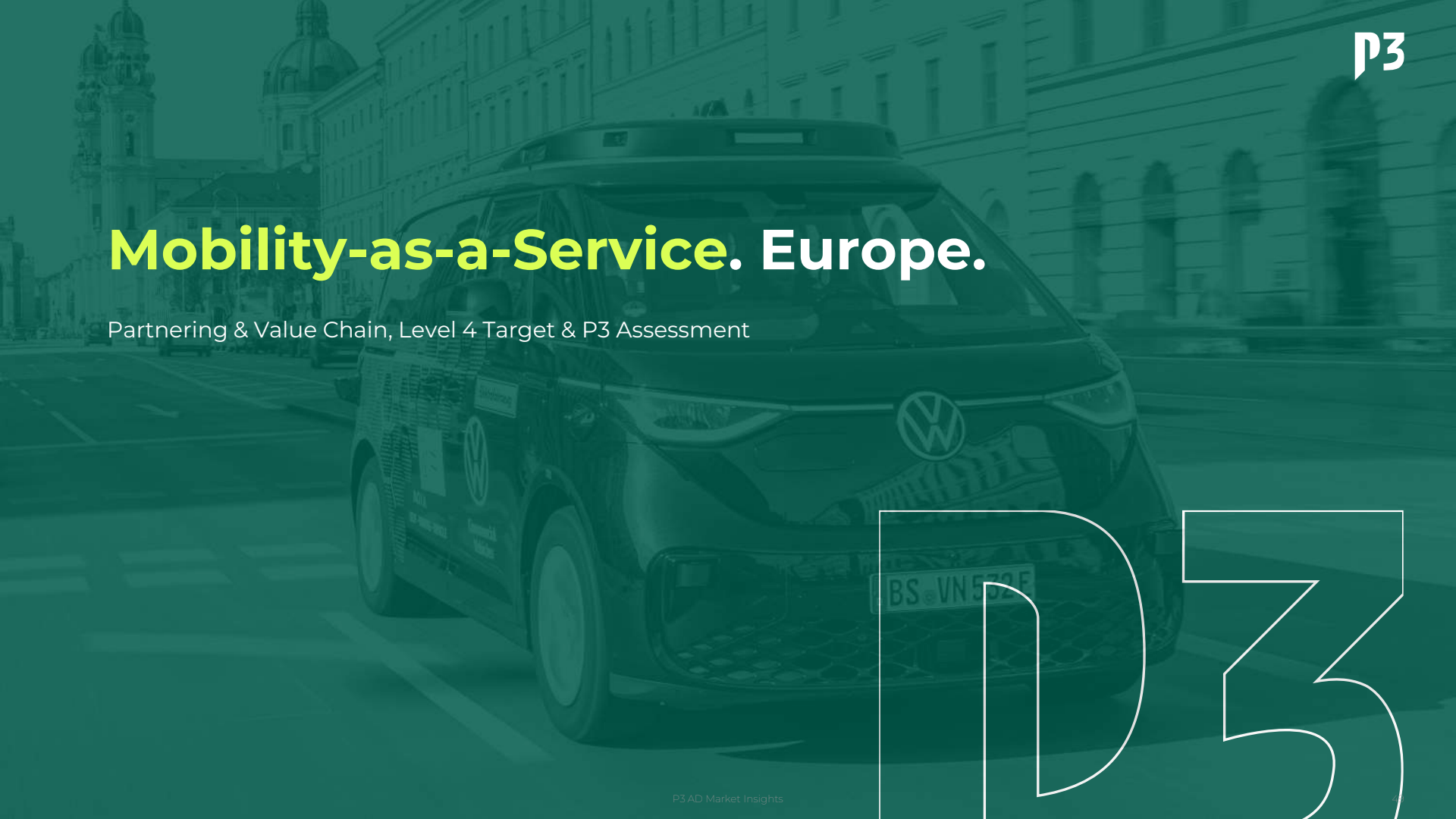
(05.10.2024)

Read

L4 target

2026 (Motional)

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.



Mobility-as-a-Service. Europe.

Partnering & Value Chain, Level 4 Target & P3 Assessment

MaaS EUROPE

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
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mobileye INNOVIZ	mobileye	mobileye	mobileye	Commercial Vehicles		ADMT	MOIA	MOIA EMOTION3D MOIA partnership	MOIA	Undisclosed		
mobileye INNOVIZ	mobileye	mobileye	mobileye	HOLON pininfarina	cognizant Continental Engineering Services	valtech mobility Undisclosed	beep HOCHBAHN FMV	beep HOCHBAHN MOIA FMV	beep hvv switch MOIA FMV		valtech mobility	
NAVTECH RADAR HESAI ZF	NVIDIA ZF	oxa	Google Cloud	Ford Applied EV NEVS evansum	STREETDRONE	Undisclosed	beep Ibott bp BAYANAT	beep STREETDRONE	beep ocado		Tencent 腾讯 Google Cloud	

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside Europe

MaaS EUROPE

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HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others	
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mobileye, INNOVIZ	mobileye	mobileye	mobileye	RIMAC, KIA, verne		verne	verne	verne	verne		Microsoft
mobileye, INNOVIZ	mobileye	mobileye	mobileye	SCHAEFFLER, VDL		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed	
Undisclosed		motor		OMNICAR	motor	Undisclosed	Undisclosed	Undisclosed	motor	Undisclosed	

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside Europe

MaaS EUROPE

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
Sensors	Chips, SoC, ECU, DCU, ...	Virtual Driver	Simulation, V&V, Dev Tools, ...	AD Vehicle	Components	Cabin Monitoring, Vehicle Control & Remote Assistance Functions	Maintenance & Repair, Financing, Asset Ownership	Fleet Control Center & Remote Assistance UI	Mobility Platform, MaaS Intelligence, Rider Experience	3rd party Maps	Cloud	V2X & others
Undisclosed		WeRide, Waymo		Renault Group		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed		
Continental, Ouster, Cepton	NVIDIA, Continental, Kalray, MicroSys	easymile	Ansys, TrustInSoft	Stellantis, Renault Group, Iveco		easymile	Executed by several public transport operators.	ottopia, DriveU.auto, Applied Autonomy	easymile, Ioki, Via	Undisclosed		
Ouster, Valeo, Hesai	NVIDIA	navya		navya, bluebus, tron-e	R3E	navya	Keolis, holo, Executed by several public transport operators.	Keolis, holo, Padam	Keolis, Padam			

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside Europe

MaaS EUROPE

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle		ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
Sensors	Chips, SoC, ECU, DCU, ...	Virtual Driver	Simulation, V&V, Dev Tools, ...	AD Vehicle	Components	Cabin Monitoring, Vehicle Control & Remote Assistance Functions	Maintenance & Repair, Financing, Asset Ownership	Fleet Control Center & Remote Assistance UI	Mobility Platform, MaaS Intelligence, Rider Experience	3rd party Maps	Cloud	V2X & others
mobileye	mobileye	mobileye	mobileye	MAN		Undisclosed	MVG	MVG	MVV	Undisclosed		
ADASKY Driven to save lives	NVIDIA	IMAGRY MAPLESS AUTONOMOUS DRIVING		Otokar		Undisclosed		Undisclosed	Undisclosed	Undisclosed		
OUSTER		auvetech		auvetech		auvetech	Undisclosed	APPLIED AUTONOMY, gudenk	robo			

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside Europe

MaaS EUROPE

Layer 1				Layer 2		Layer 3		Layer 4	Layer 5		
HW-Stack Chips / SoC / ECU		SW-Stack Virtual Driver		AD Vehicle	ADS & AD Vehicle Operations Functions	Maintenance & Repair, Financing, Asset Ownership	AD Fleet Control Center	Mobility Platform & Passenger App	Cloud, V2X, others		
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WAYMO No further announcements LUMINAR	NVIDIA	WAYMO No further announcements DiDi		VOLVO	Apex.AI	Undisclosed	Undisclosed	Undisclosed	tomtom NAVINFO		
	NVIDIA	WAYVE		JAGUAR	Undisclosed	Undisclosed	Undisclosed	Uber		Microsoft	

Focus on L2+ and L3

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update · Partner outside Europe

MaaS EUROPE

At a glance	Latest news	L4 target
Of all the European OEMs in the AD MaaS space, the **partnership of VWCV, ADMT, and MOIA** is the most ambitious and advanced one. The **ID. Buzz AD prototype vehicles with integrated Mobileye Drive ADS** are **hitting the roads in Germany and the US** – first closed user group testing is expected to start in '25.	Operating Area for Autonomous Driving. (08.11.2024) Read	**2026**
Benteler established **HOLON as its new AD business unit**, working closely with SDS supplier Mobileye, fleet operator Beep to develop autonomous shuttles services based on HOLON's mover. As a non-OEM, bringing the vehicle to series production will be challenging – but SPVs will be a USP in the AD space.	HOLON to establish autonomous shuttle manufacturing facility in Jacksonville, Florida, pioneering the future of mobility in the US. (04.09.2024) Read	**2026**
Oxa is **one of the few remaining autonomous technology provider in Europe**. First roboshuttle deployments in the US have been accomplished. The **partnership with eVersum** in particular is generating growing interest in Oxa among European transport companies.	Sunderland's self-driving bus project announces Oxa as new autonomy provider. (15.01.2025) Update Read	Not announced
Verne creates an AV ecosystem consisting of three pillars: an **autonomous electric vehicle** for ride hailing, specialized **infrastructure**, and a mobility **service platform**. The goal is to reshape future mobility and create a unique user experience. Let's see if they will make it to industrialize their solution.	Construction of Verne autonomous EV production facility kicks off at VGP Park Zagreb. (11.02.2025) Update Read	**2026**

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS EUROPE

At a glance	Latest news	L4 target
Schaeffler joined forces with VDL to build shuttles based on its rolling chassis and VDL's expertise in vehicle bodies. The shuttle will be **powered by Mobileye's SDS**. Now it's essential to bag first partnerships with fleet operators and PTAs to develop a drive-ready vehicle.	Schaeffler and VDL Groep to team up on self-driving shuttles. (31.08.2023) Read	Not announced
MOTOR Ai develops a **full-stack software solution for L4**, **relying on raw sensor data**. The SW stack aims to be **SOTIF compliant and meet AFGBV regulations**. The company also **developed a retrofittable Drive-by-Wire system**. We look forward to seeing the first vehicles on public roads and if the ambitious timeline can be met.	There is currently no broad news coverage or communications initiatives. Please check the LinkedIn channel for recent updates. Read	**2025**
Renault teamed up with Waymo on autonomous driving back in 2019 – no further announcements yet. Also, **Renault is partnering with WeRide on self-driving public transit** in France. While a first showcase was deployed in 2024, we expect more to come.	Renault Joins Forces with WeRide for Low-Carbon Public Transit Practice in Europe. (15.05.2024) Read	Not announced
EasyMile has been deployed vehicles >30 countries and >300 locations. the **EZ10 is the most widely used autonomous shuttle**. **ODD** and **SDS capabilities must be enhanced** to remain competitive in autonomous MaaS. However, EasyMile also provides driverless goods transportation solutions.	MicroSys and EasyMile collaborate on the development of safety-critical technology for autonomous driving. (02.04.2024) Read	L4 permission on one public road in France.

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS EUROPE

At a glance	Latest news	L4 target
Navya Mobility's (ex-GAMA) focus is SDS development, vehicle implementation and operation. As the technology is limited to **fixed routes** and **low speed applications**, it will be quite challenging to compete with more mature AV players. Gated areas seem to be the only promising use case in the future.	Gaussin-Macnica-Mobility becomes Navya Mobility. (09.08.2024) Read	Not announced
MAN has not yet made an appearance in the bus segment in the context of autonomous driving. The **MINGA** project, in which MAN has a **strong partner at its side in SDS provider Mobileye**, is the first step. MAN needs a clear roadmap as demand among European transport companies for automated buses is gowing.	MAN Truck & Bus to make city buses autonomous with Mobileye. (17.05.2023) Read	Not announced
Imagery's technology relies on **multiple 360° cameras** and is based on a **deep neural network** that learns to drive by imitating human behavior. Imagery is quite present on European conferences. Therefore, we are eagerly awaiting first bus deployments in Europe.	Night driving challenges in autonomous driving addressed by Imagry. (08.01.2025) Update Read	Not announced
The Estonian startup offers autonomous and sustainable last-mile solution and claims to develop the **first autonomous hydrogen vehicle** in the world. Although there are already pilot projects, it will be tough to prevail against the well-known shuttle providers.	Auve Tech extends reach to U.S. market & enhances strategic partnership with Guident Ltd. (05.04.2024) Read	Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

MaaS EUROPE

At a glance	Latest news	L4 target
There is **no clear strategy in the AD MaaS case**. Volvo has committed to **develop robotaxis with Waymo** - nothing has happened since.	Volvo Cars to debut autonomous driving Ride Pilot feature in California. (06.01.2022) Read	Not announced
Wayve does **not rely on HD maps** and **hand-coded rules** but **focuses on its deep and self-learning AI technology** based on cameras. The company raised $1bn in 2024 to take its Tesla-like technology for self-driving to many carmakers. With regard to AD MaaS, we only expect serious activities in the long term.	Wayve and Uber partner to accelerate the future of automated driving. (28.08.2024) Read	Not announced

Definition L4 target: a robotaxi service that is publicly available in a specific ODD and operated without a safety driver.

Privately Owned Vehicles.

Intro | Use Cases & Layer Description

Privately Owned Vehicles | Use Cases

			Private Ground	Highway	Urban	Suburban	Rural
			Airport, factories, yards, harbors, ...	Highways, freeways, ...	City center, designated streets, ...	Federal highway, residential areas, ...	Rural roads, gravel road, ...
POV	Parking		home yard parking (L4)	-	self parking pilot car park, urban self parking	self parking pilot parking place [e.g., supermarket], self parking	
	Driving		-	pilot (L2+), pilot (L3), chauffeur (L4)	urban navigate on pilot (L2+, L2++, L3) , city chauffeur (L4)	commuter pilot (L2+, L2++, L3), chauffeur (L4)	

POV | Layer Model Description

Layer 1		Layer 2	Layer 3	Layer 4
HW-Stack Chips / SoC / ECU	**SW-Stack Virtual Driver**	**AD Vehicle**	**Rider Experience / Content Provider**	**Cloud, V2X, others**
The **Automated Driving System (ADS)** encompasses SW and HW required to achieve Level 4 autonomy. The HW-Stack involves activities such as hardware development, production, testing, automotive approval, and safety compliance. The SW-Stack focuses on self-driving software development and includes activities such as testing & simulation, ODD (Operational Design Domain) management, SDS licensing, mapping, sensor data processing, E2E integration, and safety compliance.		**AD Vehicles** are considered L4 ready vehicle platforms. This layer centers on the development and design and include tasks such as regulatory compliance, safety management, homologation, logistics, and production.	**Rider Experience** enhances user experience through entertainment and connectivity. Tasks include in-vehicle advertisement, shopping, education, gaming, and multimodal connectivity features. May also be covered by the Mobility Platform provider.	Provides necessary supporting infrastructure. Tasks include V2X infrastructure, 3rd party HD maps, and cloud infrastructure and backend.

