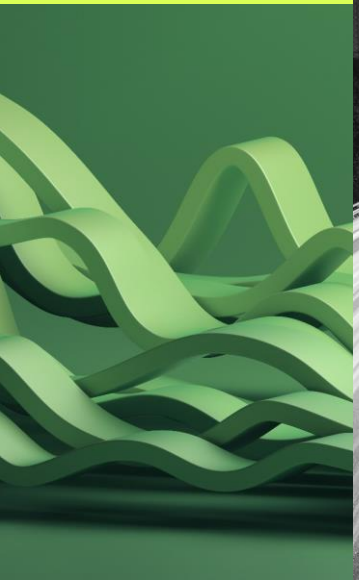
WE DEFINE
FUTURE IMPACT

TECHNOLOGY
SOFTWARE
CONSULTING

ADAS
Market Intelligence
EU / NAR / Asia



BUSINESS
AS UNUSUAL

P3 ADAS Market Insights

We analyze global OEMs regarding their ADAS capabilities across the NAR, EU, and Asian markets.

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HANDELSBLATT article
ADAS Benchmark CN 2024

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Experience Day EU 2025

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P3 & P3 Autonomous Mobility.

General Introduction

At home in the outside world.

Europe

Germany	Stuttgart	Serbia	Belgrad
	München		Subotica
	Wolfsburg	Romania	Cluj-Napoca
	Düsseldorf	Greece	Athen
	Berlin	Czech Republic	Prag
	Hamburg	Bulgaria	Sofia
	Osnabrück		Gabrovo
France	Paris		
	Toulouse		
Denmark	Kopenhagen		
Polen	Breslau		

Asia

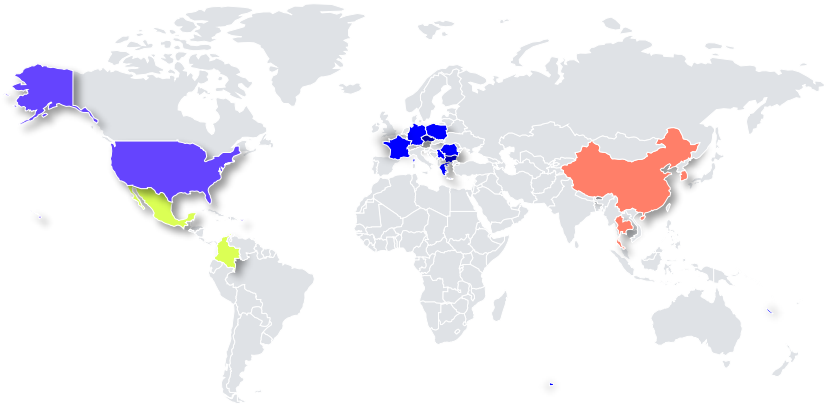
China	Peking	Korea	Seoul
	Shanghai	Thailand	Bangok
	Shenzhen		

South America

Mexico	Mexico City
	Puebla
	Querétaro
	San Luis Potosi
Colombia	Cali

North America

USA	Charleston
	Detroit
	Greenville
	Dallas



Portfolio as unusual.

SOFTWARE

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

TECHNOLOGY

- Autonomous Driving & ADAS
- 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

We can help international ADAS players to draw strategic/technological implications and critical actions to succeed in the fast-growing ADAS Market.

Competencies	Exemplary challenges & questions	How we can help	
		Quick Check	*P3 Services*
Strategic (product) approach	• General tech stack strategy • Future-proofness & updateability • Navigating geo-political ambiguity	In a compact half-day workshop, we jointly address the most relevant questions for you, incl. - P3 POV impulse - Your top 3 challenges - Potential next steps	✓ (Product) strategy development incl. local adaptions ✓ Market studies with tech focus
Market positioning	• Positioning & aspiration (L2+ vs. L3) • Business & pricing model • Sustainable monetization		✓ Market & competitor intelligence ✓ Market models & revenue pool analysis ✓ Business & pricing models
Technology approach & product compliance	• Future-proof sensor sets & architectures • Realization of certain functionalities • (Local) regulations & compliance		✓ Tech roadmaps, scouting & strategy ✓ Tech deep-dives & assessments ✓ Regulation radar
Ecosystem coverage, value chains & partnering	• Make and/or buy & partnering • Managing risk & dependencies • Managing localization		✓ Value chain insights ✓ Partner & supplier scouting ✓ Technical Due Diligence
Organization, tools & Enablement	• Shortening timelines, adapting processes and achieving “China-Speed” • Establish organization & PMT to reflect SDV		✓ Project & process management ✓ Organization development ✓ Tools & process automation
Customer experience & trust	• Establishing customer trust • Achieving perceived customer benefit & high quality of service		✓ ADAS Benchmark & customer events ✓ Trust in autonomy – trust building ✓ UX Benchmarks & simulation/real-life studies

P3 Autonomous Mobility.

What’s new?

We are continuously conducting ADAS benchmarks worldwide.

Exemplary

P3 ADAS Benchmark Events

We test OEMs' ADAS capabilities using a **standardized methodology** combining **on-road testing** and **in-depth tech evaluations**. We engage with customers through **events and roadshows** featuring live demos, allowing us to efficiently analyze performance, UX, AI and the tech stack.

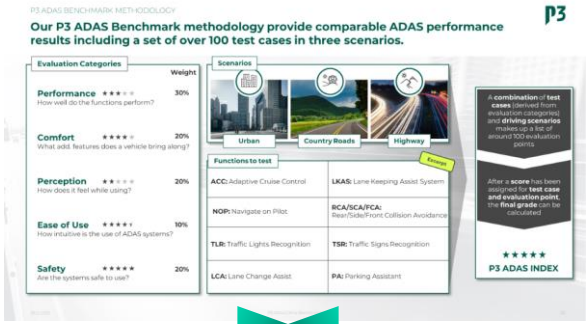
We offer extensive ADAS Benchmark Reports for the European & Chinese market based on objective and standardized performance evaluation & market analysis.

