

WE DEFINE  
FUTURE IMPACT

TECHNOLOGY  
SOFTWARE  
CONSULTING

Autonomous Driving  
Market Intelligence  
MaaS / TaaS / POV



**P3** BUSINESS  
AS UNUSUAL

# P3 **AD** Market Insights

**Edition #3/2025**

July 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 #3/2025**



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# P3 & P3 autonomous mobility.

**Short** Introduction



# Portfolio 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

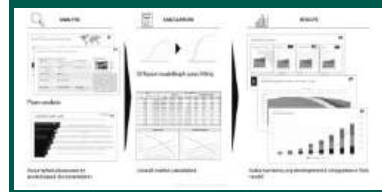
- AD Program Management incl. strategic setup, operations strategy, organizational build-up, project conduction & benchmarking
- Scaled Pilots: setup and management of runup schemes for AD pilot projects
- AD Product Lifecycle Management AD Logistics Concepts - Conceptualization of market-ready TaaS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



# Overview | Market & Strategy Portfolio



Robotaxi Performance & UX Benchmark



AD Market Models L2-4



AD Tech Partner Scouting & Analysis



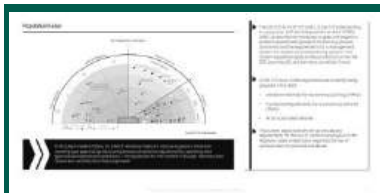
Go-to-Market Strategy



ADAS Benchmark EU, CN, US



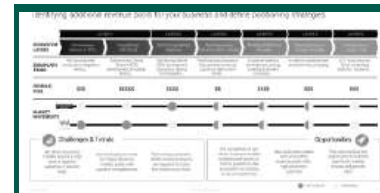
AV Fleet Simulation (MaaS & Trucking)



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.

# Our unique (autonomous) mobility market insights at a glance – for you, for free

## P3 AD Market Insights

**The most comprehensive AV market and competitor analysis** at no cost. Explore global AD markets for **MaaS, personally owned vehicles, and goods transport**. The ecosystem analysis employs a layered approach: 5-Layer for MaaS and goods transport, and 4-Layer for POV.

In this comprehensive report you'll find:

- ✓ In-depth analysis of **44 MaaS, 47 POV, and 38 autonomous goods transport companies** in North America, China, and Europe.
- ✓ A comprehensive **overview of use cases** for MaaS, POV, and goods transport.
- ✓ The latest **company updates, L4 roadmaps**, and a high-level profile for each company.

## P3 ADAS Market Insights

**Fascinating insights into L2/2+ and L3 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 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

## P3 SDV Market Insights

**Landscape, advancements, and key trends** in the SDV market, highlighting how **OEMs & suppliers** stay **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 NAR, EU, and Asia.
































































In this comprehensive 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 P3 **expert evaluations**.



**P3 autonomous mobility.**  
**ADAS Benchmark China &  
Europe 2025.**

# Overview of the vehicles we have thoroughly tested using our P3 ADAS Benchmark framework.

Vehicle Line-Up ADAS Benchmark EU		Vehicle Line-Up ADAS Benchmark China	
	  BMW 5 Series		  Polestar 4
	  Zeekr 7X		  IM Motor LS6
	  Mercedes-Benz EQE		  XPENG P7
	  Stelato S9		  XPENG P7+
	  Volkswagen ID.7		  Nio EL 6
	  Nio ET 9		  XPENG X9
	  Porsche Macan		  BYD Seal
	  ONVO L60		  BYD Xia
	  Tesla Model Y		  Li Auto L9 AD Pro
	  Hongqi Tiangong 05		  Li Auto L9 AD Max
	  Xiaomi SU7		

## Impressions | P3 ADAS Benchmark China



# We offer comprehensive testing reports based on our standardized P3 ADAS Benchmark methodology.

## Two-Day-ADAS Benchmark Event

### ADAS Benchmark



### ADAS Experience Drive



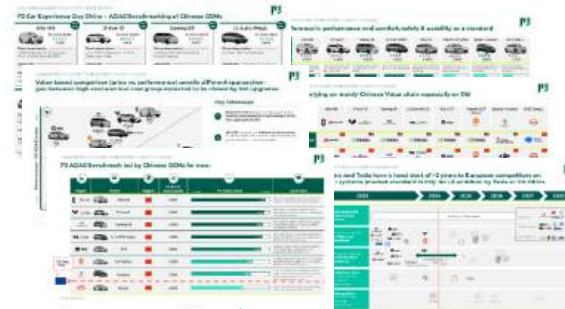
- ✓ Extensive testing of 9 (EU) and 12 (China) top notch vehicles with state-of-the-art ADAS
- ✓ Conducted in and for the EU & CN market

## Standardized Benchmark Methodology



- ✓ ~200 standardized test cases (feature set, city driving, highway, rural roads, parking) with objective scoring system
- ✓ ADAS functions in function clusters **Driving, Parking, Safety**
- ✓ Testing performed on **dedicated routes** covering basic and challenging 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

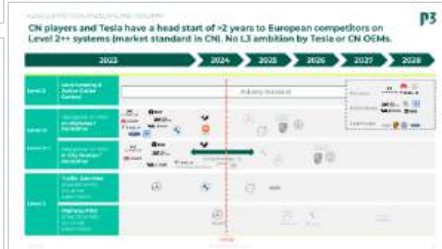
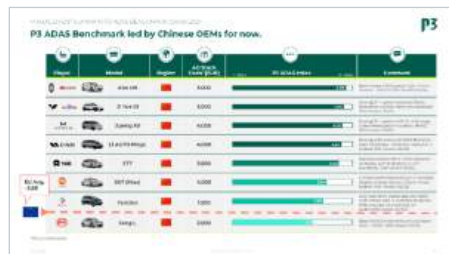


- ✓ Comprehensive **Market & Competitor** Overview
- ✓ **Report** as per **P3 Evaluation** incl. detailed insights on performance in each category
- ✓ ADAS Stack **Supply Chain & Cost Analysis**
- ✓ Competitor **ADAS Future Roadmaps**
- ✓ **Detailed Vehicle Snapshots** incl. full ADAS Stack, ADAS functions, Field of Vision,...)
- ✓ **Safety Assessment & Regulation**
- ✓ **Energy Consumption** analysis per Stack
- ✓ **Video footage** from test rides (e.g., GoPro footage)