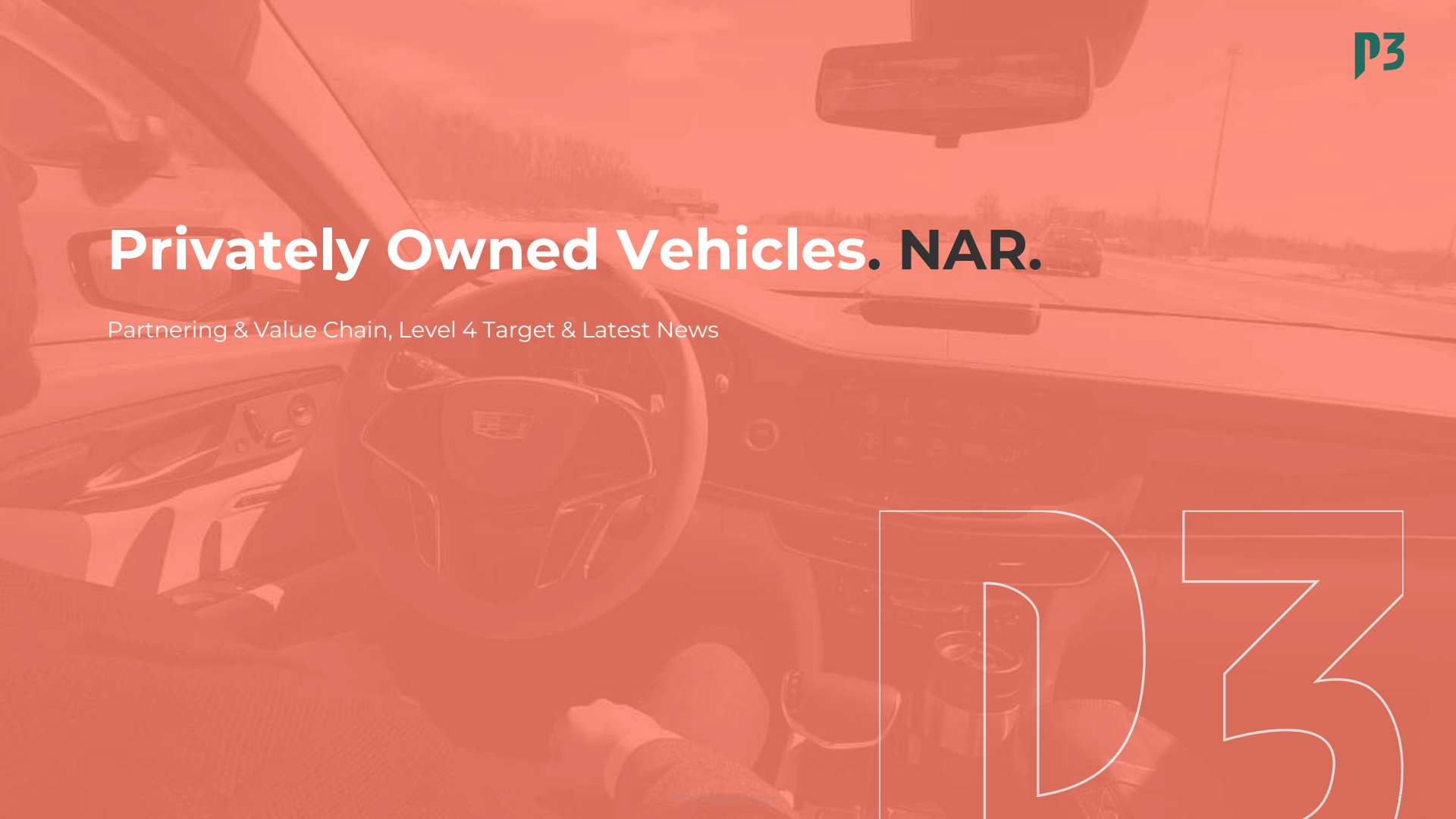
POV | Layer Model Description

Exemplary tasks

Layer 1		Layer 2	Layer 3	Layer 4
HW-Stack Chips / SoC / ECU	**SW-Stack Virtual Driver**	**AD Vehicle**	**Rider Experience / Content Provider**	**Cloud, V2X, others**
HW Development	SW Development	Design & development	In-vehicle advertisement	V2X
HW Production	Testing & Simulation	Quality assurance	Shopping	3rd party HD maps
Sensor Integration	ODD Management	Redundancy	Education	Cloud Infrastructure
Automotive approval	SDS Licensing	X-by-Wire	Working	
Sensor testing & approval	SW Testing & Approval	Regulatory compliance	Multimodal connectivity	
Sensor fusion	Mapping	Homologation	Gaming	
Calibration and Integration Support	Verification & Validation	After sales / aftermarket		
Safety & Compliance	E2E Integration	Safety management		
	Sensor Integration and Data Processing	AD requirements		
	Safety & Compliance	Logistics		
		Production		
		E2E integration		
...	...	...	...	...

Privately Owned Vehicles. NAR.

Partnering & Value Chain, Level 4 Target & Latest News



POV NAR

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
TESLA	SAMSUNG TSMC AMD NVIDIA	TESLA		TESLA		TESLA	Baidu China		
OUSTER CEPTON	Qualcomm UNTETHER AI mobileye	OCULii gm Momenta Oak Ridge cruise	Applied Intuition	gm		gm	mobileye Dynamic Map Platform	Microsoft	
OUSTER	mobileye	mobileye Baidu SAIPS LATITUDE nullmax		Ford		Undisclosed	mobileye EMG DEEPMAP Civil Maps	Au	

Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

POV NAR

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
mobileye, Valeo	mobileye, 纵目科技	mobileye	ecarx	Ford, GWM, Honda, BMW, Porsche, Polestar, Zeekr, Stellantis, gm, Mahindra, Volkswagen Group		Undisclosed	Volkswagen Group		
Ouster	NVIDIA	helm.ai		Honda		Undisclosed	Undisclosed		
Continental, Bosch	NVIDIA	LUCID		LUCID		Undisclosed	Undisclosed		

Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

POV NAR

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
NEW HESAI, OUSTER, LUMINAR		nuro, Ike	foretellix	TOYOTA		Undisclosed		Google	

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

POV NAR

At a glance	Latest news	L4 target
Tesla **collects a huge amount of data** and build a unique ecosystem around the fleet. While there are still legitimate discussions about the robustness of vision-only approaches, the **performance of FSD in the US is already impressive**. Nevertheless, it is still an L2+ system.	Tesla China rolls out OTA update with urban Autopilot enhancement. (25.02.2025) Update Read	No binding roadmap for FSD
GM has combined its former Ultra Cruise system () with its Super Cruise program. By the end of 2024, GM announced to **cease funding the development of Cruise's robotaxi business**. Instead, the company plans to **integrate Cruise with its own efforts to advance driver-assistance systems**.	GM expects to save up to $1 billion on Cruise costs. (28.01.2025) Update Read	**2025**
After getting off the robotaxi business with Argo.AI, Ford said **to focus on developing differentiated L2+ and L3 applications** for privately used cars. By 2023, Ford established Latitude to develop future automated driving technology.	US safety regulators expand Ford hands-free driving tech investigation. (20.01.2025) Update Read	Not announced
Mobileye is the **leading supplier for camera-based driver assistance systems**. In addition to L4 technology for robotaxis, **SuperVision is its state-of-the-art L2+ (eyes on) system**. Also, first **OEMs teamed up with Mobileye to integrate its Chauffeur** (eyes off) solution. We are very much looking forward to testing it on European roads.	Mobileye to end internal Lidar development. (09.09.2024) Read	Not announced

Definition L4 target: an automated driving system that does not require the driver to take over at any time in a specific ODD. Hands-off, eyes-off, brain-off.

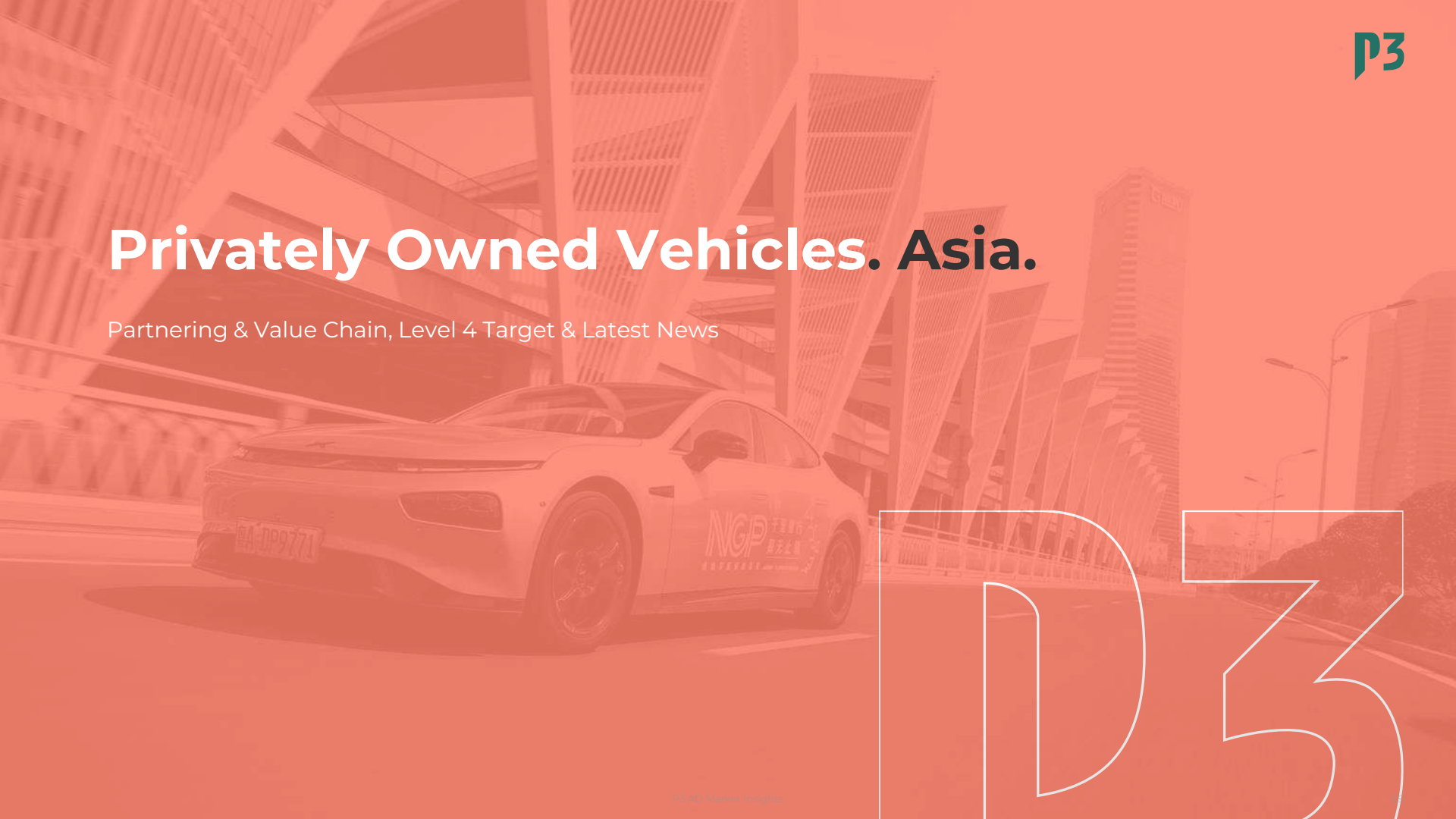
POV NAR

At a glance	Latest news	L4 target
Helm.ai employs an AI-first approach to building AD software using an **unsupervised learning technology**. This technology allows to **train on vast volumes of data** without the need for large scale fleets or human annotation. Helm.ai will **power Honda 0 Series** models. Moreover, Helm.ai develops AI-generated video and simulation tools.	Helm.ai announces GenSim-2: Generative AI with video editing capabilities for autonomous driving development. (18.12.2024) Update Read	Not announced
Lucid's advanced luxury EVs are about to be equipped with its **DreamDrive ADAS systems**, consisting of **up to 32 sensors** and offering **more than 30 driver-assistance features**. Since hardly anything is known about partnerships, the **SW is apparently primarily developed in-house**.	Lucid Motors CEO Peter Rawlinson steps down. (25.02.2025) Update Read	Not announced
Nuro **has been a pioneer in last-mile deliveries** with a special purpose vehicle. In September 2024, Nuro announced to **start licensing its L4 technology** to manufacturers of personally owned vehicles and mobility providers, like ride-hail and delivery companies. A smart move to monetize its tech end create a viable business case.	Nuro expands driverless autonomous vehicle testing in push to attract customers. (19.11.2024) Update Read	Not announced

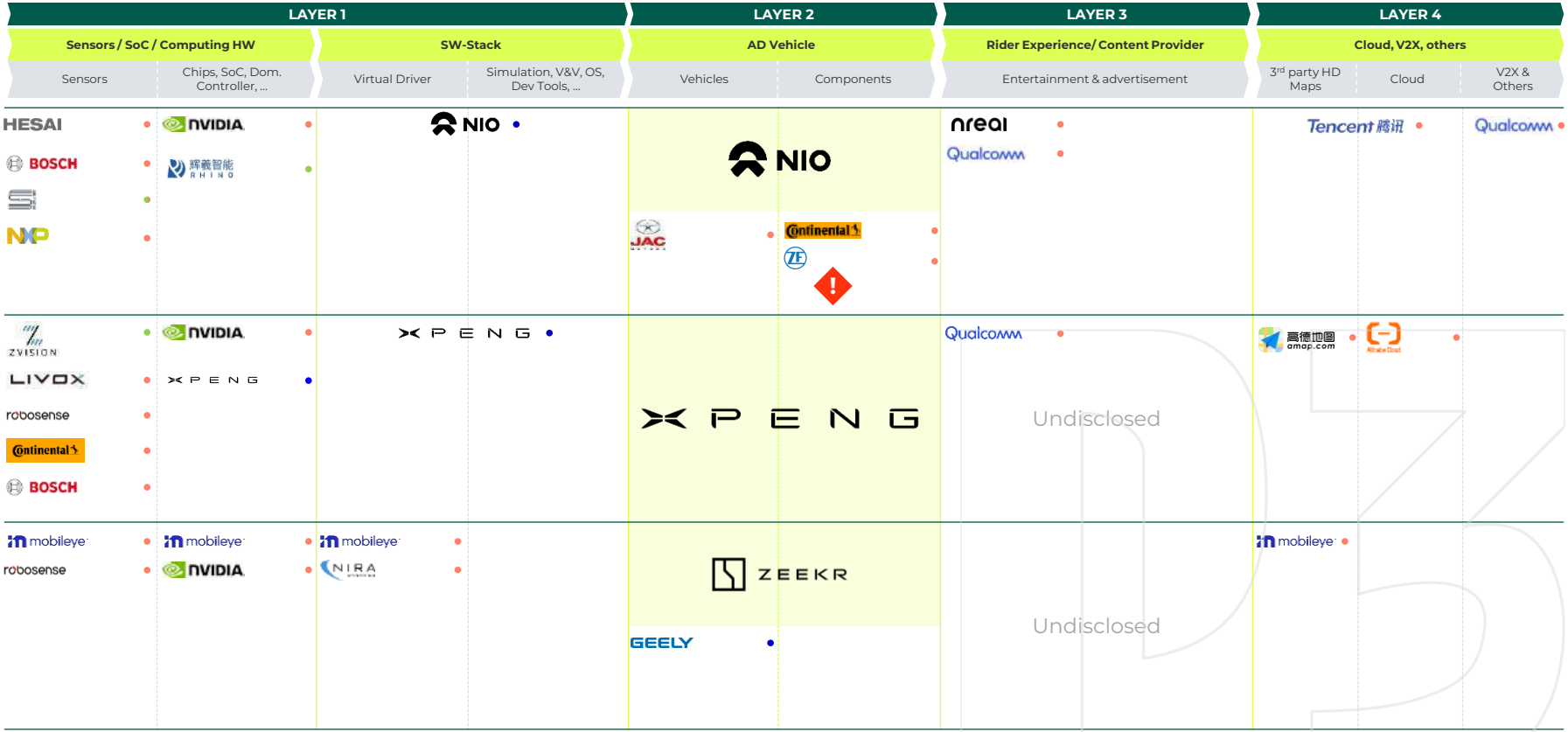
Definition L4 target: an automated driving system that does not require the driver to take over at any time in a specific ODD. Hands-off, eyes-off, brain-off.