Two-Day-ADAS Benchmark Event

ADAS Benchmark | **ADAS Experience Drive**

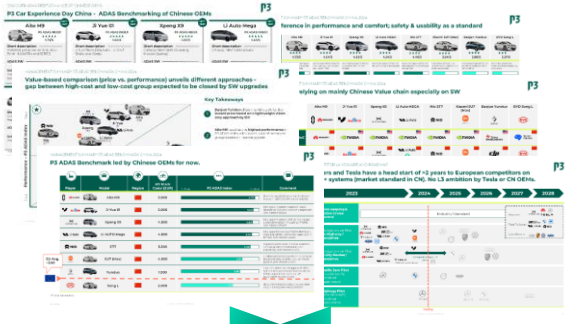
- ✓ **Extensive testing** of 8 – 10 **top notch vehicles with state-of-the-art ADAS Systems**
- ✓ **Conducted** in and for the **EU & CN market**

Standardized Benchmark Methodology



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

Extensive ADAS Benchmark Report

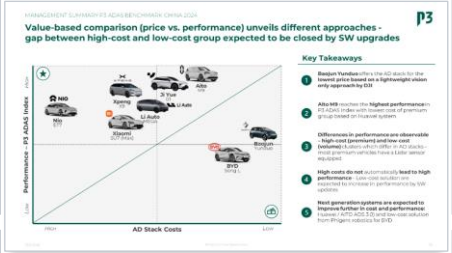


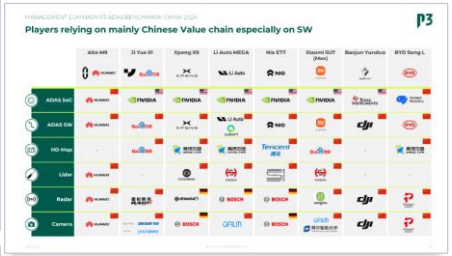
- ✓ Comprehensive **ADAS Market** & **Competitor** Overview
- ✓ **Report** as per **P3 Evaluation** incl. detailed insights on Performance in each category
- ✓ ADAS Stack **Supply Chain** & **Cost Analysis**
- ✓ Competitor **ADAS** Future **Roadmaps**
- ✓ **Detailed Vehicle Snapshots** incl. full ADAS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

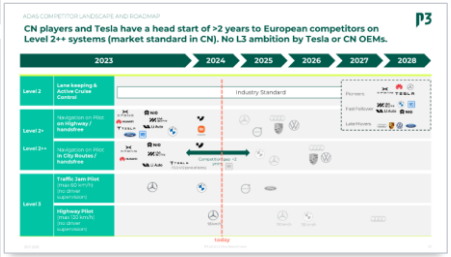
Our comprehensive ADAS Benchmark Report comprises 50-60 slides with in-depth insights into the latest ADAS technologies.

Sneak Peak

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







Much more

Pricing of benchmark reports.

ADAS Benchmark Report can also be requested for ADAS Benchmark Event China 2.0 in 2025

Focus on EU 2025 Event

ADAS Benchmark Report

Unit price* **10.000 EUR**

Bundle price **15.000 EUR**

Buy both ADAS Benchmark Europe and China report and save 5.000 EUR

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 **5.000 EUR**

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

Optional: *Workshops*

Unit price **Upon request**

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

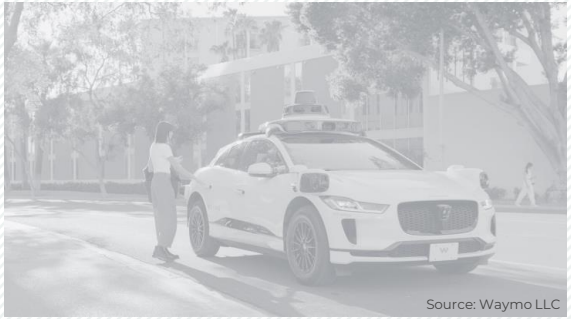
⊕ We offer the option of adding your own or desired vehicles to our benchmarks for an additional charge. The costs amount to approx. 1.000-5.000 EUR, depending on the vehicle model. Feel free to reach out.

*Unit Price for EU report or CN report

P3 Understanding of ADAS.

While the AD revolution is still waiting for major breakthroughs, short term focus shifts to ADAS & supporting technologies.

Proof of Competence achieved for Robotaxi (Level 4) but not yet profitable


Source: Waymo LLC

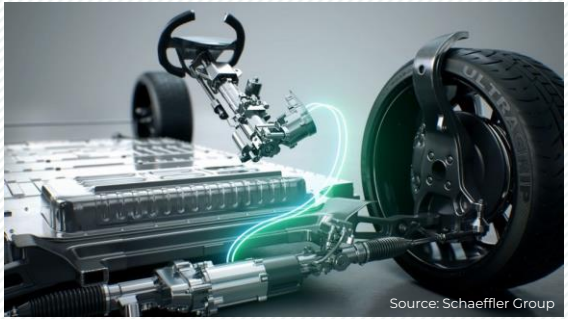
No scalability and profitability of AD L4 MaaS soon

New ADAS functions (Level 2/2+ hands-free) will deliver real customer value


Source: BMW Group

ADAS L2/L2+/L3 will grow strong and gain higher penetration

AD / ADAS function will power development of new technologies (e.g. Steer-by-Wire, new HMI concepts)


Source: Schaeffler Group

Technology Ecosystem is emerging along the ADAS value chain

FOCUS

Technical differentiation for different automation levels

CHALLENGES
- **Homologation & certification**
- **Quality of service**
- **Safety & reliability issues**

Overview of automation levels

Focus

Main responsibility switches to system

	Driver 1	Driver 2	Driver 2+	OEM 3	OEM 4	OEM 5
Responsibility						
Automation Level	 Driver Assistance **Hands on Eyes on**	 Driver Assistance **Hands on Eyes on**	*Not an official SAE Level*  Partial Automation **Hands temp. off Eyes on**	 Cond. Automation **Hands off Eyes off**	 High Automation **Hands off Mind off**	 Full Automation **Driver off**
Definition of assistance level *Based on SAE & adapted by P3*	**Longitudinal or lateral guidance** • One-dimensional assistance • Full responsibility at driver	**Longitudinal and lateral guidance** • Discontinuous two-dimensional assistance • Full responsibility at driver	**Longitudinal and lateral guidance** • Hands free driving in suitable conditions • Driver must be aware and be ready to intervene	**Longitudinal and Lateral control by function** • System handles driving tasks under specific conditions • Driver must be ready to take control when needed • Driver allowed to focus on side activities	**Full control by system in limited ODD** • System performing all driving tasks in specific ODD • Passenger aren't required to monitor the vehicle and don't need to take control	**Full control by system everywhere** • System performing all driving tasks under all roadway and environmental conditions • No Driver needed
Exemplary functions	 **ACC**	 **LKA and ACC**	 **Tesla Autopilot**	 **Highway Pilot/ Traffic Jam Pilot**	 **City Pilot L4, Parking Pilot L4**	 **Self-driving Mobility Services**