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

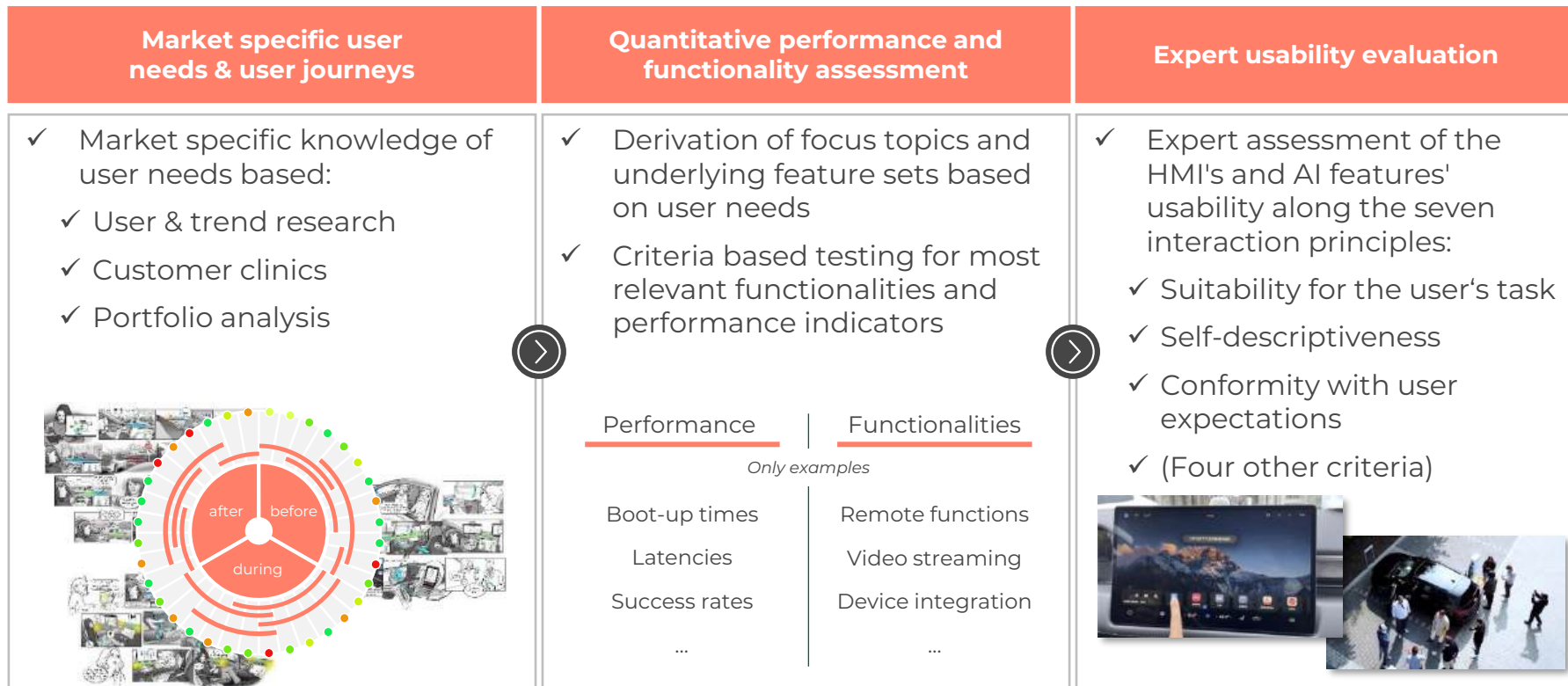
*Sneak Peak*

What does the ADAS Benchmark Report look like?



Much more

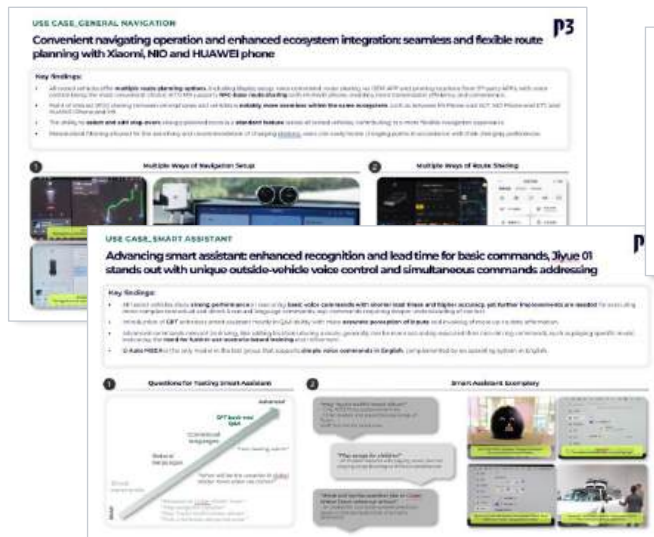
## Starting from the most important user needs, the HMI & AI Benchmark Report assesses the functionalities, performance and usability of current IVI systems.



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

Sneak Peak

What does the HMI & AI 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

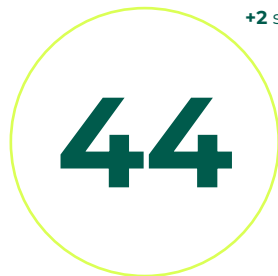
#### Potential contents:

- 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

# P3 AD Market Insights.



## Let's start: P3 AD Market Insights Introduction.



Companies focusing on  
autonomous **MaaS**



Companies focusing on  
**privately owned vehicles**



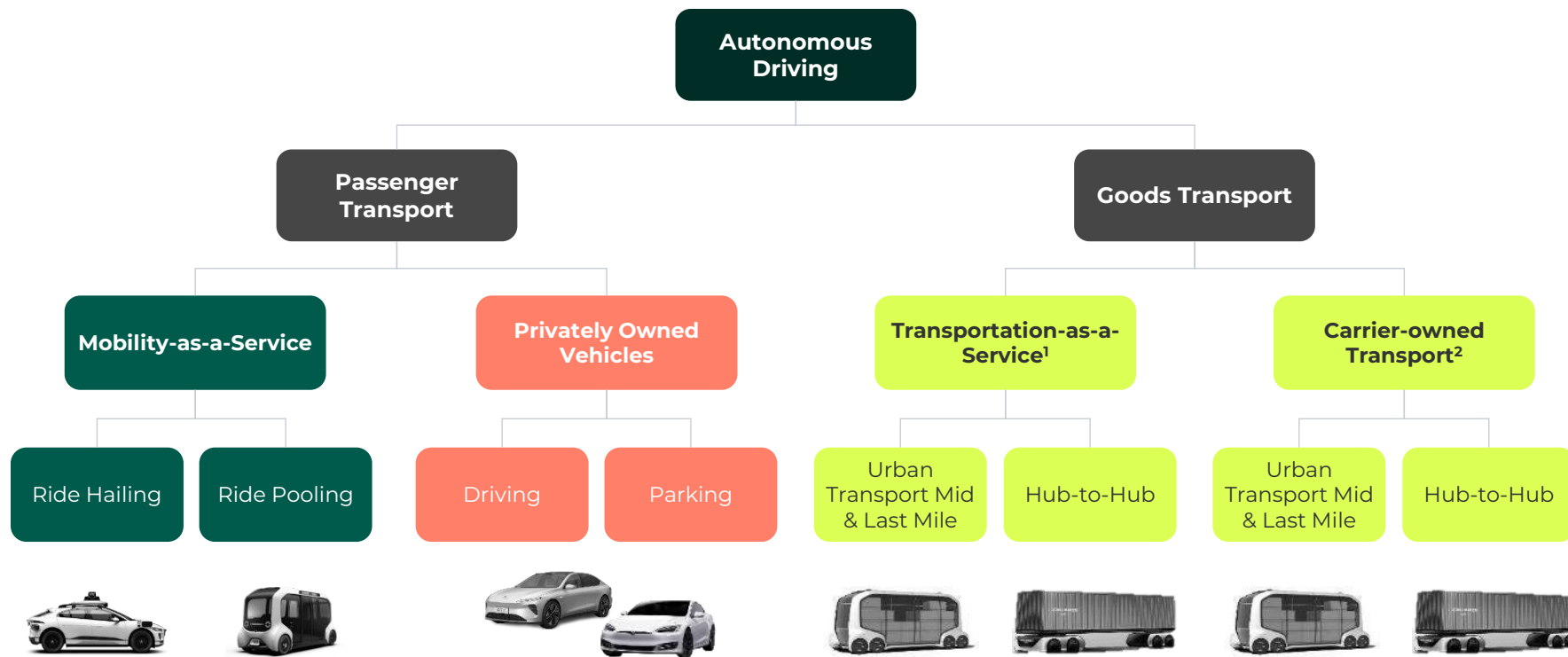
Companies focusing on **goods  
transport and TaaS**

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**.  
Any image rights of logos or images shown here are held by the respective companies

# 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**














**AGENDA**  
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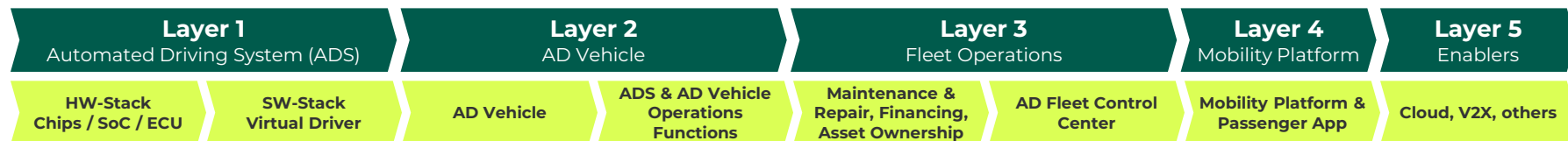
# Mobility-as-a-Service.

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		robo shuttle				
	L		robo shuttle				
	XL		robo bus				

# MaaS | Layer Model Description



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.