Privately Owned Vehicles. Asia.

Partnering & Value Chain, Level 4 Target & Latest News



POV ASIA



Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
robosense HESAI Pony.ai HUAWEI	NVIDIA Horizon Robotics HUAWEI	Momenta Baidu apollo nullmax HUAWEI		BYD		Undisclosed	高德地图 amap.com	HUAWEI	
mobileye ibeo robosense HESAI	mobileye Qualcomm SemiDrive Horizon Robotics NVIDIA	mobileye HAOMO.AI OCULII LiangDao nullmax To be confirmed		GWM		Undisclosed	NAVINFO 高德地图 amap.com	HUAWEI 中国移动 China Mobile	
robosense HUAWEI arbe	BOSCH	DiDi pony.ai HUAWEI		ARCFOX BAIC		Undisclosed	EMG HUAWEI	中国移动 China Mobile	

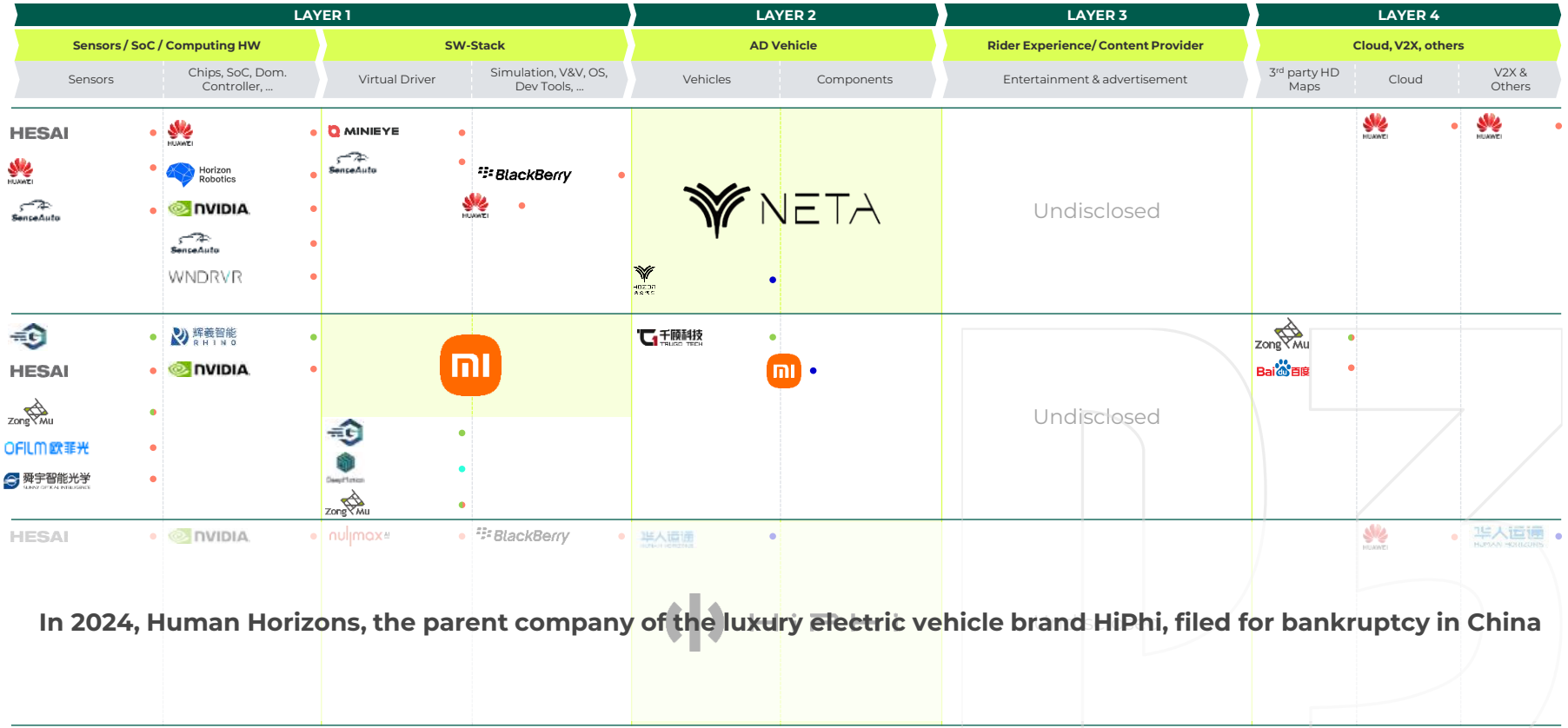
Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
luminar	SemiDrive	momenta				Undisclosed	mobileye		ZTE
mobileye	Qualcomm	nullmax AI		SAIC			here		
robosense	TTTech	HUAWEI							
ZF	Horizon Robotics	!							
Hesai	NVIDIA								
robosense	NVIDIA	momenta		SAIC		Undisclosed			Alibaba.com
	Qualcomm								
HESAI	NVIDIA	Li Auto		Li Auto		Undisclosed	高德地图 amap.com		
BOSCH	Horizon Robotics	QCRAFT							
OFILM 欧菲光	德赛西威								

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

POV ASIA



In 2024, Human Horizons, the parent company of the luxury electric vehicle brand HiPhi, filed for bankruptcy in China

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
robosense HESAI	Cambricon Horizon Robotics Black Sesame mobileye NVIDIA Qualcomm	Baidu nullmax mobileye ZHUOYU		FAW GROUP HONGQI		Undisclosed		QUECTEL	
QUANERGY dji mobileye HESAI	NVIDIA mobileye Horizon Robotics Motion BOSCH	Baidu MINIEYE ZHUOYU nullmax Motion WeRide HUAWEI		BTL CHERY EXEED LUXEED		IFLYTEK	mobileye	QUANERGY BOE	
robosense HESAI	Horizon Robotics NVIDIA	HOLOMATIC momenta pony.ai DiDi Autonomous Driving		AION GAC		Undisclosed		Tencent HUAWEI	

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

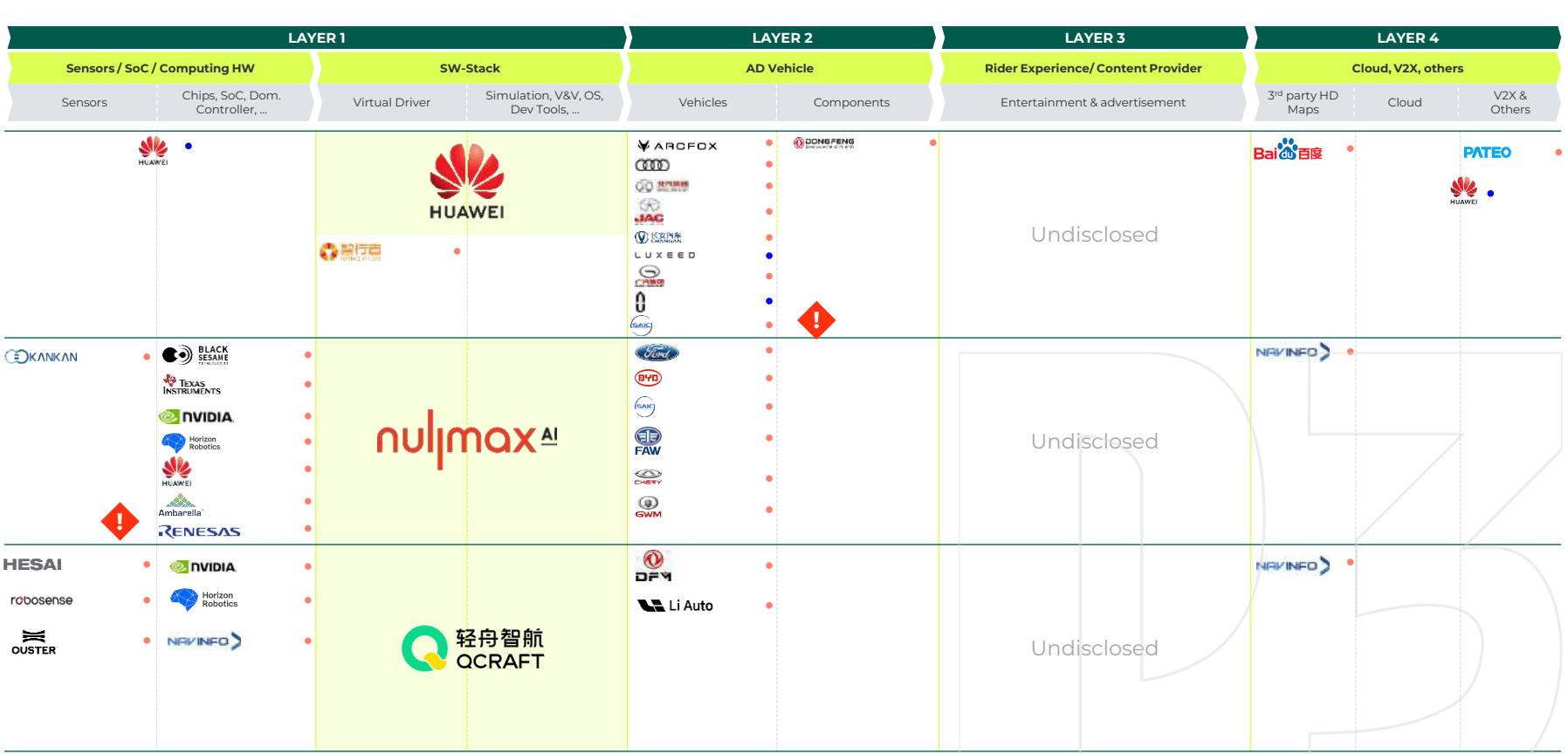
POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
HESAI BOSCH	Horizon Robotics	Baidu 百度 HUAWEI DEEPAL & Avatr		长安汽车 CHANGAN		HUAWEI DEEPAL		Baidu 百度	
HESAI	BLACK SESAME	Baidu 百度 momenta 东风日产 PhiCent ZHUOYU			HUAWEI	Undisclosed		HUAWEI Tencent 腾讯	
				DONGFENG DONGFENG MOTOR CORPORATION					
DESAY SV OFILM 欧菲光 RACE	NVIDIA	Baidu 百度		GEELY	Undisclosed		Baidu 百度		

End of 2024, Ji Yue filed for bankruptcy in China

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

POV ASIA



Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
OUSTER Valeo mobileye	RENESAS mobileye Qualcomm	autox cruise helm.ai		HONDA		SONY			
robosense	Qualcomm	HAOMO.AI		GWM		Undisclosed	NAVINFO		
BOSCH robosense HUAWEI	NVIDIA Qualcomm HUAWEI	momenta		NIO TOYOTA BYD GAC	SAIC 东风日产	Undisclosed		Tencent aws	

Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
robosense Ambarella		LOTUS ROBOTICS		LOTUS GEELY LYNK&CO		Undisclosed		LOTUS ROBOTICS	
HESAI robosense	BOSCH NVIDIA Horizon Robotics	WeRide 文远知行 BOSCH		CHERY EXEED		Undisclosed	Tencent	Tencent	
LUMINAR HESAI robosense pony.ai (Sensor fusion)	NVIDIA Horizon Robotics pony.ai	pony.ai		Undisclosed		Undisclosed	NAVINFO		

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

POV ASIA

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
DESAY SV OFILM 欧菲光 RACH	NVIDIA NXP BLACK SESAME	Baidu 百度 apollo		Filed for bankruptcy GEELY		Undisclosed	CARNERA tomtom	Microsoft	NXP SAMSUNG 中国移动
OUSTER ZVISION robosense	NVIDIA	DEEPROUTE.AI		DFM SAIC GWM To be confirmed smart		Undisclosed	Tencent 腾讯	Microsoft Alibaba.com	
mobileye QUANERGY	mobileye NVIDIA	mobileye zenseact Baidu 百度 apollo	foretellix	GEELY Filed for bankruptcy ZEEKR	Autoliv SMART EYE	Undisclosed	高德地图 amap.com	Tencent 腾讯	

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

POV ASIA

NEW in addition to MaaS chapter

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
robosense HESAI	Horizon Robotics Continental NVIDIA NXP UAES SAIC intel	Horizon Robotics MAXIEYE MINIEYE UNTOUCH Zongmu OCRAFT JF nullmax NAVINFO pony.ai Motion !	ThunderSoft WNDRVR STRADVISION	VOLKSWAGEN GROUP 理想 gm GWM BYD AION HONGQI CHERY BAIC		UNTOUCH 未动科技	NAVINFO	东软睿驰	

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

POV ASIA

At a glance	Latest news	L4 target
While NIO premium EVs are **hitting several markets outside China**, ADAS capabilities and functions of other competitors in China seem to be slightly more advanced and widely available. In 2024, NIO announced to rely on **end-to-end large models** for ADAS development. In doing so, they are following the fundamental trend of Chinese OEMs and tech suppliers.	Start of series production for Steer-by-Wire steering at Chinese car manufacturer NIO. (17.02.2025) Update Read	Not announced
XPENG announced that its XNGP urban intelligent driving system has achieved **100% HD map-free operation** with the goal to achieve full coverage of XNGP functions in major urban road networks across China by the end of 2024. XPENG **shows strong ambitions towards L4** for consumer vehicles.	XPENG P7+ model comes standard with Tianji XOS 5.4 system. (25.10.2024) Read	Not announced
Geely's announced to integrate **Mobileye's SuperVision system for privately owned vehicles**. However, this cooperation seems to struggle as Zeekr unveiled **Haohan 2.0 Plus, its proprietary end-to-end intelligent driving architecture**, building on a multimodal large language model.	ZEEKR launches Haohan 2.0 Plus end-to-end smart driving architecture at Auto Guangzhou 2024. (15.11.2024) Read	Not announced
In December 2021, **BYD and Momenta**, one of China's major SDS developers, formed a **joint venture for autonomous driving**. In 2025, BYD unveiled its "God's Eye" ADAS which will be integrated in its entire model lineup.	Horizon Robotics' Journey® 6 series in-car computing solution debuts on BYD's God's Eye C smart driving system. (13.02.2025) Update Read	Not announced

Definition L4 target: an automated driving system that does not require the driver to take over at any time in a specific ODD. Hands-off, eyes-off, brain-off.