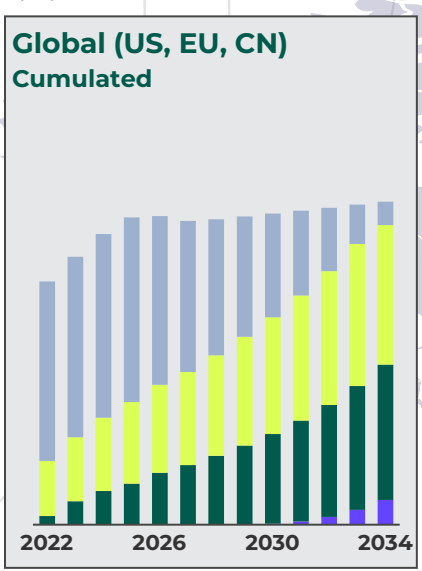
ACC = Automated cruise control, LKA = Lane keeping assist, ODD = Operational Design Domain

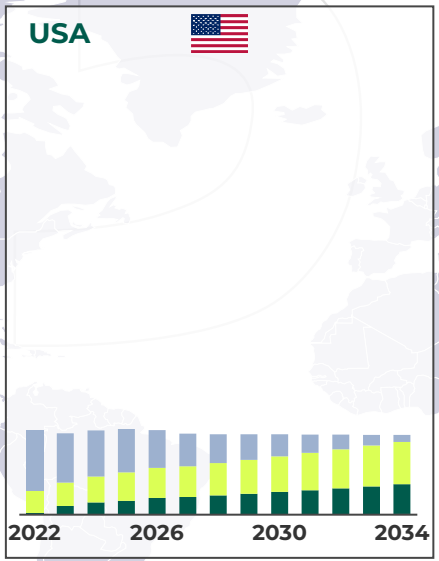
Exemplary P3 market model base case – numbers upon request

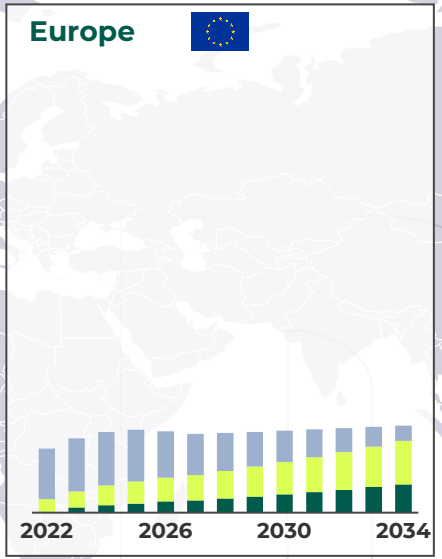
ADAS becomes standard, while large-scale L3 is not yet in sight. Yet, the fast-growing ADAS market provides opportunities to be taken.

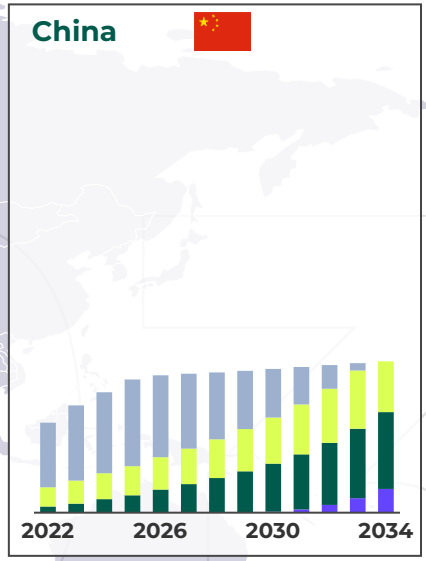
Level 1 | Level 2+ | Level 2 | Level 3

TOTAL SOLD PASSENGER VEHICLE NUMBERS PER SAE LEVEL* *[units per annum, without considering SAE-Level 0, Level 4/5 share]***









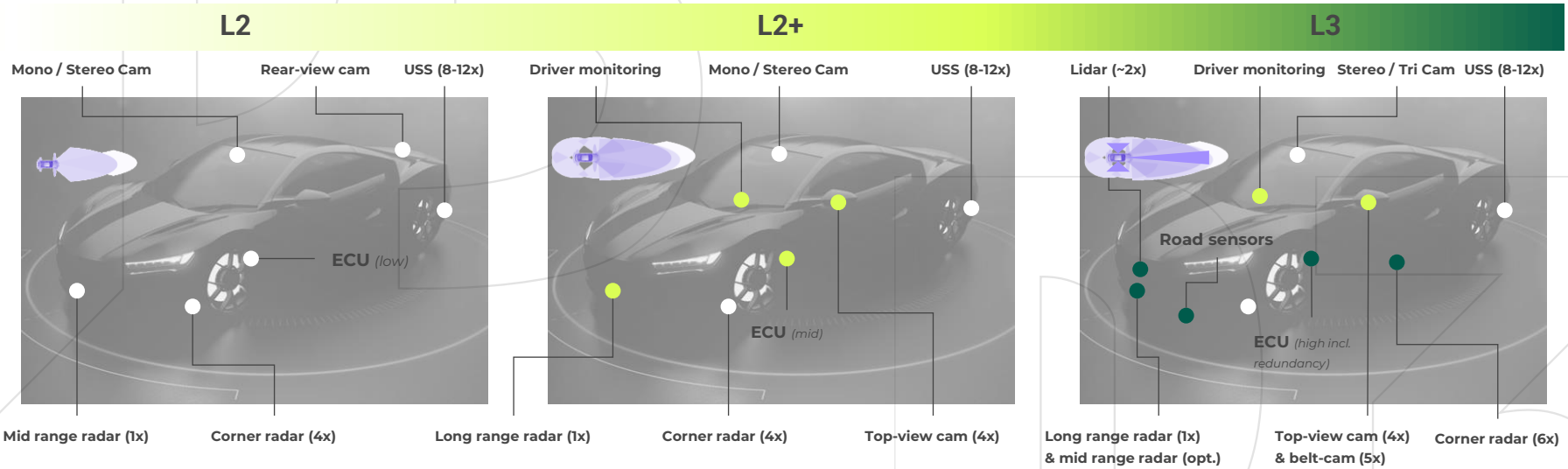
- **Scenario-based modelling with the P3 market model** allows to explore different diffusion patterns based on chosen assumption set.
- **Virtually every vehicle will be automized by 2030** – higher automation levels are on the rise, but L3+ yet lacks attractive price-performance ratio.
- **Chinese market expected to have faster diffusion of higher SAE levels.** ADAS functionalities as differentiating factor in vehicle purchase.

* Number of sold passenger vehicles on request
** Unit sales based on statista data. Diffusion patterns of SAE level based on P3 market model

Exemplary

Increasing automation levels and new functions require a multitude of new hardware components and software.