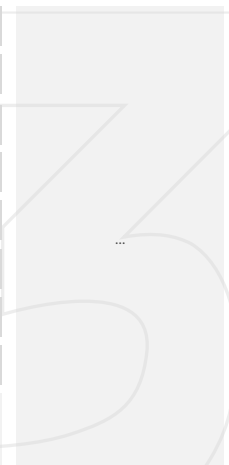
**Fleet Operations** covers operational activities for AV fleets. Tasks include maintenance, service and repair, financing, concessions, charging, training, cleaning or parts supply.

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 be 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	3 <sup>rd</sup> 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	3 <sup>rd</sup> 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



































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	3 <sup>rd</sup> party Maps	Cloud	V2X & others	
	 			    		 	     	 	  	Undisclosed			
 			 	   			  	   	     	 	 		
 				      		 	     	   	    	Undisclosed			

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

P3 AD Market Insights

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	3 <sup>rd</sup> party Maps	Cloud	V2X & others
	 NVIDIA			 HYUNDAI MOTOR GROUP	 AVRIDE				Uber			
		 AVRIDE				Undisclosed	Undisclosed	Undisclosed				Undisclosed
 APTIV	 Ambarella		 Applied Intuition	 HYUNDAI MOTOR GROUP	 APTIV	 Motional	 PIVOT	 ottobpa	 lyft			 APTIV
 OUSTER	 APTIV	 Motional		 HYUNDAI MOTOR GROUP					 VIA			 EVERSOURCE
									Uber			 OBB
									Grab			 BlackBerry
HESAI	 NVIDIA	 Strio AI		ZOOX		ZOOX	ZOOX	ZOOX	ZOOX			
 OUSTER									 STINGRAY MUSIC			
		ZOOX										Undisclosed

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	
 		ADASTEC		 		ADASTEC	  	 	  		  		
		       			Vehicles of ADS partners		Uber	Undisclosed	Uber				
Covered by ADS & OEM partners		  		Vehicles of ADS and OEM partners									
<div><div>Core Business</div><div>Partnership or supplier deal</div><div>Investment</div><div>Acquisition</div><div>Parent / Subsidiary</div><div>Update</div><div>Partner outside US</div></div>													

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
 LeddarTech		COAST		COAST		COAST	COAST	COAST	Undisclosed			
   Catching the Core	intel		 	    			  	  				
   AMD 												
Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update												

## At a glance



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.



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.



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**.



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**.

## Latest news

Uber and Waymo's commercial robotaxi service is open for business in Atlanta.

(24.06.2025)

[Update](#)
[Read](#)

Uber and May Mobility announce strategic partnership to scale autonomous vehicles.

(01.05.2025)

[Read](#)

Autonomous driving in public transport: KIRA project starts with test users. [GER]

(26.05.2025)

[Update](#)
[Read](#)

Avride and Hyundai Motor Company announce strategic alliance to accelerate autonomous mobility.

(05.03.2025)

[Read](#)

## L4 target

L4 achieved in Phoenix by **2020**.

L4 achieved in Sun City by late **2023**.

Not announced

Not announced

## At a glance



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.



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.



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.



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..

## Latest news

Motional appoints Laura Major, renowned expert in AI and Robotics, as President and CEO.

(12.06.2025)

[Update](#)
[Read](#)

Amazon's Zoox opens its first major robotaxi production facility.

(18.06.2025)

[Update](#)
[Read](#)

ADASTEC introduces SAE Level-4 Driving to Germany with the Karsan Autonomous e-ATAK in project albus.

(14.05.2025)

[Update](#)
[Read](#)

Uber and Waymo's commercial robotaxi service is open for business in Atlanta.

(24.06.2025)

[Update](#)
[Read](#)

## L4 target

**2026**

Large scale production in **2026**.

**2026**

L4 achieved in Austin with Waymo in **2025**.

## 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 its Flexdrive subsidiary, it now has a **clearer value proposition for additional and existing partners**.



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).



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.



Tesla launched its **first robotaxi deployment in June 2025** in Austin. The fleet is limited to 10 vehicles, operating only a **few hours a day in good weather**. A safety operator is onboard, and teleoperations are likely heavily used. A promising start for Tesla, but many questions remain. We're eager to see what's next.

## Latest news

Motoring down the AV superhighway.

(18.02.2025)

[Read](#)

COAST Autonomous announces collaboration with the city of Winter Haven, Florida to explore deployment of autonomous transportation solutions.

(30.03.2022)

[Read](#)

Perrone Robotics and NEORide awarded USDOT SMART grant to retrofit six Ohio transit buses with advanced driver assistance technology.

(21.05.2025)

[Update](#)

[Read](#)

Tesla's robotaxis have already caught the attention of federal safety regulators.

(23.06.2025)

[Update](#)

[Read](#)

## L4 target

Not announced














































































































Not announced

























































Not announced

**2025** – high reliance on teleops expected

# Mobility-as-a-Service. Asia.



































Partnering & Value Chain, Level 4 Target & P3 Assessment

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		3 <sup>rd</sup> party Maps	Cloud	V2X & others	
HESAI																	
robosense																	
																	
																	
																	
HESAI																	
robosense																	
																	
																	
																	
LUMINAR																	
HESAI																	
robosense																	
																	
																	
																	

Layer 1				Layer 2				Layer 3		Layer 4	Layer 5		
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  				 		Undisclosed	Undisclosed		 	 		  	
<div>Core Business</div> <div>Partnership or supplier deal</div> <div>Investment</div> <div>Acquisition</div> <div>Parent / Subsidiary</div> <div>Update</div>													























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



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	3 <sup>rd</sup> party Maps	Cloud	V2X & others	
		 	 		Not relevant	Not relevant	Not relevant	Not relevant	Not relevant				
Not relevant		 	 	   ONTIME integrates 3 <sup>rd</sup> party fleets		Undisclosed	Undisclosed		 			Undisclosed	
HESAI	   TIER IV			   Innovation by Chemistry	   TIER IV	   TIER IV	 		 TIER IV	  		Undisclosed	

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		3 <sup>rd</sup> party Maps	Cloud	V2X & others
<div>LUMINAR</div> <div>HESAI</div> <div>ZVISION</div> <div>ZF</div> <div>robosense</div>	<div>TTTech</div>	<div>pony</div> <div>autox</div> <div>momenta</div> <div>Continental</div>		<div>SAIC</div>		<div>cerence</div>	Undisclosed	Undisclosed	<div>高德地图</div>	<div>DEEPMAP</div> <div>mobileye</div>			
<div>robosense</div>	<div>NVIDIA</div>	<div>pony</div> <div>Baidu</div>		<div>HONGDI</div> <div>FAW GROUP</div>		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed			
<div>TIER IV</div>		<div>TIER IV</div>	<div>TIER IV</div>	<div>pix moving</div> <div>elaphe</div> <div>TIER IV</div> <div>SODA</div>		Undisclosed	<div></div>	Undisclosed	<div>Cloud</div>		Undisclosed		



Layer 1				Layer 2		Layer 3		Layer 4	Layer 5				
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						Undisclosed	Undisclosed	Undisclosed					Undisclosed
Covered by WeRide's suppliers													Undisclosed
 42dot		42dot		 42dot		Undisclosed	Undisclosed	  				Undisclosed	
<div>Core Business</div> <div> Partnership or supplier deal</div> <div> Investment</div> <div> Acquisition</div> <div> Parent / Subsidiary</div> <div> Update</div>													



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LUMINAR AISIN DENSO Crafting the Core ZF robosense	NVIDIA QVOC WAYMO IgA momenta WAYMO	Aurora pony.ai WAY Mobility IgA Level 5 momenta WAYMO	Applied Intuition parallel domain Apex.AI	TOYOTA		Undisclosed	Undisclosed	Aurora RIDECELL	Grab Uber DiDi	HERE tomtom NIT DATA MAXAR HERE 阿里巴巴集团 阿里巴巴集团 here	aws	PERCEPTIVE AUTOMATA
APTIV OUSTER ZENDAR opsys Technologies	APTIV NVIDIA WAYMO Motional	WAYMO Motional Aurora pony.ai 42dot 百度 IONQ		HYUNDAI MOTOR GROUP		Motional	Motional	Motional	Motional Grab AIRS i.M	here		
BOSCH robosense HESAI	NVIDIA Qualcomm Imborella	momenta		Motional		Undisclosed	Uber	滴滴出行	Uber 滴滴出行		Tencent 腾讯 aws	

## At a glance



**Baidu Apollo** has accumulated **more than 130m km**, holds **permits for first fully driverless taxi service** in CN and **processed >11m rides** by May 2025. Baidu is an absolute heavyweight in the Chinese AD market and among the strongest robotaxi players in China.