POV ASIA

At a glance	Latest news	L4 target
GWM aims to provide complete mobility ecosystems with dedicated brands for the European markets. **Regarding AD**, GWM has been working with companies such as **Mobileye, Qualcomm** or Nullmax. By end of 2024, GWM **announced the roll out of its all-scenario HD map-free NOA** functions nationwide	AutoNavi, Great Wall Motor inaugurate 'Mobility Joint Innovation Lab'. (07.01.2025) Update Read	Not announced
While BAIC teamed up with Baidu to develop robotaxis, its EV brand **Arcfox models are equipped with Huawei software and sensor suite**. Our regular ADAS benchmark drives in China showed: **Huawei system's performance is stunning**.	BAIC Group announces $70.35 million investment in Pony.ai. (02.12.2024) Read	Not announced
China's largest carmaker intends to equip premium electric vehicle models with **Momenta-developed intelligent driving technology**. SAIC may not seem as 'fancy' in its outward appearance as some startups from China – that's why they co-founded IM Motors in a JV with Alibaba.	SAIC Motor, Huawei forge partnership to co-build smart new energy vehicles. (21.02.2025) Update Read	Not announced
IM Motors, **co-founded by SAIC Motor, Zhangjiang Hi-Tech, and Alibaba** pushes its AD capabilities through **joint development with Momenta**. While urban NOA was implemented swiftly, IM also obtained the official AV testing license for highway/expressway in Shanghai for L3 testing.	IM Motors, NVIDIA, Momenta to co-pioneer DRIVE AGX Thor chip in mass-produced intelligent driving systems. (18.11.2024) Read	Not announced

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POV ASIA

At a glance	Latest news	L4 target
Li Auto is another EV company aiming for autonomous driving. Just like its main competitors, Li Auto also relies **on end-to-end architectures** for its smart driving capabilities. Li Auto **teamed up with company QCraft** to provide advanced driving features.	Li Auto rolls out 'end-to-end + VLM' smart driving system via OTA. (23.10.2024) Read	Not announced
NETA Auto, a Hozon Auto brand, is one of several Chinese OEMs that has entered into **in-depth cooperation with Huawei**. Furthermore, teaming of with Hesai for future vehicle models shall further enhance automated driving capabilities.	Wind River powers NETA Auto's intelligent controller. (19.07.2024) Read	Not announced
Xiaomi sets sight on several autonomous electric vehicle brands by **substantially investing in smart car technology**. The unveiled **Xiaomi SU7 offers great user experience at lower cost** than Western OEMs – the ADAS has still some weaknesses but is about to catch up with competition.	Xiaomi EV rolls out OTA update on Xiaomi SU7 model with VLM integration. (24.12.2024) Update Read	Not announced
In 2024, Human Horizons, the parent company of the luxury electric vehicle brand HiPhi, filed for bankruptcy in China	Human Horizons, Huawei Cloud partner on dedicated intelligent driving cloud. (25.07.2023) Read	Not announced

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POV ASIA

At a glance	Latest news	L4 target
FAW Group established several **partnerships along the AD ecosystem** – **tech providers such as DJI or Mobileye** are about to integrate their smart driving solutions into FAW Group's vehicles, usually starting with FAW's Hongqi brand.	Horizon Robotics joins hands with FAW Bestune in smart driving field. (24.02.2025) Update Read	Beyond **2025**
Through **various partnerships**, the company is driving the development of intelligent vehicles. **Chery plans to offer L4-capable vehicles in 2025**. Not much time left. Partnerships with iMotion, Nullmax or dji could boost the development.	Hesai secures design wins for multiple Chery models, mass production to begin this year. (21.01.2025) Update Read	**2025**
GAC is the fifth largest car manufacturer in China and sells its vehicles under various brands. The company has always **worked closely with Huawei** and plans to produce L4 vehicles under its own AION brand from 2024 as a manufacturing partner of Huawei.	RoboSense secures new contracts for LiDAR supply from GAC AION. (24.10.2024) Read	Not announced
CHANGAN is **working closely with Huawei on Level 4 Autopilot**, 5G, and C-V2X, and plans to offer **L4 capabilities in 2025**. Recently, the company announced a strategic cooperation with Geely, among others, to combine strengths and share resources in the development of autonomous cars.	Hesai to exclusively supply 1.5 million Lidar units to Changan Automobile for multiple car brands. (05.12.2024) Update Read	**2025**

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POV ASIA

At a glance	Latest news	L4 target
Dongfeng's **VOYAH brand vehicles** are about to be equipped with **Baidu's intelligent driving system**, offering features like Navigation on Autopilot. By end of 2024, **Dongfeng Nissan teamed up with Momenta,** while Dongfeng's **VOYAH announced a partnership** with **PhiGent Robotics**	Hesai Technology secures LiDAR supply contract for several Dongfeng Motor's brands. (22.01.2025) Update Read	Not announced
End of 2024, Ji Yue filed for bankruptcy in China	JI YUE 07 commences pre-sales at 215,900 yuan, featuring Baidu's Apollo Self Driving tech. (29.08.2024) Read	Not announced
During our benchmark drives in China, **Huawei's ADS 2.0 performance was stunning**. ADS 3.0 is about to be unveiled by the end of 2024 and promises another leap in performance. Also, the solution has been integrated in different EV models. Huawei had the goal to become China's Bosch – towards **SW capabilities, it's already much more advanced in China**.	SAIC Motor, Huawei forge partnership to co-build smart new energy vehicles. (21.02.2025) Update Read	**2025**
Nullmax pursues a '**Machine Learning First**' approach and has **teamed up with several OEMs, chip suppliers and other companies**. While the depth of cooperation is often unclear, you should keep an eye on Nullmax and its **vision-based, multi-sensor fusion and perception technology** route.	Nullmax and Renesas forge strategic partnership to deliver competitive ADAS solutions for the global market. (25.02.2025) Update Read	Not announced

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POV ASIA

At a glance	Latest news	L4 target
QCraft's robobus operates in 18 cities, 18 cities, including Beijing, Suzhou, Wuhan, and Chongqing. However, the company is currently rather **focusing on L2++ instead of L4 robotaxis** and teamed up with Li Auto, for instance. Moreover, QCraft pursues a **gradual evolution from L2++ to L4** autonomous driving.	QCraft so far delivers over 500,000 sets of 'Chengfeng' smart driving solutions. (25.12.2024) Update Read	Not announced
While providing its own "SENSING" ADAS, Honda has attracted attention primarily through **investing in GM's Cruise for MaaS initiatives.** An **investment in Helm.ai** , however, is intended to benefit the company's own software and AI competencies. **Honda 0 Series models will be powered by Helm.ai**.	Honda introduces next-generation technologies for Honda 0 Series models at Honda 0 Tech Meeting 2024. (09.10.2024) Read	**2025**
Haomo.ai is **backed by GWM** and develops its urban navigation-assisted Hpilot for mass-production. By Feb 2024, it has been **integrated in over 20 vehicle models**, achieving >120 mn km of assisted driving. Gathering a huge amount of data may be beneficial towards L4 development.	Haomo.ai nabs 300 million yuan in Series B2 financing round. (23.04.2024) Read	Not announced
While still running s small robotaxi fleet, Momenta shifted **focus is on advanced L2+ solutions for OEMs** in all key markets. Momenta **teamed up with several automakers** including Mercedes, GAC AION and IM Motors to develop and roll out end-to-end intelligent driving large model driving solutions.	IM Motors, NVIDIA, Momenta to co-pioneer DRIVE AGX Thor chip in mass-produced intelligent driving systems. (18.11.2024) Read	Not announced

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POV ASIA

At a glance	Latest news	L4 target
Lotus Robotics, the intelligent driving arm of Lotus Technology, provides comprehensive intelligent driving solutions, including advanced platform software, cloud toolchains, and operation solutions. While the company may be relatively unknown in Europe and the USA, its **AD capabilities are seen by local experts as among the best in the Asian market**.	Lotus deploys Ambarella's Oculii™ AI 4D Imaging Radar technology in L2+ semi-autonomous systems for Eletre SUV and Emeya Hyper-GT Electric vehicles. (24.09.2024) Read	Not announced
Apart from L4, WeRide's portfolio also includes **ADAS for passenger vehicles using L2+ and L3**. The company formed a **partnership with Bosch**, combining its SW stack with Bosch's industrialization and engineering capabilities. The first mass-produced vehicle using Bosch & WeRide technology is the Chery Exeed Exlantix ET.	Painting a panoramic view of the future of autonomous driving, WeRide makes a grand appearance at the Beijing Auto Show with four major products. (25.04.2024) Read	Not announced
Pony.ai offers OEMs & Tier 1 its proprietary **POV solution**, "**Xiaoma Shitu**," which supports high-speed and urban NOA. It's available in three configurations: **PonyClassic, PonyPro, and PonyUltra**. PonyClassic is equipped with 6 cameras and 1 millimeter-wave radar, while the advanced PonyUltra version features a setup of 11 cameras, 5 millimeter-wave radars, and 3 LiDAR sensors.	RoboSense, Pony.ai announce all-around partnership expansion. (13.01.2025) Update Read	Not announced
Baidu Apollo **provides OEMs and Tier 1s** with an AD platform called **Apollo Pilot**. Its AI-driven solutions focus on scalability and safety, collaborating with global automakers. The first production model of Baidu's and Geely's joint venture Ji Yue relied on solely visual perception algorithms. **In 2024, Ji Yue filed for bankruptcy.**	Baidu launches Apollo Open Platform 10.0 to advance autonomous driving development. (05.12.2024) Update Read	Not announced

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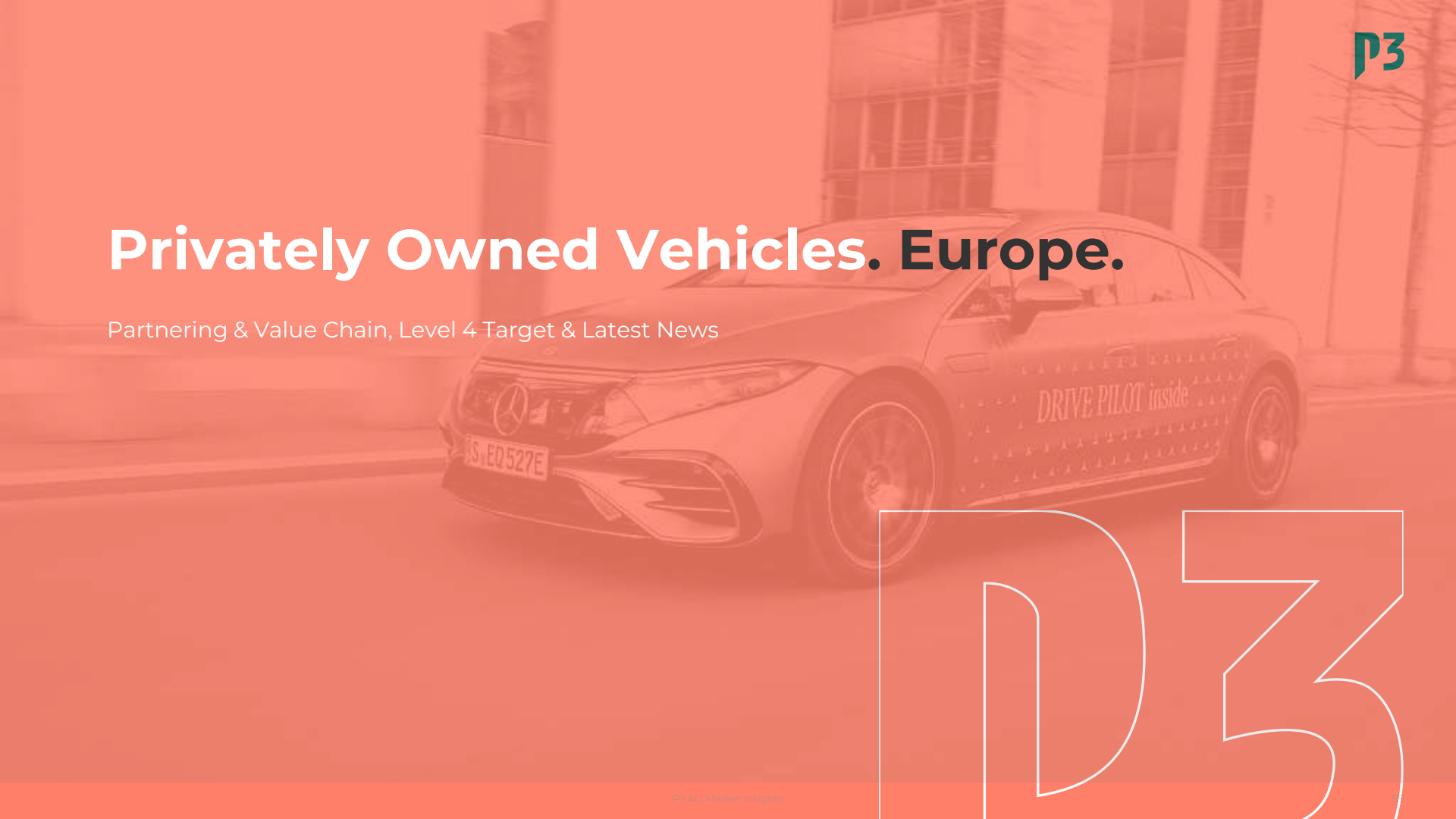
POV ASIA

At a glance	Latest news	L4 target
DeepRoute initially focused on L4 robotaxi and delivery van deployments but **shifted in 2022 to L2+ and L3** technology. In late 2024, it **raised $100 million** in a Series C1 funding round to **boost R&D in its DeepRoute IO "end-to-end" model**, expand collaborations with global automakers, explore future robotaxi opportunities, and recruit more AI-native talent.	smart, DeepRoute.ai to co-develop AI-powered smart driving systems. (17.01.2025) Update Read	**2025**
Geely is advancing AD for POVs through **partnerships and in-house development**. It collaborates with companies like Mobileye, integrating these technologies into models from brands like Volvo, and Polestar. Geely's and Baidu's joint venture, **Ji Yue**, **filed for bankruptcy in 2024.**	Foretellix and Geely partner to accelerate AV development. (07.05..2024) Read	Not announced
Horizon Robotics has **partnerships with many well-known OEMs and Tier1s** with whom they are jointly developing autonomous driving functions based on their Journey chip. Additionally, Horizon offers a variety of **smart driving solutions** ranging from basic assistance systems to **full-scenario NOA** and parking.	Horizon Robotics joins hands with FAW Bestune in smart driving field. (24.02.2025) Update Read	Not announced

Definition L4 target: an automated driving system that does not require the driver to take over at any time in a specific ODD. Hands-off, eyes-off, brain-off.

Privately Owned Vehicles. Europe.