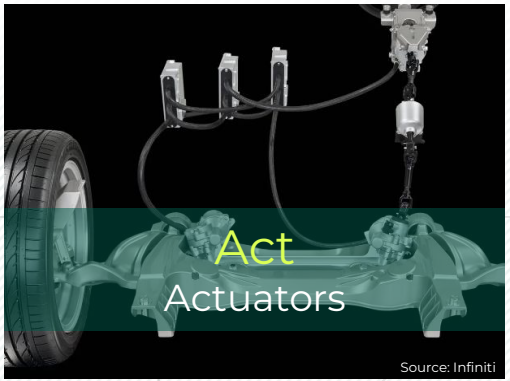
Related HW setup



The challenge for OEMs lies in **balancing the increased costs** associated with the advanced hardware required for higher autonomy while ensuring **pricing stays attractive to end-users** and justifies the **added customer value.**

○ Components for L2 ● Additional components for L2+ ● Additional components for L3

Developments and technology trends happen across whole sense-plan-act framework which P3 monitors closely



Radars | **Lidars** | **Cameras** | **ECU** | **SoC** | **Steer-by-wire** | **Brake-by-wire**

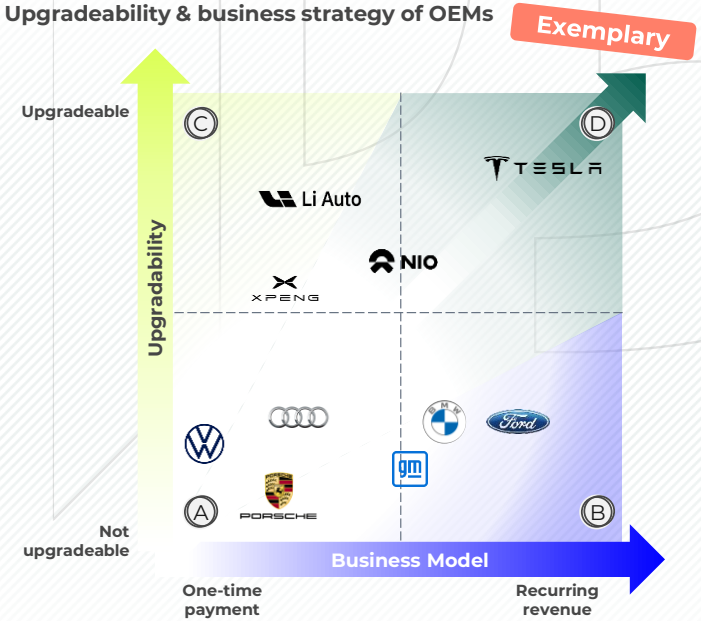
Market development hypothesis

- **Camera**: **Strong growth expected** due to automation. Product will be highly commoditized
- **Radar**: **4D radars**, combined with cameras, will be the leading sensor modality for all <SAE L3 applications.
- **LiDAR**: The advancements in imaging radar performance, **need for LiDAR being reassessed** by industry players.

- Intelligence moves from sensor towards centralized high-performance **ECUs**.
- **Reliable functions required** for higher automation levels that is mostly achieved through **redundancy**.
- AI-driven development and training methods for SDS SW require high performance **SoC and ECU**.

- European OEMs are starting to **implement Brake-by-Wire/ (front-axle) Steer-by-Wire systems (e.g. Mercedes-Benz in 2026)**.
- Brake-by-Wire technology is **pushed** by **premium European OEMs**.
- Steer-by-wire technology **reduces the mechanical complexity** in back wheel steering leading to more widespread adoption.

ADAS is increasingly seen as a differentiating factor that is gaining in importance and, depending on the approach, will also enable new business models.



A Classic package approach

- Currently still predominant strategy for ADAS functions
- One-time purchase of ADAS functions with unlimited access for customer leads to direct one-time revenue
- Generally higher portfolio variation & complexity due to specific HW/SW sets for cost optimization

B Function subscriptions approach

- Initial purchase in combination with subscription based-model after defined use time or subscription only model leads to recurring revenue for OEMs
- Potential increased initial cost for OEMs to equip vehicles with necessary hardware for later function activation, but reduced portfolio complexity

C Upgradeable package approach

- Extensive hardware setup, enabling future upgrades in functionalities and automation levels Potential for future revenue by already sold vehicle by software w/o further hardware investment

D SW-driven upgrade & subscriptions approach

- Future-proof hardware setup enabling future upgrades through software in combination with on-demand subscription model enables recurring revenue and future one-time purchases with already sold vehicles without hardware adaption

The first players are already working on providing lasting **customer value and brand differentiation through ADAS**. This is both a challenge and an opportunity that requires a considered approach on the **business model and technology side** (upgradeability).

P3 Approach.

P3 Approach & Methodology

Focus on ADAS Driving & Parking Functions

Steps of P3 Approach	Guiding Questions
1 Analysis and benchmark of the ADAS function portfolio from different OEM	Which ADAS function packages does the OEM offer? What ADAS functions do the function packages include?
2 Baselining ADAS function portfolios of OEM in the main markets EU, China and USA	Which of the ADAS functions are similarly offered by several OEM?
3 Clustering of the baselined ADAS functions	In which categories should the ADAS functions be clustered?
4 Allocation of the functions into the ODD/operational area for each player and market	Which ADAS functions does P3 consider to be offered and ready to use in which ODD (urban, highway, rural) in main markets?

Outcome: Generic ADAS function list applicable for every OEM adapted to the function portfolio and availability in the main global markets.

P3 Definition of ADAS Level 2/2+ Function Packages (I/II)

Focus on ADAS Driving & Parking Functions

Area	Adaptive Cruise Control (ACC)	Lane Keeping Assist (LKA)	Lane Change Assist (LCA)
SAE Level	Categorization to L2 & L2+*, depends on required hands-on or temp. hands-off availability under suitable conditions (e.g., on highway)		L2: Hands-on required L2+*: Enables the driver to trigger the lane change and take off hands during maneuver
Highway	ACC maintains a constant speed and safe following distance.	LKA provides additional safety by keeping the vehicle centered in its lane, especially at higher speeds.	LCA ensures safe lane changes at high speeds by monitoring fast-approaching vehicles, warning the driver, and potentially intervening to prevent collisions.
Rural			LCA helps drivers safely change lanes at higher speeds by monitoring blind spots and traffic.
Urban	ACC handles frequent stop-and-go traffic by automatically braking and accelerating.	LKA is used for navigating tight, congested streets by preventing unintentional lane departure.	LCA helps drivers safely change lanes by monitoring blind spots and traffic, especially in heavy traffic.