WeRide was the **first company in CN** to operate a fleet with **>100 vehicles** for AD testing and was permitted to test **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 3<sup>rd</sup> deployment in Europe, showing their ambitions in this market.



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, and GAC Group. Pony.ai is among the strongest AD players.



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.

## Latest news

Baidu's Apollo Go surpasses 11 million rides, expands global fleet to over 1,000 driverless vehicles.

(22.05.2025)

[Update](#)
[Read](#)

WeRide signs MoU with RTA and Uber to launch pilot operations of autonomous vehicles.

(16.06.2025)

[Update](#)
[Read](#)

Travis Kalanick is trying to buy Pony AI — and Uber might help.

(26.06.2025)

[Update](#)
[Read](#)

AutoX's RoboTaxis allowed for unmanned passenger transport service in Shanghai.

(08.07.2024)

[Read](#)

## L4 target

L4 reached in  
Guangzhou by  
**2021**

L4 reached in  
Guangzhou by  
**2022**

L4 reached in  
Beijing and  
Guangzhou by  
**2023**

L4 reached in  
Shenzhen by  
**2021**

## At a glance



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**.



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.



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.



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.

## Latest news

RoboSense, DiDi Autonomous Driving team up to promote L4 Robotaxi production.

(16.04.2025)

[Read](#)

DeepRoute.ai secures \$100 million in C1 funding round.

(05.11.2024)

[Read](#)

WeRide and Horizon Robotics signed a strategic cooperation memorandum of understanding.

(07.11.2023)

[Read](#)

OnTime joins cross-city pilot intelligent connected vehicle program in Guangdong.

(30.12.2024)

[Read](#)

## L4 target

**2025**

**2025**

Not announced

Not announced



## At a glance

## TIER IV



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.



By August 2022, SAIC accumulated **400,000km of automated driving testing** in China. SAIC has **partnered with well-known SDS providers**, such as Momena and Pony.ai, to develop self-driving vehicles.



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**.



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.

## Latest news

TIER IV and Newmo partner on made-in-Japan robotaxi service.

(02.07.2025)

[Update](#)
[Read](#)

SAIC Motor set to launch autonomous driving services in Shanghai by August.

(25.07.2024)

[Read](#)

Hongqi's 3rd-gen L4 Robotaxi allowed for unmanned road tests in Beijing.

(10.07.2024)

[Read](#)

PIX Moving and SODA.Auto announce strategic partnership to accelerate autonomous vehicle development.

(04.09.2024)

[Read](#)

## L4 target

Not announced

2025

Not announced

Not announced



## At a glance



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.



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**.



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.



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. A partnership with Waymo is set to explore future vehicle platforms for both ride hailing and POVs.

## Latest news

Nissan demos autonomous driving on streets of Yokohama.

(14.06.2024)

[Read](#)

WiTricity and YuTong Bus revolutionize public Transportation with Wireless Charging for Autonomous E-Buses.

(10.02.2023)

[Read](#)

Geotab, Kia, and 42dot join forces to drive the future of fleet management.

(12.09.2024)

[Read](#)

Waymo and Toyota outline strategic partnership to advance autonomous driving deployment.

(29.04.2025)

[Read](#)

## L4 target

**2027**

L4 reached by **2022** jointly with WeRide.

Not announced

Not announced



## 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.



Momenta's shifted focus is on advanced L2+ solutions for OEMs in all key markets. However, **in 2025, major collaborations with Uber and SAIC Mobility were announced to deploy robotaxi fleets**. The partnership with Uber aims to launch international robotaxi services, starting in Europe by 2026.

## Latest news

Waymo and Hyundai enter multi-year, strategic partnership.

(05.10.2024)

[Read](#)

SAIC Mobility, Momenta to co-launch mass-production-based Robotaxi fleet in Shanghai.

(12.05.2025)

[Read](#)




























































































## L4 target
























**2026** (Motional)







































Not announced






















# Mobility-as-a-Service. Europe.


















Partnering & Value Chain, Level 4 Target & P3 Assessment

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	3 <sup>rd</sup> party Maps	Cloud	V2X & others	
 				 Commercial Vehicles		ADMT 	MOIA  Uber  	MOIA  EMOTION3D  MOIA partnership	MOIA  Uber  				
													Undisclosed
 				  	 	 	      	     MOIA   	       MOIA   			 	
 HESAI  	 		 	 Applied EV  NEVS   	 		       BAYANAT  	    	   ocado 			   	

Layer 1				Layer 2				Layer 3		Layer 4	Layer 5		
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 				   <b>verne</b>									
 				<b>SCHAEFFLER</b>  		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed			
Undisclosed	<b>motor</b>			 		Undisclosed	Undisclosed	Undisclosed		Undisclosed			

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
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Undisclosed		 		Renault Group		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed		
  	   		 	  			Executed by several public transport operators.	  	  	Undisclosed		
  		nauya		  				 	  	 		

Layer 1				Layer 2			Layer 3		Layer 4	Layer 5		
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 •	 •	 •	 •			Undisclosed	 •	 •	 •			Undisclosed
 • <small>Driven to save lives</small>	 •			Otokar •		Undisclosed	 •	Undisclosed	Undisclosed	Undisclosed		
 •				 •	 •	 •	Undisclosed	 •  •	 •			 •

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 		 WAYMO No further announcements 					Undisclosed	Undisclosed	Undisclosed	 			
		 WAYVE				Undisclosed	 Admiral GROUP PLC Insurance of test fleet	Undisclosed	  				

Focus on L2+ and L3

## At a glance



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.



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.



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.



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.

## Latest news

MOIA unveils series production version ID. Buzz AD and turnkey solution for fully autonomous mobility services.

(17.06.2025)

[Update](#)
[Read](#)

HOLON to establish autonomous shuttle manufacturing facility in Jacksonville, Florida, pioneering the future of mobility in the US.

(04.09.2024)

[Read](#)

Oxa harnessing NVIDIA technology to accelerate \$2 trillion industrial mobility automation market, driven by physical AI.

(18.03.2025)

[Read](#)

Construction of Verne autonomous EV production facility kicks off at VGP Park Zagreb.

(11.02.2025)

[Read](#)

## L4 target

2026

2026

Not announced

2026

## At a glance

## Latest news

## L4 target

SCHAEFFLER



**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



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.

Deutsches KI-Start-up testet autonome Fahrzeuge auf öffentlichen Straßen. [GER only]

(02.05.2025)

[Read](#)

Not announced

Renault Group



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

EASY MILE



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.

## 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 growing.

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)

[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

## At a glance



There is **no clear strategy in the AD MaaS case**. Volvo has committed to **develop robotaxis with Waymo** - nothing has happened since.



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.

## Latest news

Volvo Cars to debut autonomous driving Ride Pilot feature in California.

(06.01.2022)

[Read](#)

Wayve and Uber partner to launch L4 autonomy trials in the UK.

(10.06.2025)

[Update](#)[Read](#)

## L4 target








Not announced

Not announced

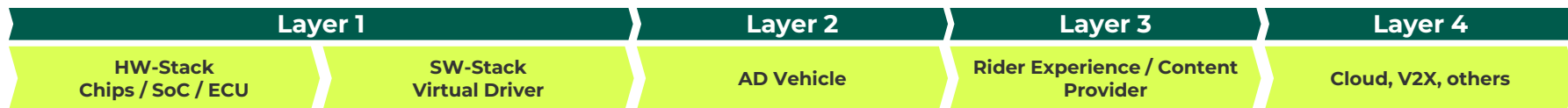
# Privately Owned Vehicles.