Partnering & Value Chain, Level 4 Target & Latest News



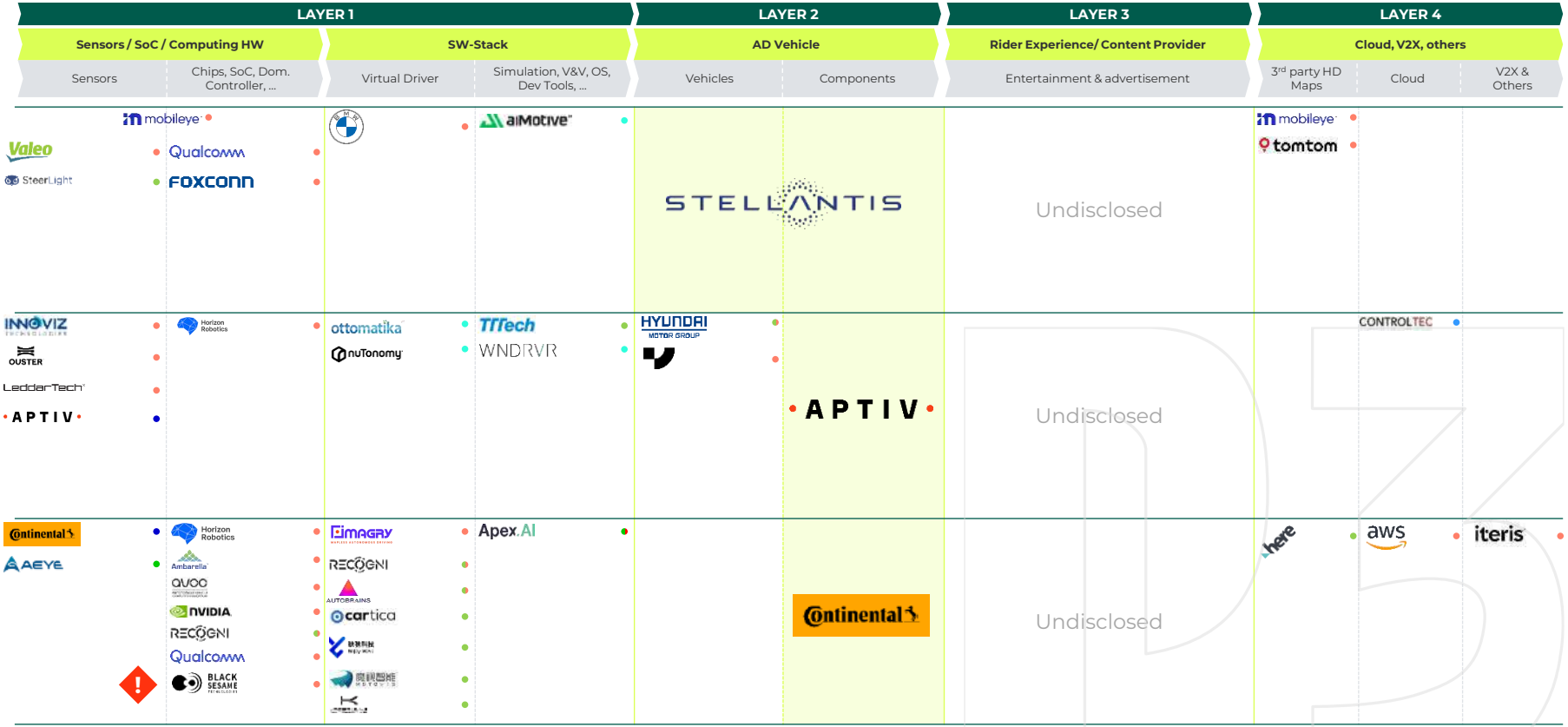
PARTNERING & VALUE CHAIN

POV EUROPE

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
Luminar BOSCH Valeo veoneer	NVIDIA brainchip Qualcomm	NVIDIA Baidu 百度 momenta				Mercedes me ZYNC	DEEPMAP here	Tencent 腾讯	
mobileye INNOVIZ TECHNOLOGIES APTIV MAGNA veoneer Valeo	Qualcomm	Arriver Valeo AUTOBRAINS Tencent 腾讯 STELLANTIS TATA TECHNOLOGIES	TTTech BlackBerry			BMW CONNECTED DRIVE AirConsole	here	aws	ottopia
mobileye INNOVIZ TECHNOLOGIES	NVIDIA Qualcomm CARIAD mobileye	VAIVA Safe Mobility Hello Agiso UAI UNDERSTAND.AI INTENTA Horizon Robotics BOSCH	CARIAD BlackBerry Luxoft TTTech Applied Intuition	VOLKSWAGEN GROUP		Undisclosed	tomtom mobileye here 高德 AutoNavi NIRA	Microsoft	verizon HUAWEI

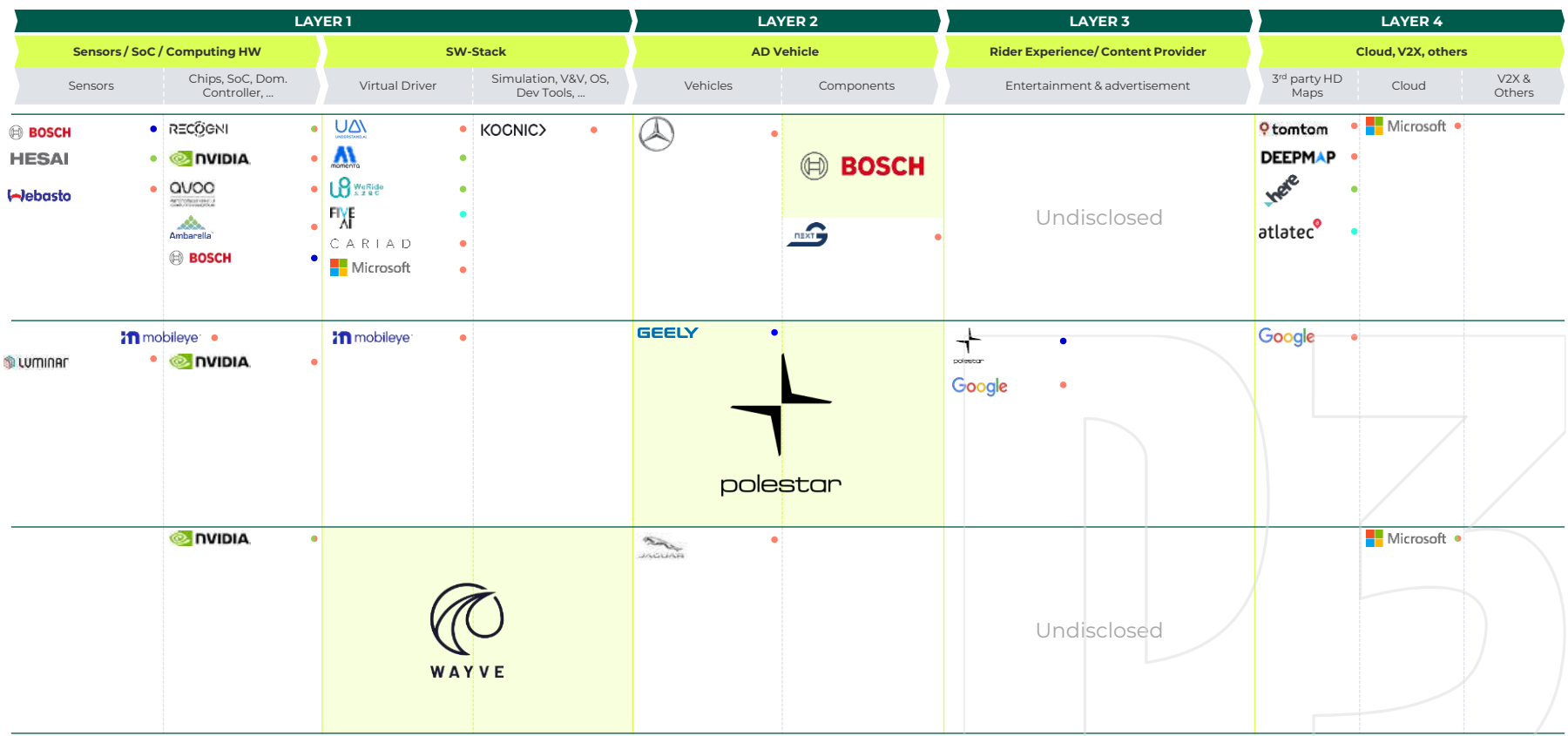
Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

POV EUROPE



Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

POV EUROPE


LAYER 1
LAYER 2
LAYER 3
LAYER 4
Sensors / SoC / Computing HW
SW-Stack
AD Vehicle
Rider Experience/ Content Provider
Cloud, V2X, others
Sensors
Chips, SoC, Dom. Controller, ...
Virtual Driver
Simulation, V&V, OS, Dev Tools, ...
Vehicles
Components
Entertainment & advertisement
3rd party HD Maps
Cloud
V2X & Others
BOSCH
HESAI
Webasto
RECOGNI
NVIDIA
QUOC
Ambarella
BOSCH
KOGNIC
momenta
WeRide
FIVE AI
CARIAD
Microsoft
BOSCH
Undisclosed
tomtom
Microsoft
DEEPMAP
here
atlatec
LUMINAR
mobileye
NVIDIA
mobileye
GEELY
polestar
Google
Google
polestar
WAYVE
NVIDIA
JAGUAR
Undisclosed
Microsoft
Core Business
Partnership or supplier deal
Investment
Acquisition
Parent / Subsidiary
Update

POV EUROPE

LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Entertainment & advertisement	3rd party HD Maps	Cloud	V2X & Others
NEW JOYNEXT	NEW Ambarella	NEW AUTOBRAINS		BMW, TOYOTA, VINFAST	Continental, KNORR-BREMSE	Undisclosed	Undisclosed		

Core Business ● Partnership or supplier deal ● Investment ● Acquisition ● Parent / Subsidiary ◆ Update

POV EUROPE

At a glance	Latest news	L4 target
Drive Pilot is the world's first ADAS to gain **type approval for a L3 system** and available in Europe and the US. Initially, the supported speed was limited to 60 km/h. In 2024, an upgrade was announced, enabling the system to follow a vehicle on the motorway at up to 95 km/h.	Support speed of up to 95 km/h on German motorways. (17.12.2024) Read	Not announced
BMW seems to have greatly **reduced its own activities with regard to L3 and L4** and **instead focuses on partnerships** - most recently with Stellantis and Tata. In our regular ADAS benchmark drives, BMW's driver assistance systems show the strongest performance among all European OEMs.	Here and BMW extend partnership on AI-powered mapping system. (08.01.2025) Read	Not announced
CARIAD is primarily responsible for software development in the **private ownership** segment. There is also a development partnership (Automated Driving Alliance) with Bosch. We are watching the development of CARIAD and are curious to see whether they can live up to their great task.	Volkswagen Group intensifies collaboration with Mobileye. (20.03.2024) Read	Not announced
Stellantis is working on **L3 solutions with technology partners** - especially **BMW**. In 2025, Stellantis announced STLA AutoDrive, its first in-house-developed L3 automated driving system.	Stellantis unveils STLA AutoDrive, hands-free and eyes-off autonomous technology for a new era of driving comfort. (20.02.2025) Update Read	Not announced

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POV EUROPE

At a glance	Latest **news**	**L4** target
Aptiv is a leading company in the development of ADAS for and invested a huge amount of money in Motional, a JV with Hyundai, before reducing its common equity interest from 50% to about 15% by end of March 2024. **Aptiv has acquired or at least invested in software companies to strengthen in-house capabilities** towards ADAS and AD.	Horizon Robotics, Aptiv join forces to develop localized intelligent driving solutions. (03.07.2023) Read	Not announced
Continental **spun off its own AD unit**. Traditional Tier 1 such as Conti compete with strong SW players as OEMs/ customers increasingly purchase HW and SW separately. However, partnerships and investments in AI companies show that Conti **is willing to keep up the race.**	Black Sesame Technologies, Continental ink MoU on HPC development at CES 2025. (13.01.2025) Update Read	Not announced
Bosch **teamed up with CARIAD** to jointly develop automated driving functions and acquired AV company Five AI a couple of years ago to strengthen its AD capabilities. Traditional Tier 1 such as Bosch **compete with strong SW players** as OEMs/ customers increasingly purchase HW and SW separately	For safer roads: Bosch teams up with Microsoft to explore new frontiers with generative AI. (28.02.2024) Read	Not announced
Polestar is a renowned EV player in the EU market. While ADAS of both Polestar 1 and 2 can't compete with many competitors, there is supposed to be a **significant leap with Polestar 3 and 4**. With **NVIDIA, Luminar and especially Mobileye**, they have strong technology partners at their side.	Polestar 4 to integrate Luminar LiDAR with Mobileye Chauffeur. (09.11.2023) Read	Not announced

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POV EUROPE

At a glance	Latest news	L4 target
Wayve does **not rely on HD maps** and **hand-coded rules** but **focuses on its deep and self-learning AI technology** based on cameras. The company raised $1bn in 2024 to take its Tesla-like technology for self-driving to many carmakers. This approach is different compared to companies like Tesla.	Wayve launches in the US with San Francisco testing program and new office. (23.10.2024) Read	Not announced
Autobrains, pursuing an **End-to-End AI approach**, provides scalable automated driving solutions from single front camera vision to advanced AD solutions. While Autobrains has **well-known investors**, an **ADAS design win in China** and a **collaboration with top OEM on a L4 project** have already been announced, without disclosing the customers.	Autobrains and JOYNEXT revolutionize smart camera solution powered by Autobrains' affordable safety ADAS software. (04.12.2024) Read	Not announced

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Goods Transport & TaaS.

Intro | Use Cases, Market Insights & Layer Description

Goods Transport & TaaS | Use Cases

			Gated Area	Highway	Urban	Suburban	Rural
			Airport, factories, yards, harbors, ...	Highways, freeways, ...	City center, designated streets, ...	Federal highway, residential areas, ...	Rural roads, gravel road, ...
Transport	S		last mile delivery	-	last mile delivery	last mile delivery	last mile delivery
	ML		automated yards, e.g., intralogistics trucks (L4)	-	hub-and-spoke robo transporter	hub-and-spoke robo transporter	robo transporter
	XL		automated yards, e.g., intralogistics trucks (L4)	hub-to-hub self-driving truck	-	-	-
Platooning			automated yards, e.g., intralogistics trucks (L4)	hub-to-hub self-driving truck	-	-	-
Off-Highway / Gated Area			e. g. snow clearing (L4), rob harvesters	-	e. g., street sweeping machines (L4)	e. g., street sweeping machines (L4)	e.g., robo tractor

Automated Yards

Transportation within gated areas, yards, hub or similar confined areas

Hub-to-Hub

Hub-to-hub transportation between logistic hubs incl. drayage run

Hub-and-Spoke

Hub-and-spoke transportation from a hub to different spokes incl. drayage runs

Robo Transporter

Robotransporter Free float autonomous transport vehicles & other use cases such as shuttles

Goods Transport & TaaS | Longlist

		WAYMO	tusimple	Aurora	DAIMLER TRUCK	nuro	Plus	KARGOBOT	TRATON	einride	VOLVO
Transport	S										
	ML	P				P				G/P	
	XL	P	P	P	P		P	P	P		P
Platooning					P			P	P		P
Off-Highway / Gated Area					P				G/P		G

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Longlist

		udelv	kodiak	Gatik	amazon	pony.ai	IVECO	Ford	TESLA	TRUNK 主线科技	INCEPTIO TECHNOLOGY
Transport	S				P						
	ML	P		P		P					
	XL		P		P	P	P	P	P	P	P
Platooning						P	P	P			
Off-Highway / Gated Area			G/P								

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Longlist

		STARSHIP	AVRIDE	TORC	MARS	SAIC	NEOLIX	HYUNDAI MOTOR GROUP	DAF	Applied Intuition	Alibaba.com
Transport	S	G/P	P					P			
	ML						P				G/P
	XL			P	P	G/P				P	P Da Man Lv - No picture available yet
Platooning								P	P		
Off-Highway / Gated Area											

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Longlist

		SHACMAN	UNITY DRIVE	FACTION	nuport	Waabi		WAYVE	serve	Motional	DELIVERS.AI
Transport	S								P		P
	ML		P	P			P	P		P	
	XL	G			G	P					
Platooning											
Off-Highway / Gated Area			G/P				P				

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Longlist

		westwell	kiwibot	cartken	STREETDRONE	DEEPROUTE.AI	TERAKI	whale dynamic		AUTRA TECH	ZF
Transport	S		P	P			P				
	ML				P	P		P			
	XL								P	P	P
Platooning											
Off-Highway / Gated Area		P									

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Longlist

		MAGNA	CLEVON	driveblocks	DEEPWAY	LOXO	BOT.AUTO	亿咖智驾 HONG JING Drive	tinymile	OTTONOMY.IO	NEUBILITY
Transport	S	P	P						P	P	P
	ML					P					
	XL			P	P		P	P			
Platooning											
Off-Highway / Gated Area				G							

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Longlist

NEW

		STACK	robione	ZELOS	robomart	TIER IV	Outrider	embotech	OSHKOSH	FERNRIDE	EASY MILE
Transport	S										
	ML		P	P	P						
	XL	P				P					
Platooning											
Off-Highway / Gated Area							G	G	G	G	G

Activities | No activities | Stopped activities | G=Gated Area | P=Public road

Goods Transport & TaaS | Layer Model Description

Layer 1		Layer 2	Layer 3		Layer 4	Layer 5
HW-Stack Chips / SoC / ECU	SW-Stack Virtual Driver	AD Vehicle	Fleet & Hub Operations	Fleet Monitoring & Control Center	Transport & Platform Provider	Cloud, V2X, others

The **Automated Driving System (ADS)** encompasses SW and HW required to achieve Level 4 autonomy.
The HW-Stack involves activities such as hardware development, production, testing, automotive approval, and safety compliance.
The SW-Stack focuses on self-driving software development and includes activities such as testing & simulation, ODD (Operational Design Domain) management, SDS licensing, mapping, sensor data processing, E2E integration, and safety compliance.