* No automation level officially defined by SAE

P3 Definition of ADAS Level 2/2+ Function Packages (II/II)

Focus on ADAS Driving & Parking Functions

Area	Traffic Sign Assist (TSA)	Traffic Light Assist (TLA)	Navigation on Pilot (NoP)
SAE Level	L2 functions due to independency from hands-on/hands-off mode		SAE L2+* if hands-off is enabled under suitable conditions (e.g. highway)
Highway	Recognizes and displays traffic signs, such as speed limits.	Traffic lights are less common on highways. However, in some countries, there are highway interchanges where traffic lights are installed.	Handles highway entry and exit ramps autonomously, ensuring smooth transition. Executes safe lane changes by monitoring traffic.
Rural		Informs the driver about the status of traffic lights to help navigate busy intersections safely and efficiently.	Navigates complex intersections, identifies pedestrians, cyclists and other objects.
Urban	Informs the driver about current speed limits, entry restrictions, and other regulatory signs.		Navigates complex intersections, identifies pedestrians and cyclists, manages tight spaces and heavy traffic.

* No automation level officially defined by SAE

P3 Definition of ADAS Level 3 Function Packages

Focus on ADAS Driving & Parking Functions

	Traffic Jam Pilot	Highway Pilot	Urban Pilot
Definition	Autonomous driving system for congested traffic conditions at lower speeds, only on highway. It manages acceleration, braking, and steering without driver intervention.	Enables autonomous driving on highways at higher speeds, operating under certain conditions (e.g. clear road markings or moderate traffic).	Controls the vehicle in city environments, handling tasks like navigating intersections, detecting pedestrians, and obeying traffic signals.
Level 2/2+ Functions included	• Lane Keeping Assist • Adaptive Cruise Control	• Lane Change Assist • Lane Keeping Assist • Adaptive Cruise Control • Traffic Sign Assist	• Lane Change Assist • Lane Keeping Assist • Adaptive Cruise Control • Traffic Sign Assist • Traffic Light Assist

P3 Definition of ADAS Parking Functions

Focus on ADAS Driving & Parking Functions

	 Parking (forward, reverse etc.)	 Remote Parking	 Trained Parking	 Reverse Assist	 Maneuver Assist
SAE Level	L2 (L2+* if hands-off is possible)	L3 or L4	L2+* if hands-off is possible		
Definition	Vehicle is able to drive and back automated into a parking space, typically used for perpendicular or angled parking.	Vehicle parks itself while being controlled externally by the driver using a smartphone app, key fob, or another remote interface. The system autonomously handles actuators, allowing the driver to park or retrieve the vehicle from a short distance without being inside it.	Vehicle is able to learn and repeat a specific parking maneuver based on previous driver inputs. Vehicle records the exact path taken to park in a particular location (e.g. home garage or designated parking spot).	Vehicle reverses by tracking and replicating its previous path or by actively detecting obstacles and adjusting its trajectory. The vehicle is able to back up without driver intervention or with minimal input.	Vehicle navigates low-speed, complex driving situations, such as tight turns, narrow passages, or obstacle avoidance in confined spaces. This feature enhances vehicle control and reduces driver effort in challenging maneuvering scenarios.

* No automation level officially defined by SAE

ADAS One Pager Structure

Consideration of most advanced ADAS vehicle

Overview of the availability of L2/L2+ and L3 ADAS function packages in different ODD

Achieved SAE-Level

Urban | SAE-Level 2 | Rural | SAE-Level 2+ | Highway | SAE-Level 3

ADAS Function & Supplier Overview*

Function	ACC	LKA	LCA	TLR	NoP	Traffic Jam Pilot
Urban			-		-	-
Rural			-		-	
Highway						

Parking Functions				
Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist

Available | – Not available | N/A

Overview of the existing parking functions

ADAS Snapshot

- The L2 **BMW Driving Assistant Professional** is available in many BMW models and is often offered as part of a larger package that includes several driver assistance systems.
- The **Hands-Off Driving Feature** is available on highways **up to 130 km/h (L2+)** with triggered lane changes.
- **BMW Personal Pilot L3** function can be ordered for the **BMW** highways with barriers separating traffic, for **up to 60km/h. E** to **detect emergency vehicles**.
- L3 function will be offered exclu in **Germany** priced at 6,
- The BMW P conjunction with the relevant BMW Connected

Specific information regarding ADAS functions

Sensor Setup***

- 6x cameras
- 7x radars
- 2x lidar
- ~2x mic.

Sensor Setup of the most advanced ADAS vehicle

Market Availability

L2 | L2 | L2 | L3

SAE-Level availability in the global market (focus on EU, USA, China / add. markets in case of ADAS feature highlights)

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW

- Upo quest -

Overview on relevant components and the related suppliers for ADAS

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS.EU Players

ADAS Status, Evaluation & Latest News

Source: BMW Group

ADAS EU | BMW

UPDATE

Consideration of most advanced ADAS vehicle

Urban | SAE-Level 2 | Rural | SAE-Level 2+ | Highway | SAE-Level 3

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-			-		-						
Rural			-			-			-					
Highway														

Available | – Not available | N/A

ADAS Snapshot

- The L2 **BMW Driving Assistant Professional** is available in many BMW models and is often offered as part of a larger package that includes several driver assistance systems.
- The **Hands-Off Driving Feature** is available on highways **up to 130 km/h (L2+)** with triggered lane changes.
- The L2 and L2+ features are easily **activated with one single button on the steering wheel** and **deactivated via braking or "over-steering"**.
- **BMW Personal Pilot L3** function can be ordered for the **BMW 7 Series.** L3 only works on highways with barriers separating traffic, for **up to 60km/h. Exterior microphones** are used to **detect emergency vehicles**.
- L3 function will be offered exclusively in **Germany** priced at €3,500 (incl. VAT) for end-customers.
- The BMW Personal Pilot L3 is only available in conjunction with the relevant BMW Connected Drive services. The period of validity for these services is **two years.**

Sensor Setup***

- 6x cameras
- 7x radars
- 2x lidar
- ~2x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS EU | Mercedes-Benz

Consideration of most advanced ADAS vehicle

Urban | SAE-Level 2 | Rural | SAE-Level 2+ | Highway | SAE-Level 3

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-			-		-						-
Rural			-			-			-					
Highway														

Available | – Not available | N/A

ADAS Snapshot

- The L3 System **“DRIVE PILOT”** will be available in the U.S. market (Nevada) as an option for model year 2024 Mercedes-Benz **S-Class** and **EQS Sedan** models.
- **DRIVE PILOT** takes over the dynamic driving task, **up to the speed of 95 km/h** on German highways. Once conditions are suitable, the system indicates availability on the control buttons. Microphones are used to detect signals from emergency vehicles. Acoustic road moisture sensor is used to measure the sound level of the spray from the tire on wet roads, to determine impacts on the other sensors.
- The digital **HD map** provides **a three-dimensional image** of the road and the surroundings.
- **L3 function** will be offered **exclusively in Germany and the U.S** (Nevada and California) and is priced between €6,000 (S-Class) and €8,500 (EQS) (incl. VAT) for end-customers.