Intro | Use Cases & Layer Description

# Privately Owned Vehicles | Use Cases

			 <b>Private Ground</b>	 <b>Highway</b>	 <b>Urban</b>	 <b>Suburban</b>	 <b>Rural</b>
			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



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	3 <sup>rd</sup> 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





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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
							China		
						Undisclosed			

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



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
 	  			     		Undisclosed			
						Undisclosed	Undisclosed		
 						Undisclosed	Undisclosed		



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
Undisclosed	 					Undisclosed			



## At a glance



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.



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**.



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.



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.

## Latest news

Tesla China rolls out OTA update with urban Autopilot enhancement.

(25.02.2025)

[Read](#)

GM teams up with Nvidia to bring AI to robots, factories, and self-driving cars.

(18.03.2025)

[Read](#)

Feds question Ford in hands-free driving investigation.

(24.06.2025)

[Update](#)
[Read](#)

Mobileye selects Valens Semiconductor's VA7000 MIPI A-PHY chipsets for automated and autonomous driving projects.

(02.04.2025)

[Read](#)

## L4 target

No binding roadmap for FSD

2025

Not announced

Not announced



## At a glance

## Latest news

## L4 target

helm.ai



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.

Update

Read

Not announced

lucid



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**.

Read

Not announced

nuro



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.

Update























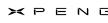












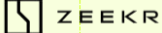

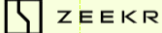


Read

Not announced




































# Privately Owned Vehicles. Asia.

Partnering & Value Chain, Level 4 Target & Latest News



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
<b>HESAI</b>   	 			   	  	 			
 <b>LIVOX</b>   	 					 Undisclosed	 		
  <b>HESAI</b>	 	 		 	 	Undisclosed			

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

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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
    	    	   				Undisclosed	 		
	 			 		Undisclosed			
  	  	 				Undisclosed			



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
<b>HESAI</b>  	  WINDRVR	 				Undisclosed			
  	 					Undisclosed			
<b>robosense</b> <b>HESAI</b>	  	 				Undisclosed			

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



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
<b>HESAI</b> <b>BOSCH</b>	Horizon Robotics	<b>Baidu</b> <b>HUAWEI</b> DEEPAL & Avatr		<b>长安汽车</b> <b>CHANGAN</b> <b>吉利汽车</b> <b>小鹏汽车</b>		<b>HUAWEI</b> DEEPAL		<b>Baidu</b>	
<b>QIANERGY</b> <b>dji</b> <b>mobileye</b> <b>HESAI</b>	<b>NVIDIA</b> <b>mobileye</b> Horizon Robotics <b>Motional</b> <b>BOSCH</b>	<b>Baidu</b> <b>MINIEYE</b> <b>ZHUOYU</b> <b>nulimax</b> <b>Motional</b> <b>WeRide</b> <b>HUAWEI</b>		<b>VTL</b> <b>CHERY</b> <b>EXEED</b> <b>LUXEED</b> <b>AION</b> 埃安		<b>IFLYTEK</b>	<b>mobileye</b>	<b>QIANERGY</b> <b>BOE</b>	
<b>robosense</b> <b>HESAI</b>	Horizon Robotics <b>NVIDIA</b>	<b>HOLOMATIC</b> <b>Motional</b> <b>pony.ai</b> <b>DICK Autonomous Driving</b>		<b>GAC</b>		Undisclosed		<b>Tencent</b> 腾讯 <b>HUAWEI</b>	



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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
HESAI		Baidu 东风日产 Voyah ZHUOYU				Undisclosed			Tencent 腾讯 ByteDance VOYAH	
robosense		Horizon Robotics MAXEYE MINIEYE LINTOUCH Zongshen 轻舟智能 OCRAFT JF Continental NVIDIA NXP UAES SAIC intel	ThunderSoft WINDRVR STRADVISION	VOLKSWAGEN GROUP 理想 gm GWM CHANGAN GEELY BYD SAIC AION MITSUBISHI CHERY POWERTRAIN BAIC		UNTOUCH 未动科技		NAVINFO		
HESAI										
BOSCH										
DENSO										
<div>Core Business</div> <div>Partnership or supplier deal</div> <div>Investment</div> <div>Acquisition</div> <div>Parent / Subsidiary</div> <div>Update</div>										



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
						Undisclosed			
						Undisclosed			
						Undisclosed			



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
OUSTER Valeo in mobileye	RENESAS in mobileye Qualcomm	autotx helm.ai momenta		HONDA		SONY	GOOGLE MAPS PLATFORM Baidu    apollo		
robosense	Qualcomm ESPRESSIF SYSTEMS	HAOMO.AI		GWM		Undisclosed	NAVINFO		
BOSCH robosense HUAWEI HESAI	NVIDIA Qualcomm HUAWEI zemvee	momenta		NIO TOYOTA 东风日产 DOV HONDA 上汽大众 GAC Aekun	ESAKI HUAWEI HONDA 上汽大众	Undisclosed	Tencent 腾讯 aws		

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
















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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
robosense 				 GEELY LYNK & CO		Undisclosed			
BOSCH HESAI robosense	 		  QNX	 EXEED		Undisclosed			
LUMINAR HESAI robosense	  			Undisclosed		Undisclosed			

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



LAYER 1				LAYER 2		LAYER 3	LAYER 4		
Sensors / SoC / Computing HW		SW-Stack		AD Vehicle		Rider Experience/ Content Provider	Cloud, V2X, others		
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						Undisclosed			
						Undisclosed			
						Undisclosed			

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

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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
 ZHUOYU	 NVIDIA  ZHUOYU  Qualcomm	 ZHUOYU		 GWM  DONGFENG  CHERY  FAW GROUP  BYD  VW China		Undisclosed	 阿里巴巴 Alibaba.com		 ZHUOYU Liability Insurance

NEW



## At a glance

NIO



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.

XPENG



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.

ZEEKR



Geely's announced to integrate Mobileye's SuperVision system for privately owned vehicles. However, this cooperation seems to struggle as Zeekr officially launched its **G-Pilot intelligent driving system** by March 2025, including a L3 smart driving architecture-

BYD



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.

## Latest news

Start of series production for Steer-by-Wire steering at Chinese car manufacturer NIO.

(17.02.2025)

[Read](#)

XPENG P7+ model comes standard with Tianji XOS 5.4 system.

(25.10.2024)

[Read](#)

ZEEKR unveils G-Pilot intelligent driving system.

(19.03.2025)

[Read](#)

Horizon Robotics' Journey® 6 series in-car computing solution debuts on BYD's God's Eye C smart driving system.

(13.02.2025)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced



## At a glance



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



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**.



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.



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.

## Latest news

AutoNavi, Great Wall Motor inaugurate 'Mobility Joint Innovation Lab'.

(07.01.2025)

[Read](#)

BAIC Group announces \$70.35 million investment in Pony.ai.

(02.12.2024)

[Read](#)

SAIC Motor, Huawei forge partnership to co-build smart new energy vehicles.

(21.02.2025)

[Read](#)

IM Motors, NVIDIA, Momenta to co-pioneer DRIVE AGX Thor chip in mass-produced intelligent driving systems.

(18.11.2024)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced



## At a glance

## Latest news

## L4 target

Li Auto



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



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

mi



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)

[Read](#)

Not announced

FAW GROUP



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)

[Read](#)

Beyond **2025**



## At a glance

## Latest news

## L4 target



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)

[Read](#)

2025



In March 2025, Chery introduced its **"Falcon" smart driving system**, which will be implemented across all brands and models in 2025. Falcon 500, an integrated driving & parking system for highway NOA or urban memory navigation; Falcon 700, w/ enhanced compute for full-scenario navigation; and Falcon 900, a L3 system using VLA and a world model for advanced autonomy.

Chery unveils intelligent strategy, aiming for global smart driving expansion.

(19.03.2025)

[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**. In March 2025, Chery announced plans to release China's first L3 autonomous production vehicle equipped with ADiGO GSD (**GAC Self-Driving**) in 2025)

GAC Group launches Xingling Zhixing intelligent driving initiative.