AD Vehicles are considered L4 ready vehicle & truck platforms. This layer centers on the development and design and include tasks such as regulatory compliance, safety management, homologation, logistics, production, and provision of TaaS and remote operations functions and components.

Fleet Operations covers operational activities for AV fleets. Tasks include hub setup, financing, concessions, charging, maintenance, training, cleaning or parts supply.
Moreover, Fleet Monitoring & Control Center tasks include goods and vehicle monitoring, remote vehicle control, departure checks, and remote assistance.

Transport providers (i.e., carriers) carry goods from shippers (e.g., grocery stores) to B2B or B2C customers using autonomous vehicles.
Freight matching may be executed by **Platform providers** that connect shippers and carriers or transport demand and supply. They are responsible for order management or disposition planning based on data analysis and simulation.

Provides necessary supporting infrastructure. Tasks include V2X infrastructure, 3rd party HD maps, and cloud infrastructure and backend.

Goods Transport & TaaS | Layer Model Description

Exemplary tasks

Layer 1		Layer 2	Layer 3		Layer 4	Layer 5
HW-Stack Chips / SoC / ECU	**SW-Stack Virtual Driver**	**AD Vehicle**	**Fleet & Hub Operations**	**Fleet Monitoring & Control Center**	**Transport & Platform Provider**	**Cloud, V2X, others**
HW Development	SW Development	Design & development	Hub Setup	Execution of ADS & AD Vehicle Operations Functions (e.g., remote assistance) in UI	Logistics platform	V2X
HW Production	Testing & Simulation	Quality assurance	Financing / Insurance		Booking	3rd party HD maps
Sensor Integration	ODD Management	Redundancy	Concessions	AD Vehicle Real-Time Tracking and Monitoring	Pricing	Cloud Infrastructure
Automotive approval	SDS Licensing	X-by-Wire	Charging	Incident Management	Payment	
Sensor testing & approval	SW Testing & Approval	Regulatory compliance	Maintenance & Service	AD vehicle Maintenance Scheduling	Disposition planning	
Sensor fusion	Mapping	Homologation	Washing & Cleaning	AD Vehicle Charging Scheduling	Fleet Intelligence (e.g., fleet & load optimization)	
Calibration and Integration Support	Verification & Validation	After sales / aftermarket	Training	Emergency Response Coordination	Order management	
Safety & Compliance	E2E Integration	Safety management	In/De-fleeting	AD Vehicle Mission Dispatch	API / Integration	
...	Sensor Integration and Data Processing	AD requirements	Parts supply	Safety Driver Management	Customer support	...
	Safety & Compliance	Production	...	Data Analytics and Reporting	Customer authentication (delivery services)	
	...	ADS & AD Vehicle Operations Functions (e.g., for remote assistance)		Customer interaction	Data Analytics	
		E2E integration		...	E2E Integration	
		...			...	

Goods Transport & TaaS. NAR.

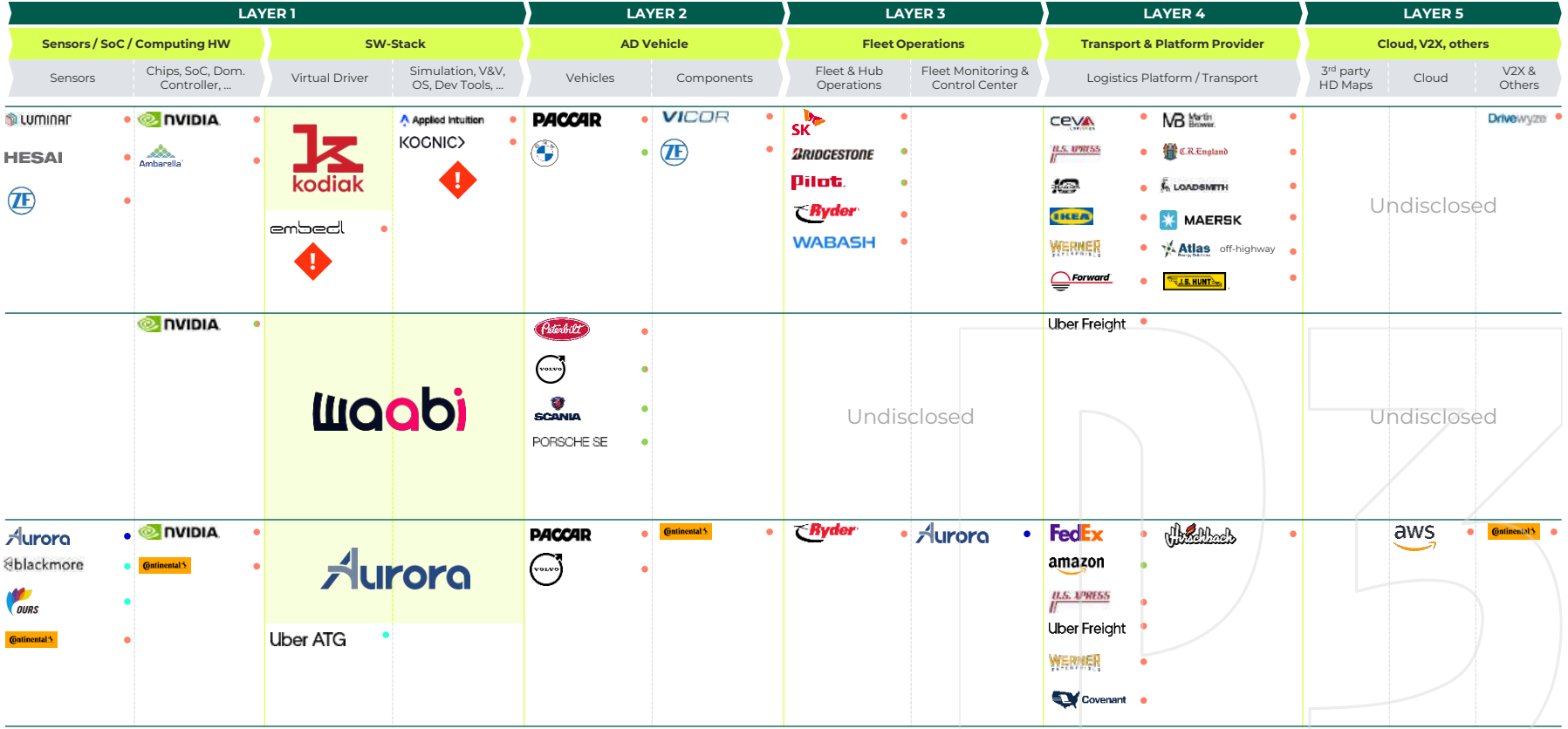
Partnering & Value Chain, Level 4 Target & Latest News

Goods Transport & TaaS NAR

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Fleet Operations		Transport & Platform Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Fleet & Hub Operations	Fleet Monitoring & Control Center	Logistics Platform / Transport	3rd party HD Maps	Cloud	V2X & Others
WAYMO	SAMSUNG, intel	WAYMO	LATENT LOGIC	JAGUAR		AutoNation, Swiss Re, transdev	WAYMO, autofleet	Uber Freight	Undisclosed		
Luminar, AEVA		TORC, algolux	TNO innovation for life, Applied Intuition, foretellix, DeepScenario	FREIGHTLINER		PENSKE		SCHNEIDER, C.R. England, Uber Freight	aws		
Plus, OUSTER, TELEDYNE FLIR, AEVA, Luminar	NVIDIA	Plus	BlackBerry	PACCAR, TRATON, IVECO, SAIC, FAW GROUP, JAC, HYUNDAI	CUMMINS, VELOCITI, SCHAEFFLER, BOSCH, EMERGENCY SAFETY SOLUTIONS	GOODYEAR		amazon, ZTO, SF EXPRESS, DSV, dm, WORLDEX	aws, Alibaba.com	Transurban	

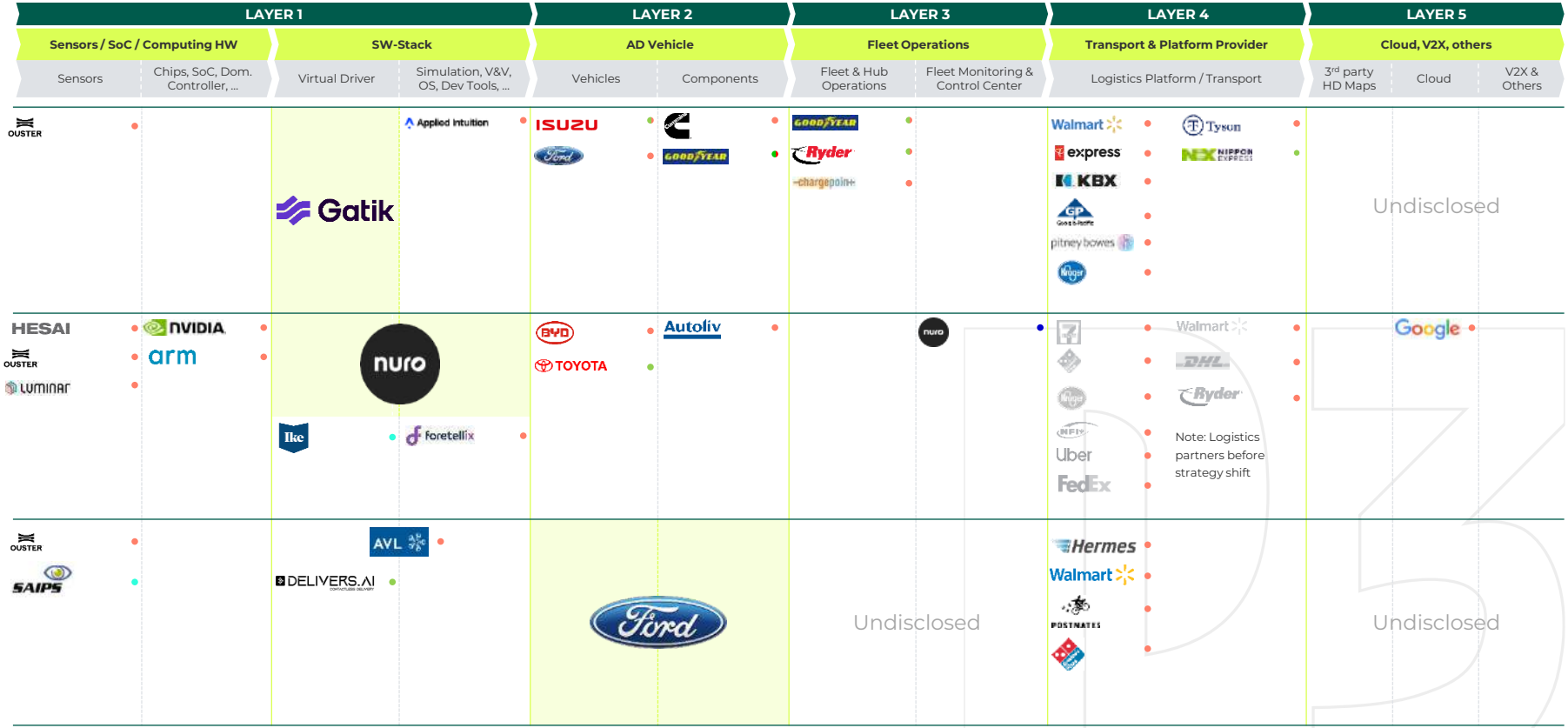
Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

Goods Transport & TaaS NAR



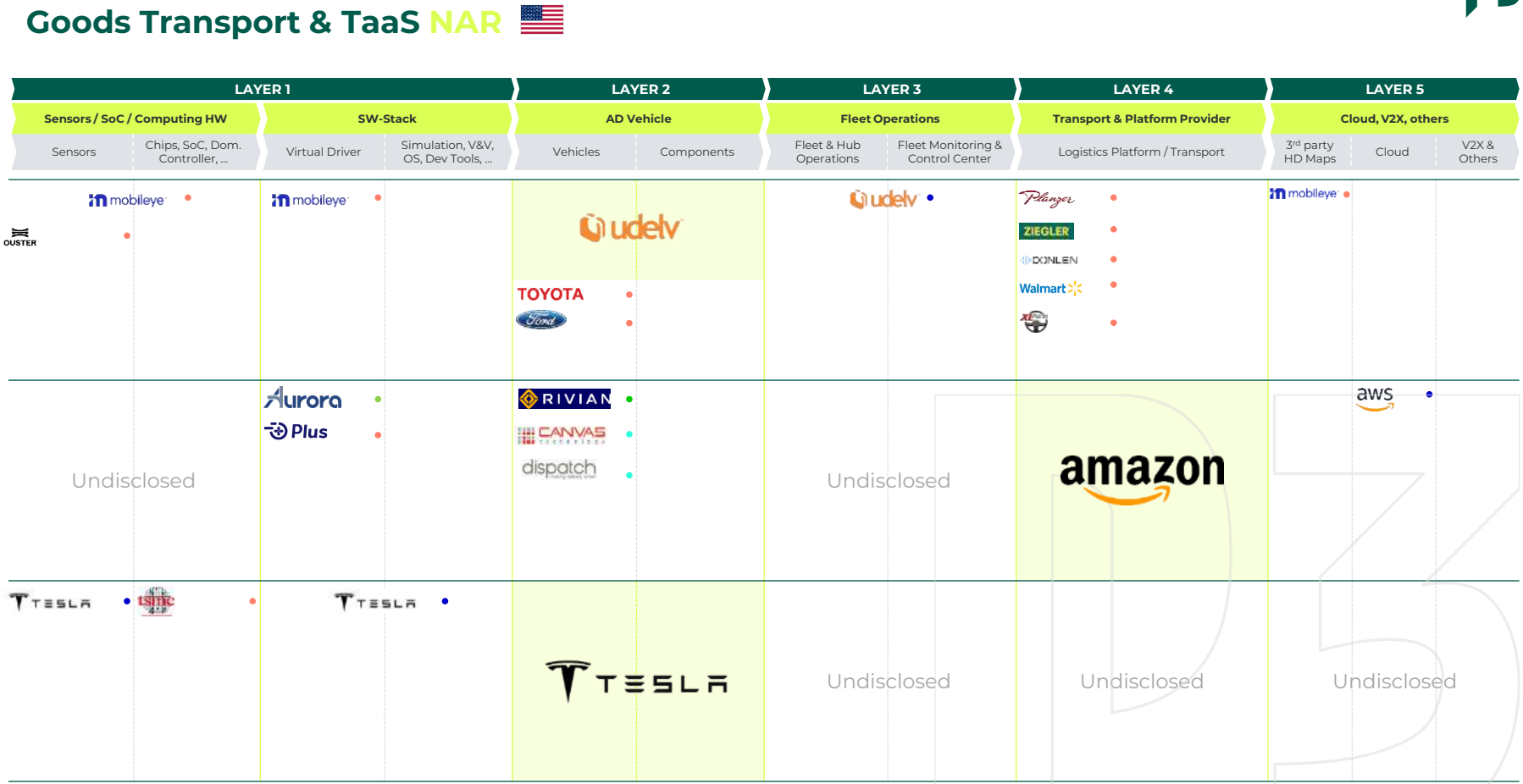
Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