Sensor Setup***

- 7x cameras
- 5x radars
- 1x lidar
- ~2x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS EU | Volkswagen

Consideration of most advanced ADAS vehicle

Urban: SAE-Level 2 | Rural: SAE-Level 2+ | Highway: SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-			-		-					-	-
Rural			-			-			-					
Highway						-	-		-					

Available | – Not available | N/A

ADAS Snapshot

- The **VW "Travel Assist 2.5"** can be activated via the steering wheel and is available **in ID.4, ID.5, ID.7** and the **ID.BUZZ** as well as in **MQB/MLB-based vehicles (e.g., Passat, Tiguan, Touareg)**
- **Adaptive Cruise Control** is active from 30 km/h, **Lane Keeping Assist** from 65 km/h, and **Lane Change Assist** can perform lane changes at speeds from 90 km/h.
- The optional **hazard warning system** warns you of roadworks or approaching emergency vehicles.
- **The drowsiness detection and emergency assist system** automatically alerts unfocused drivers via the instrument cluster and can autonomously stop the vehicle when needed via lane change. **The emergency assist is not available yet in current VW vehicle models.**
- The **ADAS stack for ID.7** is estimated to cost around €1,990 for end-customers.

Sensor Setup***

- 5x cameras
- 3x radars
- 0x lidar
- 0x mic.

Market Availability

L2 (EU) | L2 (US) | L2 (China) | L2 (Germany)

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS EU

P3 Evaluation

In our P3 ADAS Benchmark EU 2025, BMW 5 series showed **the strongest system performance** especially regarding the **level 2+ function** and **availability on highways**. **Extensive set of parking functions** was tested with advanced performance.

Update

For early 2025 Mercedes plans **L3 Highway Pilot** up to 95 km/h after final permission in December 2024.
In the P3 ADAS Benchmark EU 2025, Mercedes-Benz EQE showed **well-working L2 function** with **high availability on highways and rural roads** that also provides acceptable support in urban areas.

Update

Volkswagen's ADAS strategy is built on a combination of **internal development through Cariad** and **strategic partnerships with industry leaders** like Bosch, Horizon Robotics, Qualcomm, Valeo and Mobileye, while also **focusing on localization** for specific regions like China.
In the P3 ADAS Benchmark EU, VW ID.7 showed smooth performance of LKA and ACC on highways, automatic speed adjustment and reduction when approach roundabouts. Poor parking camera resolution quality.

Update

Latest news

Here and BMW extend partnership on AI-powered mapping system.
(08.01.2025)

BMW implements vehicles leaving the factory autonomously via infrastructure-based sensors placed outside the vehicle.
(24.11.2024)

Mercedes announced to launch its steer-by-wire system as first German OEM in 2026.

(22.04.2025)

Mercedes announced to launch a Navigation-on-Pilot function (L2+) in the new CLA in China developed together with Momenta.
(22.04.2025)

Update

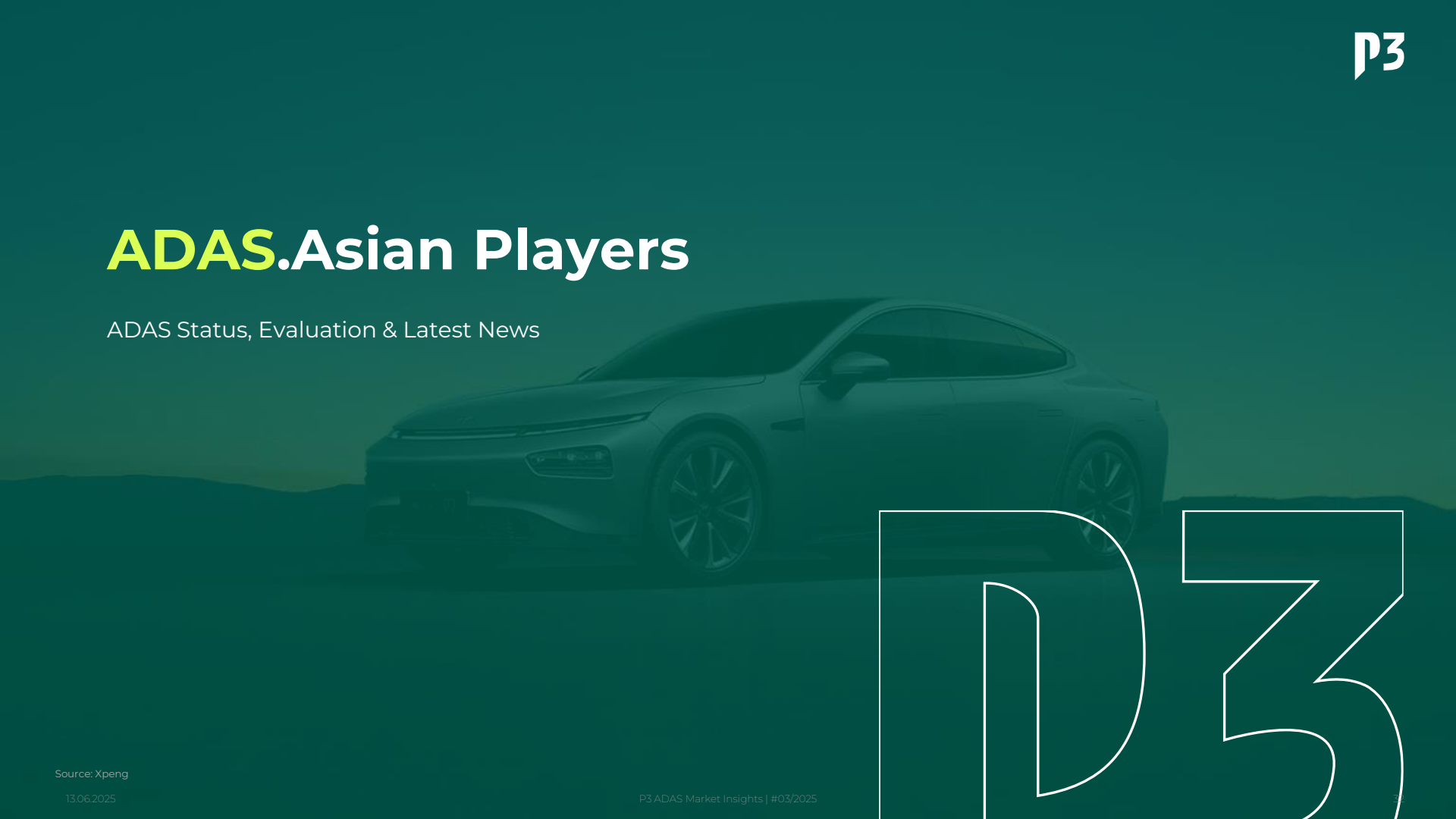
VW announced AI-powered ADAS up to L2++ and L3 in China for China through joint venture between CARIAD and Horizon Robotics using AI-driven GAIA platform.
(18.04.2025)