(19.03.2025)

[Read](#)

Not announced



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 Momena**, while Dongfeng's **VOYAH announced a partnership with PhiGen Robotics**

VOYAH partners with ByteDance's Volcano Engine to advance AI smart cockpit, intelligent driving techs.

(05.03.2025)

[Read](#)

Not announced



## At a glance



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.



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**.



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.



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.

## Latest news

Horizon Robotics deepens partnership with Bosch to deliver ADAS solutions to multiple automakers.

(25.04.2025)

[Read](#)

SAIC Motor, Huawei forge partnership to co-build smart new energy vehicles.

(21.02.2025)

[Read](#)

Another major milestone! Nullmax secures ADAS project from leading OEM.

(26.06.2025)

[Update](#)
[Read](#)

QCraft, Luxshare-ICT team up to co-develop integrated smart driving solutions.

(22.04.2025)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced



## At a glance



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 also teamed up with Momenta to deploy ADAS solutions in China.



Haomo.ai is **backed by GWM** and develops its urban navigation-assisted H-pilot 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.



While still running a small robotaxi fleet, Momenta shifted **focus is on advanced L2+ solutions for OEMs** in all key markets. Momenta **teamed up with several automakers** including SAIC VW, Honda, GM and IM Motors to develop and roll out end-to-end intelligent driving large model driving solutions.



**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**.

## Latest news

Honda Motor, Momenta to co-develop AI-large-model-enabled driver assistance solutions for China.

(23.04.2025)

[Read](#)

Haomo.ai nabs 300 million yuan in Series B2 financing round.

(23.04.2024)

[Read](#)

SAIC Volkswagen partners with Momenta to develop mass- producible driver assistance solutions.

(27.04.2025)

[Read](#)

Lotus Robotics and HERE Technologies collaborate on Highway Navigation Pilot for Automated Driving.

(03.04.2025)

[Read](#)

## L4 target

2025

Not announced

Not announced

Not announced



## At a glance



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 Exlantis ET.



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.



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.**



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.

## Latest news

QNX now powering WeRide's next-generation ADAS platform.

(09.04.2025)

[Read](#)

RoboSense, Pony.ai announce all-around partnership expansion.

(13.01.2025)

[Read](#)

Baidu launches Apollo Open Platform 10.0 to advance autonomous driving development.

(05.12.2024)

[Read](#)

DeepRoute.ai, Qualcomm to co-develop ADAS solutions based on Snapdragon Ride platform.

(09.04.2025)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

**2025**

## At a glance



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.**



ZHUOYU provides **intelligent driving systems and self-developed core components**, such as sensing modules and domain controllers. As of April 2025, **over 30 new models are in development** under the company's ClixPilot program. At Auto Shanghai 2025, ZYT introduced its **VLA large model**, which supports both ADAS and in-cabin intelligent applications.

## Latest news

Geely launches unified intelligent driving solution suite 'G-Pilot'.

(04.03.2025)

[Update](#)[Read](#)

ZHUOYU showcases advanced vehicle intelligence solutions at Auto Shanghai 2025.

(25.04.2025)

[Read](#)

## L4 target

Not announced

Not announced

# Privately Owned Vehicles. Europe.

Partnering & Value Chain, Level 4 Target & Latest News



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
LUMINAR BOSCH Valeo veoneer	NVIDIA brainchip* Qualcomm	NVIDIA Baidu momenta				Mercedes me ZYNC	DEEPMAP here	Tencent 腾讯	
INNOVIZ TECHNOLOGIES APTIV MAGNA veoneer Valeo	mobileye Qualcomm	Ariiver Valeo AUTORA Tencent 腾讯 STELLANTIS TATA TECHNOLOGIES	TTTech QNX EDGE CASE			BMW CONNECTED DRIVE AirConsole	here aws	ottopia	
mobileye INNOVIZ TECHNOLOGIES Valeo	NVIDIA Qualcomm CARIAD mobileye	VAIVA Safe Mobility mobileye UA Horizon Robotics BOSCH ZHUOYU SW models in CN	CARIAD QNX Luxoft TTTech Applied Intuition INTENTA	VOLKSWAGEN GROUP		Undisclosed	tomtom mobileye here 高德 NIRA	Microsoft verizon HUAWEI	



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
 	  					Undisclosed	 		
   		 	 			Undisclosed			
 	      	     				Undisclosed	  		



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
BOSCH HESAI Webasto	RECOGNIA NVIDIA QVOC Ambarella BOSCH Horizon Robotics	UDAC mentimeter WeRide FIVE AI CARIAD Microsoft BOSCH	KONIC	China: ZEEKR DONGFENG BAIC LYNK & CO	BOSCH NEXT	Undisclosed	tomtom DEEPMAP here atlatel	Microsoft	
LUMINAR	mobileye NVIDIA	mobileye		GEELY polestar		polestar Google	Google		
	NVIDIA	WAYVE		Ford NISSAN		Undisclosed		Microsoft S.RIDE Data collection Admiral Group PLC Insurance of test fleet	



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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
JOYNEXT 行 思 智 行	Ambarella			 TOYOTA 	 	Undisclosed	Undisclosed		



## At a glance



**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.



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.



**CARIAD is primarily responsible for software development** in the **private ownership** segment. There is also a development partnership (Automated Driving Alliance) with Bosch. Moreover, Volkswagen Group is strongly working with Mobileye in the European market.



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.

## Latest news

Support speed of up to 95 km/h on German motorways.

(17.12.2024)

[Read](#)

Here and BMW extend partnership on AI-powered mapping system.

(08.01.2025)

[Read](#)

Volkswagen Group cooperates with Valeo and Mobileye to enhance driver assistance in future MQB vehicles.

(25.03.2025)

[Read](#)

Stellantis unveils STLA AutoDrive, hands-free and eyes-off autonomous technology for a new era of driving comfort.

(20.02.2025)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced



## At a glance

• APTIV •



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.

Continental



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**.

BOSCH



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

polestar



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.

## Latest news

Horizon Robotics, Aptiv join forces to develop localized intelligent driving solutions.

(03.07.2023)

[Read](#)

Black Sesame Technologies, Continental ink MoU on HPC development at CES 2025.

(13.01.2025)

[Read](#)

For safer roads: Bosch teams up with Microsoft to explore new frontiers with generative AI.

(28.02.2024)

[Read](#)

Polestar 4 to integrate Luminar LiDAR with Mobileye Chauffeur.

(09.11.2023)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced

## At a glance



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.



Autobrain, pursuing an **End-to-End AI approach**, provides scalable automated driving solutions from single front camera vision to advanced AD solutions. While Autobrain 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.

## Latest news

S.RIDE, provider of the Taxi App “S.RIDE®,” partners with UK-based Wayve to begin collecting public road data for Driver Assistance and Autonomous Driving AI development.

(12.05.2025)

[Update](#)[Read](#)

Autobrain and JOYNEXT revolutionize smart camera solution powered by Autobrain's affordable safety ADAS software.

(04.12.2024)

[Read](#)

## L4 target

Not announced











Not announced

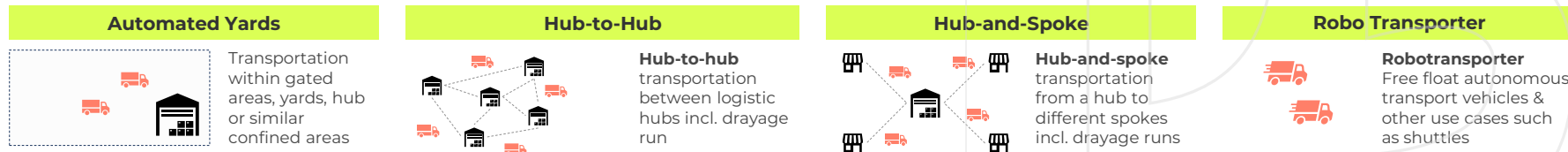
# Goods Transport & TaaS.