Goods Transport & TaaS NAR



Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS NAR



Goods Transport & TaaS NAR

LAYER 1		LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Fleet Operations	Transport & Platform Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Fleet & Hub Operations	Fleet Monitoring & Control Center	Logistics Platform / Transport	3rd party HD Maps	Cloud	V2X & Others
whale dynamic Whale Dynamic AV stack consists of 3rd party HW		whale dynamic		ONX		zeeba	robomart AVERY DENNISON	Undisclosed		
Undisclosed		EMBARK GHOST Applied Intuition kodiak TORC Gatik driveblocks		ISUZU DAIMLER TRUCK TRATON einride		Undisclosed	Undisclosed	Undisclosed		
AVRIDE NVIDIA		AVRIDE		AVRIDE		Undisclosed	Uber GRUBHUB Rakuten	Undisclosed		

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS NAR

At a glance	Latest news	L4 target
The Waymo Driver has **over a decade of deep AD experience** including **millions of miles on public roads** and **billions of miles in simulation**. Waymo has **reduced trucking efforts to a minimum** in order to focus on the ride hailing case. Also, the existing fleet is used for food delivery via Uber Eats.	Phoenix residents can now experience Uber Eats delivery with the Waymo Driver. (03.04.2024) Read	Focus on ride hailing and urban delivery with I-PACE fleet
Torc is an independent **subsidiary of Daimler Truck AG** and the **first AV company to enter an integrated partnership** with a **truck OEM**. Torc and DT are ramping up development and testing in the US. Go-to-market is targeted for 2027.	Torc signs lease agreement for new autonomous truck hub in Dallas-Fort Worth Area for testing and commercial operations . (07.01.2025) Update Read	**2027**
PlusDrive follows an **evolutionary path from L2++ to L4**. **Global initiatives in cooperation with IVECO, TRATON Group, and Hyundai have been announced**. In contrast to competitors, Plus is already testing its self-driving and highly automated trucks on European roads.	Autonomous driving technology leader Plus adds H.E.L.P.® alerts in preparation for launch of commercial driverless trucking operations. (18.12.2024) Update Read	**2027**
Kodiak Robotics develops autonomous technology for long-haul trucking and carried the **first commercial freight just eight months after being founded.** After long considering Kodiak as an acquisition candidate, they meanwhile became **one of the strongest players in the market**.	Kodiak delivers customer-owned autonomous RoboTrucks to Atlas Energy Solutions, completes 100 loads of proppant with first-ever driverless commercial semi-truck service. (24.01.2025) Update Read	**2025**

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS NAR

At a glance	Latest news	L4 target
Toronto-based Waabi is renowned for both it's founder and its **closed-loop simulator**, Waabi World, which targets an **AI-first approach**. Waabi has entered promising partnerships with Volvo and Uber Freight. The company is worth observing.	Volvo Autonomous Solutions and Waabi announce strategic partnership to advance autonomous freight transport. (04.02.2025) Update Read	**2025**
Instead of deploying robotaxis, Aurora is **focusing primarily on TaaS** and has already entered into truck **collaborations with PACCAR, Volvo and Continental**. These **collaborations promise to scale their test fleet** to get their product ready for production.	Aurora takes feds to court over safety rules as it nears self-driving truck launch. (14.01.2025) Update Read	**2027**
Gatik focuses on **short-haul, B2B logistics** for the **retail industry.** More specifically, hub-and-spoke supply chain operations. The vehicles are restricted to **fixed, repeatable routes.** Gatik has found a niche that no other market player is dedicated to now.	Gatik secures strategic investment from NIPPON EXPRESS HOLDINGS to expand North American middle-mile logistics. (21.08.2024) Read	L4 target reached in Arkansas by 2021
Nuro **has been a pioneer in last-mile deliveries** with a special purpose vehicle. In September 2024, Nuro announced to **start licensing its L4 technology** to manufacturers of personally owned vehicles and mobility providers, like ride-hail and delivery companies. A smart move to monetize its tech end create a viable business case.	Nuro expands driverless autonomous vehicle testing in push to attract customers. (19.11.2024) Update Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS NAR

At a glance	Latest news	L4 target
After Argo's shutdown, it's unclear how Ford will proceed for urban delivery and trucking. Nevertheless, **Ford Otosan is cooperating with AVL** in this area. We believe they can't keep up with the leading self-driving truck companies.	Ford, VW-backed Argo AI is shutting down. (26.10.2022) Read	Not announced
Udelv has been doing **commercial deliveries for Walmart** for some time. With the **'Transporter**' they now have their own **versatile special purpose vehicle**, equipped with Mobileye's promising SDS. It's been quite around Udelv for a while – as other companies, Udelv seem to struggle towards industrialization of its vehicle.	Ziegler orders autonomous and electric delivery vehicles from the company Udelv. (05.01.2022) Read	Not announced
Amazon has **invested in Aurora and conducted road tests with Embark, which later didn't survive market consolidation**. Amazon's vision could be to cover the entire logistics chain - in the future also with autonomous trucks, delivery vehicles and last mile delivery solutions.	Amazon stops field tests of its delivery robot Scout. (07.10.2022) Read	Not announced
Little is still known about Tesla's Semi Truck and targeted automated driving capabilities. According to the company, it will be the first vehicle to drive fully autonomously. The truck is to be equipped with **'enhanced' autopilot functionalities for automated highway driving**. At least we still have doubts.	Tesla Semi with sensor rig spotted potentially ground truth calibrating for FSD. (30.09.2024) Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS NAR

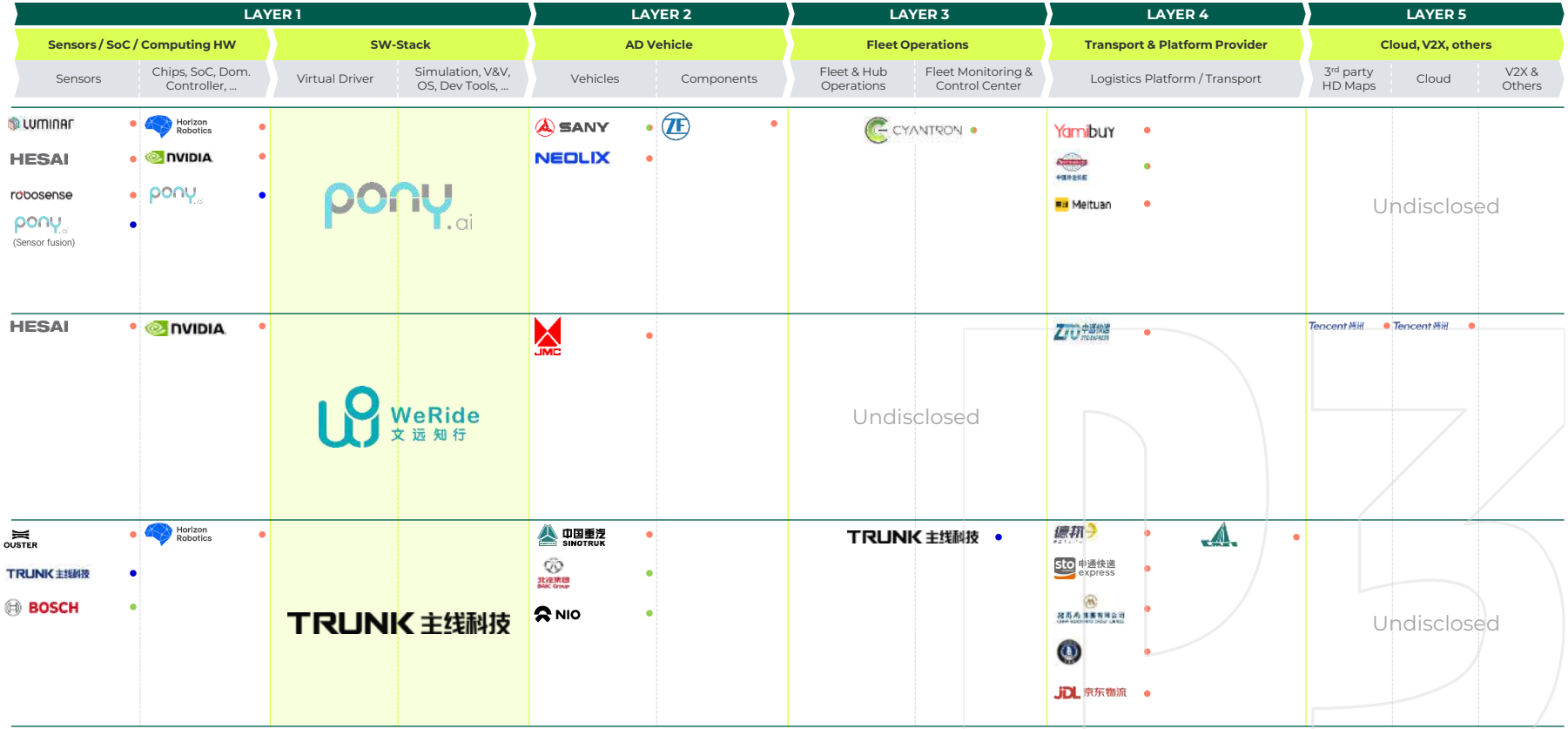
At a glance	Latest news	L4 target
Robomart has teamed up with a couple of companies to establish the **Autonomous Retail Collective (ARC**), an ecosystem aimed at developing and advancing self-driving shops. Collaboration is key in the autonomous mobility space – therefore, Robomart is worth to 'watch-out'.	Robomart unveils autonomous retail collective to propel self-driving shops. (08.04.2024) Read	Not announced
Applied Intuition provides various solutions for its customers, including an ADAS and AD development platform, a vehicle software platform, and an **autonomy stack aimed at off-highway autonomy and trucking**. In 2023, the company **acquired Embark's trucking assets**, which may serve as the basis for their autonomy stack.	Applied Intuition expands IP portfolio through Ghost Autonomy deal. (22.10.2024) Update Read	Not announced
Avride is the **rebranded, international division** of the robotaxi and delivery robot company **Yandex Self-Driving Group**. While international assets have been separated from Russian-owned Yandex assets, Avride said it's testing AVs (and probably the rover as well) in diverse ODDs across the globe, focusing on safety.	Avride Partners with Rakuten to Launch Autonomous Delivery in Tokyo. (26.02.2025) Update Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS. Asia.

Partnering & Value Chain, Level 4 Target & Latest News

Goods Transport & TaaS ASIA



Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS ASIA

LAYER 1				LAYER 2		LAYER 3		LAYER 4		LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Fleet Operations		Transport & Platform Provider		Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Fleet & Hub Operations	Fleet Monitoring & Control Center	Logistics Platform / Transport		3rd party HD Maps	Cloud	V2X & Others
ZVISION, BOSCH	Ambarella, Horizon Robotics	INCEPTIO TECHNOLOGY		NIO, DONGFENG, SINOTRUK	ZF	Undisclosed		JDL 京东物流, Meituan, 壹米滴答, 跨越速运, 德邦快递, SF EXPRESS 顺丰速运, 中国邮政 CHINA POST, 中国物流, ZTO 中通快运, sto express, Nestle, 优通		NAVINFO		
HESAI		SAIC Plus		SAIC		Undisclosed		Undisclosed		Undisclosed		
OUSTER, HESAI	Horizon Robotics, NVIDIA	NEOLIX, pony.ai		NEOLIX		Undisclosed		JDL 京东物流, FedEx, Grab Food, foodpanda, Meituan				ncs, FIXPOSITION

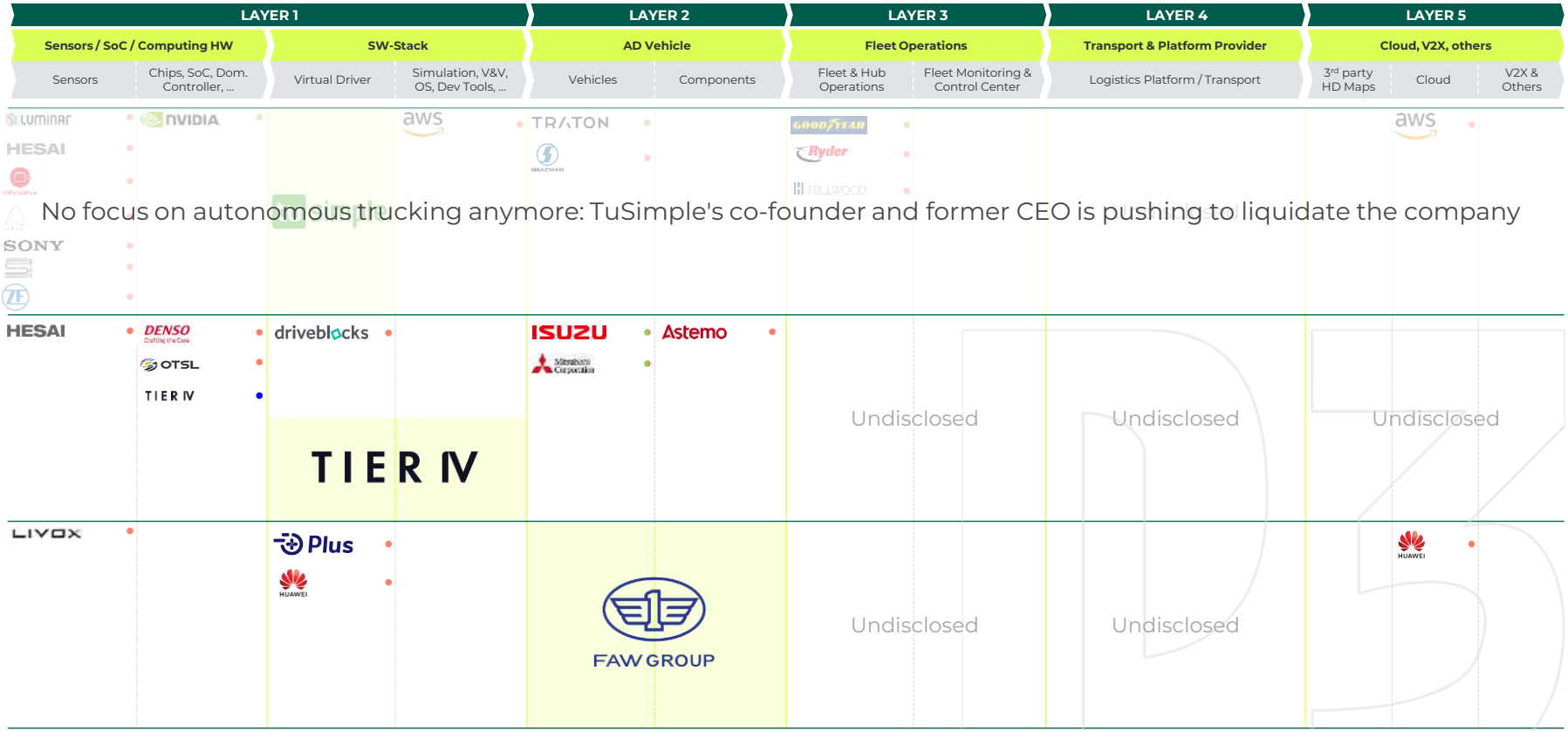
Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS ASIA