VW Group cooperates with Valeo and Mobileye to enhance driver assistance up to L2+ in future MQB platform-based vehicles.
(25.03.2025)

Update

ADAS.Asian Players

ADAS Status, Evaluation & Latest News



Source: Xpeng

ADAS Asia | Xiaomi

UPDATE

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking[1]	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban						-		-	-					
Rural						-			-			-	-	-
Highway							-		-					

Available – Not available N/A

ADAS Snapshot

- Xiaomi Pilot Pro, an in-house developed ADAS system, is available on the Xiaomi SU7 with **NoP activation via steering wheel button** (but limited availability in complex city situations).
- The ADAS stack is estimated to cost around €4,050 for end-customers.
- Some insights from P3 ADAS Benchmark Events (China) in 2024 show:
  - The system faces **challenges with lane control**, and it lacks comfort features such as FCA distance warnings.
  - It struggles with **ACC and LKA disengagements**, along with limited recognition of traffic signs, leading to frequent interventions for lane control.

Sensor Setup***

- 11x cameras
- 3x radars
- 1x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

[1] Chinese players usually rely on Parking Space to Parking Space functionality with automated parking

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | XPENG

UPDATE

Consideration of most advanced ADAS vehicle

Urban | SAE-Level 2+ | Rural | SAE-Level 2+ | Highway | SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking[1]	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban						-		-	-					
Rural						-			-				-	-
Highway							-		-					

Available | – Not available | N/A

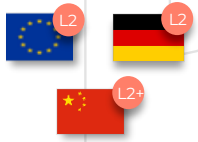
ADAS Snapshot

- Xpeng's "XNGP" (Xpeng Navigation Guided Pilot) ADAS system is available on the **P5, P7, P7+, G9, G6 and X9 models**, emphasizing **Xpeng's proprietary AD software** as a key market differentiator.
- The ADAS stack in these models to cost around €4,050 for end-customers.
- The **AI Valet Driving feature in XOS 5.1.0 can memorize and customize up to 10 driving routes of up to 100 km** each during manual driving, functioning independently of XNGP's availability.
- L2+ system includes **Xpeng's in-house developed mid-range LiDARs** and a user-friendly HMI that supports **lane change visualizations** and **NoP functionalities** in various driving scenarios.

Sensor Setup***

- 11x cameras
- 5x radars
- 2x lidar
- 0x mic.

Market Availability



Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

[1] Chinese players usually rely on Parking Space to Parking Space functionality with automated parking

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Li Auto

Li Auto

UPDATE

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2+	Rural	SAE-Level 2+	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking[1]	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban						-		-	-					
Rural						-			-				-	-
Highway							-		-					

Available – Not available N/A

ADAS Snapshot

- The most advanced ADAS system from Li Auto **Li AD Max** is installed in the flagship vehicle **Li L9**, in the **Max versions Li L6, Li L7** and **Li L8** as well as in the **Li MEGA**.
- The **ADAS stack** in these models to cost around **€3,950** for end-customers.
- The system features **fast processing of sensor data** through the use of **two NVIDIA Orin-X** chips.
- With the introduction of the **MindVLA architecture** in the **2025 models**, such as the updated Li L6, the system is supported by the new **NVIDIA Thor-U chip** for enhanced processing performance.
- The full-scenario **Navigation on Autopilot (NOA)** system now offers **nationwide coverage** across highways, urban ring roads, city streets and campus roads.

Sensor Setup***

- 11x cameras
- 1x radars
- 1x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

[1] Chinese players usually rely on Parking Space to Parking Space functionality with automated parking

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Seres (Aito M9)

UPDATE

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2+	Rural	SAE-Level 2+	Highway	SAE-Level 2+

ADAS Function & Supplier Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking[1]	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban						-		-	-					
Rural						-			-			-	-	-
Highway							-		-					

Available – Not available N/A

ADAS Snapshot

- The ADAS stack is estimated to cost around **€2,850 (with ADS 2.0)** for end-customers. With updated ADS versions **3.3** and **4.0**, **costs for ADAS stack will be higher**.
- The NoP system, with **its smooth, announced maneuvers, builds high trust**. Minor issues include occasional manual overtaking and aggressive lane-changing in dense traffic.
- In China, the **Aito M5 was introduced in 2025 with ADS 2.0** as well as the **facelift of the M9 with updated Huawei ADS 3.3 version**.
- Roll-out of **ADS 4.0 for Aito M9** vehicles was announced for **July 2025** with **four versions where extensive ADAS features** (e.g., SAE L3 driving on highways, navigation from parking space to parking space (P2P 2.0)) are expected. **ADS 4.0** is based on the **new "WEWA" architecture** (World Engine in the Cloud, World Action Model) to **enable enhanced human-machine co-driving experience**.

Sensor Setup***

- 11x cameras
- 3x radars
- 1x lidar
- 0x mic.

Market Availability

L2+

Soon SAE L3 capabilties on highways

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

[1] Chinese players usually rely on Parking Space to Parking Space functionality with automated parking

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | BYD

NEW

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2+	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking[1]	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban			-					-	-			-	-	-
Rural			-						-					
Highway							-		-					

Available – Not available N/A

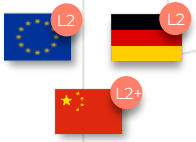
ADAS Snapshot

- BYD with strong ADAS performance and extensive feature portfolio in China.
  - BYD released the **DiPilot Advanced Intelligent Driving Assistance System** with **different versions (DiPilot 100, 300, 600)** and **different sensor modalities**, e.g. for LiDAR and camera.
  - **Navigation on Autopilot (NOA)** in addition to NoP included covering automatic overtaking and automated lane changes.
- Yangwang U8 is capable of rotating nearly 360 degrees on the spot by spinning the left and right wheels in opposite directions which underlines exotic ADAS features of Chinese OEMs to provide USPs to Chinese customers.
- **Automated Valet Parking** in addition other parking functions which encompasses drop-off and go and auto park after lock.
- The **ADAS stack** for **vehicle models** for **European** market to cost around **€2,220** for end-customers.

Sensor Setup***

- 11x cameras
- 3x radars
- ~3x lidar
- 0x mic.