Intro | Use Cases, Market Insights & Layer Description



# Goods Transport & TaaS | Use Cases

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



# Goods Transport & TaaS | Longlist

											
											
Transport	S										
	ML	<b>P</b> 				<b>P</b> 				<b>G/P</b> 	
	XL	<b>P</b> 	<b>P</b> 	<b>P</b> 	<b>P</b> 		<b>P</b> 	<b>P</b> 	<b>P</b> 		<b>P</b> 
Platooning					<b>P</b> 			<b>P</b> 	<b>P</b> 		<b>P</b> 
Off-Highway / Gated Area			<b>G/P</b> 		<b>P</b> 				<b>G/P</b> 		<b>G</b> 

Activities



































No activities

Stopped activities

G=Gated Area

P=Public road

# Goods Transport & TaaS | Longlist

											
											
Transport	S		<b>P</b> 		<b>P</b> 						
	ML	<b>P</b> 		<b>P</b> 		<b>P</b> 					
	XL					<b>P</b> 	<b>P</b> 	<b>P</b> 	<b>P</b> 	<b>P</b> 	<b>P</b> 
Platooning					<b>P</b> 	<b>P</b> 	<b>P</b> 				
Off-Highway / Gated Area											

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

# Goods Transport & TaaS | Longlist

		STARSHIP	STACK	TORC	MARS	SAIC	NEOLIX	HYUNDAI MOTOR GROUP	PACCAR	Applied Intuition	阿里巴巴 Alibaba.com
Transport	S	G/P 						P 			
	ML						P 				G/P 
	XL		P 	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

Transport	S								<b>P</b> 		<b>P</b> 
	ML		<b>P</b> 	<b>P</b> 			<b>P</b> 	<b>P</b> 		<b>P</b> 	
	XL	<b>G</b> 			<b>G</b> 	<b>P</b> 					
Platooning											
Off-Highway / Gated Area			<b>G/P</b> 				<b>P</b> 				

Activities

No activities

Stopped activities

**G**=Gated Area**P**=Public road

# Goods Transport & TaaS | Longlist

Transport	S		P 	P 							
	ML					P 		P 			
	XL				P 		P 		P 	P 	P 
Platooning											
Off-Highway / Gated Area		P 									

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

# Goods Transport & TaaS | Longlist

		driveblocks	robione	<b>tiR</b> 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 	G 

Activities

No activities

Stopped activities

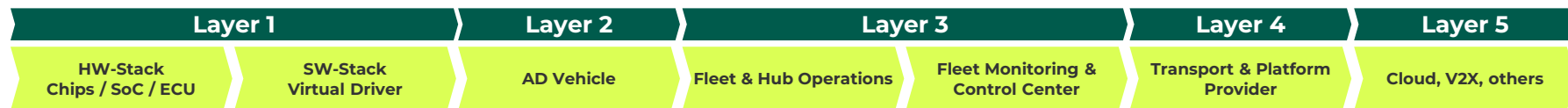
G=Gated Area

P=Public road

Goods Transport & TaaS | Longlist

		CLEVON	LOXO	宏景智驾 HONG JING DRIVE	pinkbot	OTTO.NOMY.IO™	NEUBILITY
Transport	S	P 			P 	P 	P 
	ML		P 				
	XL			P 			
Platooning							
Off-Highway / Gated Area							

## Goods Transport & TaaS | Layer Model Description



### 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	AD Vehicle Real-Time Tracking and Monitoring	Booking	3rd party HD maps
Sensor Integration	ODD Management	Redundancy	Concessions	Incident Management	Pricing	Cloud Infrastructure
Automotive approval	SDS Licensing	X-by-Wire	Charging	AD vehicle Maintenance Scheduling	Payment	
Sensor testing & approval	SW Testing & Approval	Regulatory compliance	Maintenance & Service	AD Vehicle Charging Scheduling	Disposition planning	
Sensor fusion	Mapping	Homologation	Washing & Cleaning	Emergency Response Coordination	Fleet Intelligence (e.g., fleet & load optimization)	
Calibration and Integration Support	Verification & Validation	After sales / aftermarket	Training	AD Vehicle Mission Dispatch	Order management	
Safety & Compliance	E2E Integration	Safety management	In/De-fleeting	Safety Driver Management	API / Integration	
...	Sensor Integration and Data Processing	AD requirements	Parts supply	Data Analytics and Reporting	Customer support	...
	Safety & Compliance	Production	...	Customer interaction	Customer authentication (delivery services)	
		ADS & AD Vehicle Operations Functions (e.g., for remote assistance)			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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
 WAYMO	 SAMSUNG  intel	 WAYMO	 LATENT LOGIC	 JAGUAR	Note: trucking will not be considered here anymore.	 AutoNation  Swiss Re  transdev	 WAYMO  autofleet	 Uber Freight	Undisclosed			
 LUMINAR  AT&T	 NVIDIA  flex	 TORC  algotux	 TNO Innovation for life  Applied Intuition  foretellix  DeepScenario  NVIDIA	 FREIGHTLINER		 PENSKE		 SCHNEIDER  C.R. England  Uber Freight	 amazon			
 Plus  OUSTER  TELEDYNE FLIR  AT&T  LUMINAR	 NVIDIA	 Plus TIER IV	 QNX  NVIDIA	 PACCAR  TRATON  IVECO  SAIC  FAW GROUP  JAC  HYUNDAI	 VELOCITI  SCHAEFFLER  BOSCH  EMERGENCY SAFETY SOLUTIONS	 GOODYEAR		 amazon  SF EXPRESS  ZTO  DSV  dm  WORLDDEX	 amazon  ZTO  DSV  dm  Alibaba.com  Transurban			
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update	Partner outside US						




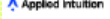










































Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update Partner outside US

# 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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
  	 	 	 	  	 	    	 	        	  		Undisclosed	
				   		Undisclosed				Undisclosed		
   	 	  		 				     				












































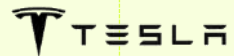





Core Business Partnership or supplier deal Investment Acquisition Parent / Subsidiary Update

# 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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
			 	 	   			     			Undisclosed	
Undisclosed	  	  		 				         <div>Note: Logistics partners before strategy shift</div>				
 		 				Undisclosed		   			Undisclosed	
Core Business	Partnership or supplier deal	Investment	Acquisition	Parent / Subsidiary	Update							




















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

# 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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
	 	 		     		 		         	 			
	Undisclosed	   		     		Undisclosed				 		
 	 	 				Undisclosed		Undisclosed		Undisclosed		
Core Business	 Partnership or supplier deal	 Investment	 Acquisition	 Parent / Subsidiary	 Update							

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

# 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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
 Whale Dynamic AV stack consists of 3 <sup>rd</sup> party HW												Undisclosed
Undisclosed	  			 DAIMLER TRUCK TRATON 		Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed	Undisclosed
		 TORC  driveblocks										
						Undisclosed	Undisclosed	  	Undisclosed	Undisclosed	Undisclosed	Undisclosed

# Goods Transport & TaaS NAR

## At a glance



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.



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.



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.



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**.

## Latest news

Phoenix residents can now experience Uber Eats delivery with the Waymo Driver.

(03.04.2024)

[Read](#)

Torc collaborates with Flex on physical AI platform for autonomous trucks, accelerated by NVIDIA.

(18.03.2025)

[Read](#)

Plus, an AI-based virtual driver software company powering factory-built autonomous trucks, to go public via merger with Churchill Capital Corp IX.

(06.05.2025)

[Update](#)
[Read](#)

Vay and Kodiak partner to incorporate assisted autonomy technology into Kodiak's fully autonomous technology stack.

(25.06.2025)

[Update](#)
[Read](#)

## L4 target

Focus on ride hailing and urban delivery with I-PACE fleet

**2027**

**2027**

**2025**

# Goods Transport & TaaS NAR

## At a glance



Toronto-based Waabi is renowned for both its 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.



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.



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.



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.

## Latest news

Volvo Autonomous Solutions and Waabi announce strategic partnership to advance autonomous freight transport.

(04.02.2025)

[Read](#)

Aurora's driverless trucks have a human observer behind the wheel again.