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Fleet Operations		Transport & Platform Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Fleet & Hub Operations	Fleet Monitoring & Control Center	Logistics Platform / Transport	3rd party HD Maps	Cloud	V2X & Others
OUSTER, HESAI, robosense, ZVISION	NVIDIA	DEEPROUTE.AI		ISUZU		Undisclosed		Alibaba, 德邦快递 DEPPON EXPRESS	Tencent 腾讯 SD maps – probably consumer vehicles only		
HESAI, arbe, WEITU威孚	Horizon Robotics	KARGOBOT		SHACMAN		Elenergy		快递通	Undisclosed		
Undisclosed		Baidu 百度 apollo		DEEP WAY		Undisclosed		SAP, LIONBRIDGE	Qualcomm		

Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

Goods Transport & TaaS ASIA



No focus on autonomous trucking anymore: TuSimple's co-founder and former CEO is pushing to liquidate the company

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS ASIA

At a glance	Latest news	L4 target
Pony.ai is a leading player in L2+ solutions for OEMs as well as L4 robotaxi deployments. However, Pony **will jointly develop premium autonomous heavy-duty truck with SANY and Sinotrans**. They are among the **pioneers in the Chinese self-driving truck market**.	Pony.ai, Sinotrans renew agreement on autonomous logistics service joint venture. (17.01.2025) Update Read	Not announced
WeRide unveiled **China's very first L4 self-driving cargo van** in September 2021 and also has other products like robo sweepers in its portfolio. In February 2025, WeRide launched **Robovan W5**, a purpose-built delivery solution.	WeRide launches Robovan W5, pioneering new class of autonomous delivery vehicle. (06.02.2025) Update Read	Not announced
Investments from Bosch, Nio and BAIC made Trunk.Tech known outside China. It is without question **one of the most promising startups** in the Chinese self-driving truck / freight haulage space.	Autonomous truck solution developer Trunk.Tech bags hundreds of millions of yuan. (07.05.2024) Read	Not announced
Chinese startup with the **aim to build a nation-wide freight network** using autonomous trucks. Unlike other AV truck companies, **Inceptio initially focuses on L3**. However, it could possibly be a hidden champion among autonomous trucks with regard to full autonomy - at least in China.	Inceptio powers launch of DFCV's Hi-Truck Tianlong Autonomous GX/KX Series. (27.09.2024) Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS ASIA

At a glance	Latest news	L4 target
SAIC Hongyan, in collaboration with UTOPILOT, launched a 5G+L4 smart heavy truck that completed fully driverless testing & operations on public roads by 2023. Within 3 years, a fleet of ~300 truck was formed, making it the **world's largest commercial fleet of smart heavy truck**. By 7/2024, the fleet has accumulated **>10 million kilometers** of AD operation.	SAIC Hongyan's 5G+L4 Smart Heavy Truck to Begin Trial Operations in Danzhou. (03.07.2024) Read	Not announced
Nearly **1,000 Neolix delivery vehicles have been deployed** in nine countries and **over 40 cities worldwide**, with a cumulative mileage of more than 6 million kilometers by 2024. The shuttle may be compared with Nuro, which is currently focused exclusively on the US market.	NEOLIX completes C+ financing round with 1 billion yuan raised. (20.02.2025) Update Read	Not announced
DeepRoute.ai **announced an autonomous medium-duty truck business line for urban logistics**. Having started a first commercialization project with Deppon Logistics, DeepRoute is **backed by Alibaba and its huge network** of ecommerce, logistics & community shopping, among others. Reads well.	DeepRoute.ai collaborates with DEPPON LOGISTICS Co., LTD to expedite commercialization. (20.06.2022) Read	Not announced
KargoBot was launched during Auto Shanghai 2023 **by MaaS giant DiDi** and focuses on a pilot vehicle approach with a human driver onboard and multiple L4 trucks following its lead. We will closely trace KargoBot's development.	KargoBot greenlighted for truck platooning test with driverless follow vehicles in Beijing. (16.01.2025) Update Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS ASIA

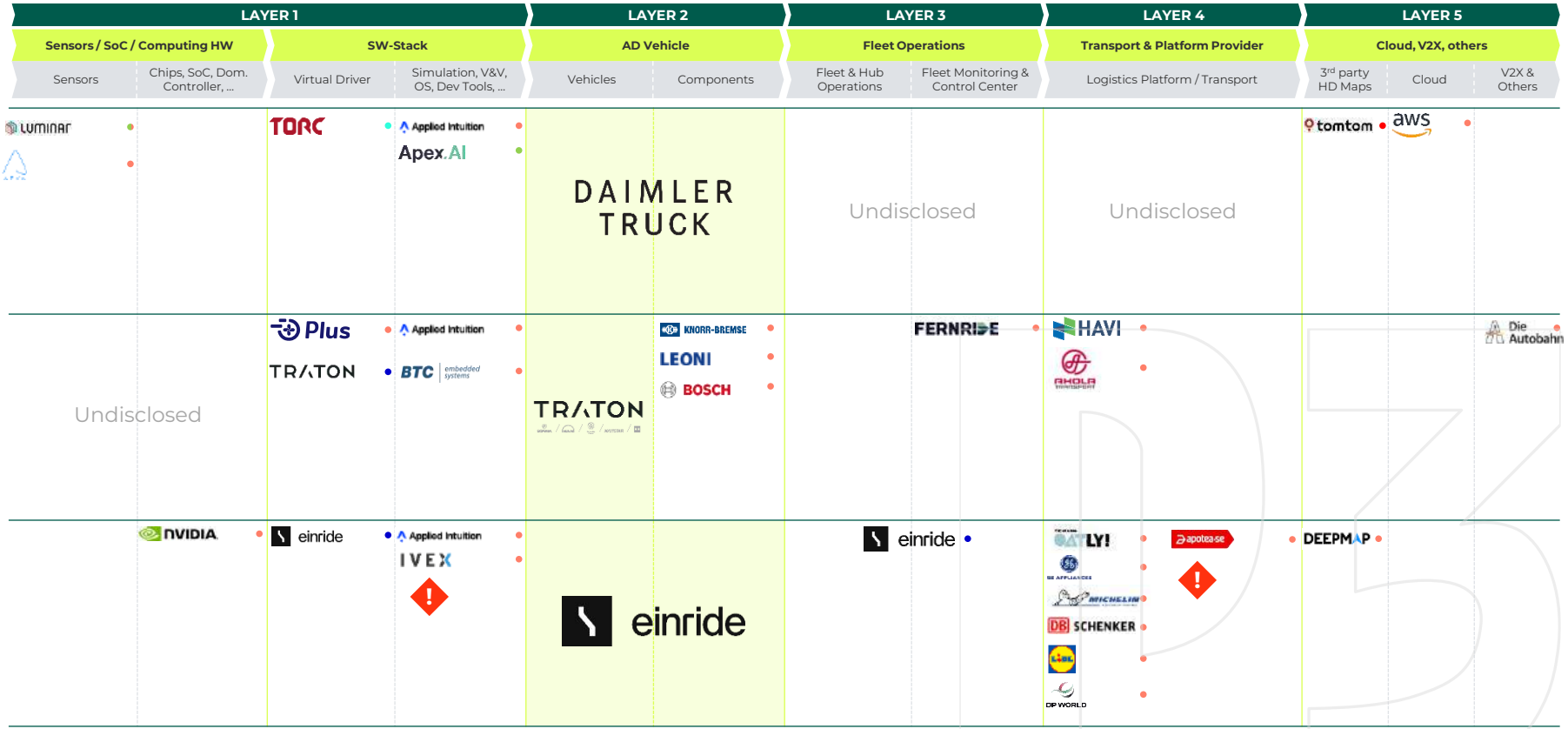
At a glance	Latest news	L4 target
DeepWay - a **subsidiary of Baidu** - plans to offer heavy Level-3-trucks by June 2023. The vehicles will have a range of 300 km, and in addition to a fast-charging function, it will also be possible to swap batteries in 6 minutes. The integration of fuel cells is targeted for the future.	DeepWay secures 750 million yuan in Series B financing. (26.12.2024) Update Read	**2024-2026**
No focus on autonomous trucking anymore: TuSimple's co-founder and former CEO is pushing to liquidate the company	TuSimple Co-Founder demands company liquidation. (26.11.2024) Read	Not announced
TIER IV is a Japan-based company **specializing in Autoware-based AD solutions**. The company aims to make autonomous mobility technology scalable and accessible, collaborating globally to **advance AVs for different industries**. TIER IV participates in projects such as METI aimed at deploying robotaxis for transportation and autonomous trucks for logistics.	TIER IV and Hitachi Astemo join hands on autonomous driving systems: Introducing SOAFEE-compliant SDV architecture. (17.10.2024) Read	Not announced
By 2020, FAW Jiefang and Zhito Technology unveiled the J7 L3 super-truck, marking the first mass production heavy-duty truck to use lidar. FAW Jiefang is **developing automated heavy-duty trucks based on Plus.ai's stack** while also having a s**trong partnership with Huawei** in place.	Plus, FAW Jiefang Qingdao to co-develop autonomous gas-powered heavy-duty truck. (10.07.2024) Read	**2025**

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS. Europe.

Partnering & Value Chain, Level 4 Target & Latest News

Goods Transport & TaaS EUROPE



Goods Transport & TaaS EUROPE

LAYER 1				LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Fleet Operations		Transport & Platform Provider	Cloud, V2X, others		
Sensors	Chips, SoC, Dom. Controller, ...	Virtual Driver	Simulation, V&V, OS, Dev Tools, ...	Vehicles	Components	Fleet & Hub Operations	Fleet Monitoring & Control Center	Logistics Platform / Transport	3rd party HD Maps	Cloud	V2X & Others
	NVIDIA	Aurora Waabi		VOLVO ISUZU			VOLVO	DFDS DHL Uber Freight ascend CONVOY	Undisclosed		
INNOVIZ			ROSAS	LOXO VW		NOVIV	HEIA-FR HTA-FR	MIGROS Planzer	Undisclosed		
		LOXO									
	NVIDIA	Plus		IVECO		Undisclosed		DSV dm	here		Continental

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS EUROPE

LAYER 1		LAYER 2		LAYER 3		LAYER 4	LAYER 5		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Fleet Operations		Transport & Platform Provider	Cloud, V2X, others		
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Undisclosed		WAYVE		MAXUS, JAGUAR		Admiral		ocado GROUP, dpd, ASDA	Microsoft		
kodiak, tusimple, ZF		ZF, embotech, STRADVISION		CLEVON	ZF		ZF	ZF	Microsoft		
		driveblocks, TIER IV	Applied Intuition, Apex.AI, b-plus		pepper, Shadow Robot	Undisclosed		Undisclosed	Undisclosed		

Core Business · Partnership or supplier deal · Investment · Acquisition · Parent / Subsidiary · Update

Goods Transport & TaaS EUROPE

LAYER 1				LAYER 2		LAYER 3		LAYER 4		LAYER 5		
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	NVIDIA, Texas Instruments	STARSHIP		STARSHIP		Undisclosed		GRUBHUB, Flink, veriff, DOORDASH, Domino's, coop	Bolt	Undisclosed		

Core Business | Partnership or supplier deal | Investment | Acquisition | Parent / Subsidiary | Update

Goods Transport & TaaS EUROPE

At a glance	Latest news	L4 target
DTNA's **Cascadia trucks with an integrated Torc AV stack** are already **hitting the roads in the US** with a targeted go-to-market by 2027. Currently, there is **no disclosed roadmap for the European market** yet.	Daimler Truck and TORC Robotics select Aeva to supply advanced 4D LiDAR technology for series-production autonomous trucks. (09.01.2024) Read	Not announced
As TRATON's partnership with TuSimple came to an end, **Scania, MAN, and International will now work together with Plus** to intensify the development of L4 self-driving trucks. The companies will focus on hub-to-hub operations – using the **same AV stack across all major TRATON brands** is a reasonable approach.	TRATON Announces Global Release Of Plus SuperDrive. (30.10.2024) Read	Not announced
The **Einride Pod** is unique from other self-driving trucks as there is **no driver's cab**. The pod currently operated in gated areas on fixed routes. Towards L4 with higher speeds on public roads there need to be leaps in development. However, Einride's ecosystem is unique.	Einride scales autonomous operations, launching Europe's first daily commercial application. (18.12.2024) Update Read	Target reached in gated areas only
The **"Volvo VNL Autonomous"** fully redundant truck was unveiled in 2024 and will be **powered by Aurora**. In addition, **Volvo has invested in Waabi** and thus betting on a second horse. The approach seems to make sense in order not to be dependent on an SDS provider in its self-driving roadmap.	Volvo Autonomous Solutions and Waabi announce strategic partnership to advance autonomous freight transport. (04.02.2025) Update Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS EUROPE

At a glance	Latest news	L4 target
LOXO'S last mile delivery vehicle is reminiscent of some US and Chinese market players' solutions but is the **first vehicle of its kind made in Europe**. **Commercial success** in Europe **requires both a technically mature solution and a profitable business case**. In 2024, LOXO and Planzer announced a joint pilot based on an ID. Buzz, shifting away from the SPV.	LOXO expands into Germany with self-driving logistics subsidiary. (15.11.2024) Read	Not announced
IVECO and Plus are jointly developing self-driving trucks and conducting **test drives on European highways**. **Pilot projects have already been announced** - so the two could be pioneers for autonomous trucks in Europe along TRATON.	IVECO, Plus, dm-drogerie markt and DSV launch automated trucking pilot in Germany. (15.11.2023) Read	Not announced
Wayve does **not rely on HD maps** and **hand-coded rules** but **focuses on its deep and self-learning AI technology** based on cameras. The company raised $1bn in 2024 to take its Tesla-like technology for self-driving to many carmakers. Let's see if delivery vehicles are still a targeted use case for Wayve in the future.	Asda and Wayve launch UK's largest self-driving grocery home delivery trial. (17.04.2023) Read	Not announced
ZF offers a **comprehensive portfolio for commercial vehicle automation** such as sensors and high-performance computers. While ZF has already **supplied L4 truck companies**, we don't believe ZF will develop an own L4 SDS but rather focus on lower SAE levels and components.	Clevon collaborates with ZF to orchestrate driverless last-mile delivery fleets. (22.02.2023) Read	Not announced

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

Goods Transport & TaaS EUROPE

At a glance	Latest news	L4 target
driveblocks develops a **modular; scalable AD software** stack for commercial vehicles. **It allows OEMs/Tier1 to integrate it with their vehicles and solutions in an open and flexible way**. The solution targets the EU market first and is a differentiating, but also ambitious approach compared to other players.	TIER IV paves the way for highway trucking with innovative reference design. (02.05.2024) Read	Not announced
Starship delivery robots completed **>6mn autonomous deliveries**. It is **unlikely that these robots will become widely accepted for last mile delivery**. However, there could certainly be use cases in gated areas. Being a pioneer in the robot delivery space, more and more new players have entered the market.	Tallinn-based Starship Technologies raises €83.6 million to make the robot delivery take over the streets. (06.02.2024) Read	Reached at various locations

Definition L4 target: commercial self-driving service operated within a specific ODD without a safety driver.

BUSINESS AS UNUSUAL

WE EMPOWER
FUTURE IMPACT

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