(19.05.2025)

[Update](#)
[Read](#)

Gatik to accelerate mass production of SAE Level 4 (L4) production-ready autonomous trucks, built on NVIDIA in-vehicle compute.

(18.03.2025)

[Read](#)

Nuro announces Series E financing at \$6B valuation, backed by leading financial and strategic investors.

(09.04.2025)

[Read](#)

## L4 target

2025

Not announced

L4 target reached in Arkansas by 2021

Not announced

# Goods Transport & TaaS NAR

## At a glance



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.



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.



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.



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.

## Latest news

Ford, VW-backed Argo AI is shutting down.

(26.10.2022)

[Read](#)

Ziegler orders autonomous and electric delivery vehicles from the company Udelv.

(05.01.2022)

[Read](#)

Amazon stops field tests of its delivery robot Scout.

(07.10.2022)

[Read](#)

Tesla Semi with sensor rig spotted potentially ground truth calibrating for FSD.

(30.09.2024)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced

# Goods Transport & TaaS NAR

## At a glance



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'.



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.



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.

## Latest news

Robomart unveils autonomous retail collective to propel self-driving shops.

(08.04.2024)

[Read](#)

Applied Intuition raises \$600M as it pushes further into defense.

(17.06.2025)

[Update](#)
[Read](#)

Avride and Hyundai Motor Company announce strategic alliance to accelerate autonomous mobility.

(05.03.2025)

[Read](#)

## L4 target

Not announced

































Not announced

Not announced

# Goods Transport & TaaS. Asia.











































Partnering & Value Chain, Level 4 Target & Latest News

# 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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
    <small>(Sensor fusion)</small>	  			 				 		Undisclosed	
							Undisclosed				
  				  				 		Undisclosed	

















































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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
  	 			  		Undisclosed		      	     			
HESAI		 				Undisclosed		Undisclosed		Undisclosed		
 HESAI	 	 		NEOLIX		Undisclosed		    	  			 

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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
<div>                           </div>	<div></div>	<div></div>		<div></div>		Undisclosed		<div> </div>	<div> SD maps – probably consumer vehicles only</div>			
<div>  </div>	<div></div>	<div></div>		<div></div>		<div></div>		<div></div>	Undisclosed			
Undisclosed		<div> </div>		<div></div>		Undisclosed		<div> </div>				<div></div>

# 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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
LIVOX		 		 FAW GROUP		Undisclosed		Undisclosed			
HESAI	  TIER IV	  <div>TIER IV</div>		 		Undisclosed		Undisclosed	Undisclosed		

# Goods Transport & TaaS ASIA

## At a glance



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.



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.



**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.



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.

## Latest news

Pony.ai, Sinotrans renew agreement on autonomous logistics service joint venture.

(17.01.2025)

[Read](#)

WeRide launches Robovan W5, pioneering new class of autonomous delivery vehicle.

(06.02.2025)

[Read](#)

Autonomous truck solution developer Trunk.Tech bags hundreds of millions of yuan.

(07.05.2024)

[Read](#)

Inceptio powers launch of DFCV's Hi-Truck Tianlong Autonomous GX/KX Series.

(27.09.2024)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced

# Goods Transport & TaaS ASIA

## At a glance

SAIC



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.

NEOLIX



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.

DEEPRROUTE AI



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.

KARGOBOT



**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.

## Latest news

SAIC Hongyan's 5G+L4 Smart Heavy Truck to Begin Trial Operations in Danzhou.

(03.07.2024)

[Read](#)

NEOLIX completes C+ financing round with 1 billion yuan raised.

(20.02.2025)

[Read](#)

DeepRoute.ai collaborates with DEPPON LOGISTICS Co., LTD to expedite commercialization.

(20.06.2022)

[Read](#)

China's autonomous trucking firm KargoBot.ai closes Series A+ funding.

(15.05.2025)

[Update](#)
[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced

## Goods Transport &amp; TaaS ASIA



## At a glance



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.



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 **strong partnership with Huawei** in place.



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.

## Latest news

DeepWay secures 750 million yuan in Series B financing.

(26.12.2024)

[Read](#)

Plus, FAW Jiefang Qingdao to co-develop autonomous gas-powered heavy-duty truck.

(10.07.2024)

[Read](#)

Plus and TIER IV partner to advance Autonomy 2.0 in Japan, starting with driverless trucks.

(10.03.2025)

[Read](#)

## L4 target

**2024-2026**

**2025**

Not announced



































# Goods Transport & TaaS. Europe.

Partnering & Value Chain, Level 4 Target & Latest News































# 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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
 	 		  	DAIMLER TRUCK		Undisclosed		Undisclosed		 		
Undisclosed		 TRATON	  embedded systems 	 LEONI 		FERNRIE 		 	 			
	 	 IVEX 			 		   					

# 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	3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
		 		 				  Uber Freight  		Undisclosed	
  				  			 	 		Undisclosed	
						Undisclosed		 			

# 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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
Undisclosed		 WAYVE		 MAXUS				 ocado GROUP			Microsoft	
								 dpd				
									 ASDA			
 tu simple		 embotech*		CLEVON							Microsoft	
												
 Applied Intuition		 driveblocks	 Apex.AI		 pepper							
		 TIER IV			 SCHAEFFLER							
						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				
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		3 <sup>rd</sup> party HD Maps	Cloud	V2X & Others
	 •  •	STARSHIP •		STARSHIP		Undisclosed		 •  •  •  •  •  •	Undisclosed			
HESAI •		 •	 •  •	 •		 •  •	Undisclosed		Undisclosed			
		embotech*						Undisclosed		Undisclosed		
	 •	 •	 •  •	 •		 •  •	 •	Undisclosed		Undisclosed		
		FERNRIDE						Undisclosed		Undisclosed		

# Goods Transport & TaaS EUROPE

## At a glance

## Latest news

## L4 target

DAIMLER  
TRUCK

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

TRATON



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.

How TRATON and Applied Intuition will partner to deploy software across the commercial vehicle industry.

(17.03.2025)

[Read](#)

Not announced

einride



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 founder steps down as CEO amid push to scale electric, autonomous trucks.

(21.05.2025)

[Update](#)
[Read](#)

Target reached  
in gated areas  
only

VOLVO



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)

[Read](#)

Not announced

# Goods Transport & TaaS EUROPE

## At a glance

LOXO



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.

IVECO



**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.

WAYVE



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.

ZF



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.

## Latest news

Loxo selects Aeva to power autonomous delivery vehicles.

(28.05.2025)

[Update](#)
[Read](#)

IVECO, Plus, dm-drogerie markt and DSV launch automated trucking pilot in Germany.

(15.11.2023)

[Read](#)

Asda and Wayve launch UK's largest self-driving grocery home delivery trial.

(17.04.2023)

[Read](#)

ZF and Aidrivers agree on strategic cooperation to offer autonomous mobility solutions in port logistics.

(04.06.2024)

[Read](#)

## L4 target

Not announced

Not announced

Not announced

Not announced

# Goods Transport & TaaS EUROPE

## At a glance



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.



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.



Embotech, a Swiss ETH spin-off, develops AI-based decision software for autonomous driving. Their PRODRIVER system enables **Level 4 autonomy in logistics and industrial settings**, powering automation in car factories and ports



FERNRIDE **enables autonomous, electric trucking using human-assisted remote control**. Based in Munich, it serves major logistics clients like VW and DB Schenker, addressing driver shortages and sustainability with scalable yard automation solutions across Europe.

## Latest news

STW and driveblocks jointly develop AI assistance system for mobile machinery.

(02.05.2025)

[Read](#)

foodora and Starship Technologies continue to innovate the last-mile experience with the expansion of their autonomous robot delivery fleet.

(17.06.2025)

[Update](#)

[Read](#)

APM Terminals Maasvlakte II signs unique cooperation contract with Embotech and Terberg for the purchase and implementation of 30 electric automated terminal trucks .

(09.01.2025)

[Read](#)

FERNRIDE launches comprehensive driverless testing.

(22.01.2025)

[Read](#)

## L4 target

Not announced

Reached at various locations

Not announced

Not announced



WE **EMPOWER**  
FUTURE IMPACT