Market Availability



Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

[1] Chinese players usually rely on Parking Space to Parking Space functionality with automated parking

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Honda

NEW

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 3 [1]

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban			-			-		-	-		-	-	-	-
Rural			-			-			-					
Highway						-	-		only in Japan					

Available | – Not available | N/A

ADAS Snapshot

- Honda divides its ADAS system according to performance into **Honda Sensing 360, 360+ and Elite**.
- Compared to the Sensing 360 package with basic ADAS functions, the **Honda Sensing 360+** package includes additional features such as **Active Lane Change Assist** or **driver monitoring system**.
- Honda Sensing 360+ was **launched in 2023** and is currently **only available in China**.
- Honda's **most advanced ADAS system** is called **Sensing Elite** and features a **Traffic Jam Pilot on highways** at low speeds (L3). However, this system is only available in the **Honda Legend** (2025) **and in Japan[1].**

Sensor Setup***

- 5x cameras
- 5x radars
- 0x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Hyundai

NEW

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban			-			-		-	-			-	-	-
Rural			-			-			-					
Highway						-	-		-					

Available – Not available N/A

ADAS Snapshot

- Hyundai's ADAS system is called **Hyundai Smart Sense**.
- The **Highway Driving Assist** feature from Hyundai Smart Sense with **ACC, LCA** and **Speed Limit Adaption** is included in the Elantra, Sonata, Kona, Santa Cruz, Tucson, Santa Fe and Palisade models and is active at vehicle speeds of **up to 150 km/h**.
- The more advanced ADAS system, known as **Highway Driving Assist II**, adds a **lane change feature** that is available at highway speeds **from 60 km/h**. It is included in the Palisade, IONIQ 5 and IONIQ 6 vehicles.
- The **Hyundai Remote Smart Parking Assist 2** enables **Smart Parking**, **Remote Parking** and Remote Moving **Forward** and **Backward**.
- The **ADAS feature package** for the **L2+ system** to cost around **€4,500 on top** for end-customers.

Sensor Setup***

- 5x cameras
- 3x radars
- 0x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Toyota

NEW

Consideration of most advanced ADAS vehicle

Urban | SAE-Level 2 | Rural | SAE-Level 2 | Highway | SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban			-		-	-		-	-		-		-	-
Rural			-		-	-			-					
Highway					-	-	-		-					

Available | – Not available | N/A

ADAS Snapshot

- Toyota's ADAS system is called **T-Mate** and includes **Toyota Safety Sense (TSS)** and **Toyota Parking Assistance**.
- TSS compromises the systems **ACC, LKA, and TSR** whereby Toyota Parking Assistance offers **Automated and Trained Parking**.
- T-Mate also has a **Driver Monitoring System** to monitor **driver alertness** and **condition**.
- The Toyota Group's **most advanced ADAS system** is called **Lexus Safety System+** and is used in its **Lexus** car brand.
- The supplementary **Lexus CoDrive** includes **dynamic ACC** and **Lane Change Assist** at speeds **above 90 km/h**.
- Lexus CoDrive is included in the **Lexus LS models**.
- The **ADAS feature package** for the **L2+ system** to cost around **€4200** in dedicated markets for end-customers.

Sensor Setup***

- 7x cameras
- 2x radars
- 2x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Nissan

NEW

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban			-		-	-		-	-		-		-	-
Rural			-		-	-			-					
Highway					-		-		-					

Available | - Not available | N/A

ADAS Snapshot

- Nissan's most advanced ADAS system is called **ProPILOT 2.0** which is available without additional cost.
- **ProPILOT 2.0** enables **hands-off driving** in a **single lane on designated highways** with one-way traffic. The system assists the driver, including **overtaking, lane changes** and **exiting** (L2+ system).
  - ProPILOT 2.0 is only available in the **Japanese** and **North American markets**.
- The **ProPILOT Park** enables **Automated and Trained parking**.

Sensor Setup***

- 7x cameras
- 5x radars
- 0x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia | Polestar

NEW

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 2

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking[1]	Reverse Assist	Maneuver Assist
Urban			-		-	-		-	-	-	-	-	-	-
Rural			-		-	-			-					
Highway			-		-	-	-		-					

Available | – Not available | N/A

ADAS Snapshot

- Polestar's most advanced ADAS system is called **Pilot Assist.**
- Pilot Assist has **basic ADAS functions** such as ACC, LKA and TSR and can provide **Steering Assistance** when changing lanes.
- Polestar wants to integrate **Luminar's lidar technology** and **Mobileye's chauffeur platform** in future models of its **Polestar 4**.
- The **ADAS stack** for **vehicle models** for **European** market to cost around **€1,770** for end-customers.

Sensor Setup***

- 11x cameras
- 1x radars
- 0x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS Asia

P3 Evaluation

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. During ADAS Benchmark Event in China 2025, SU7 showed **average ADAS performance**.
After fatal crash, Xiaomi has to prove again system reliability towards general public and authorities.

Update

XNGP excels with a **robust ADAS and user-friendly HMI**, with drawbacks like harsh acceleration and low refresh rate for the digital rearview mirror. In 2024, new P7+ was announced equipped with **cameras and radar sensors presumably comparable to LiDAR performance costly LiDAR** technology was removed from ADAS sensor set.

Update

Strong performance of ADAS NOP with **high availability** (but city cases limited). The AD Max and Pro systems were tested during ADAS Benchmark Event in China 2025 where the L9 above-average ADAS performance. Li Auto offers a **smooth driving experience** and **utilizes ADAS hardware components from well known suppliers**.

Ji Yue 01 excels in **NoP performance on main roads**, boasting **best availability in its class**. Vision-only approach based on Baidu's Apollo AD System and HMI with advanced visualization of system on a big screen proves the system performance.

Latest news

Xiaomi announced the upcoming model YU7 to be launched in July 2025.

(23.05.2025)

Xiaomi SU7 was involved in a deadly accident during activated ADAS functions.

(01.04.2025)

Update

XPENG launched at Shanghai Autoshow 2025 the XPENG World Foundation Model with several times more parameters than conventional models, enabling real-time adaptation to complex driving scenarios.

(23.04.2025)

Update

Li Auto launched Li Mega at Shanghai Autoshow 2025 which is based on next generation autonomous driving architecture “MindVLA”.

(23.04.2025)

Update

Geely & Baidu JV Jiyue cuts projects due to [illegible] but denies bankruptcy.

(12.12.2024)

Ji Yue was disbanded overnight after going bankrupt (26.12.2024)

ADAS Asia

P3 Evaluation

Aito M9 is the **highest-rated vehicle in its peer group**. It excels in setting the **correct speed 90% of the time and parking quickly in tight spaces**. Explainable AI through announcement of every automatically performed maneuver e.g. lane changes. Announced **ADS 4.0 system** from Huawei (Aito is backed by Huawei) will probably be **available in the vehicle models in 2nd half of 2025 with SAE L3 smart driving on highways**.

Update

BYD offers **Level 2 in Europe** and **Level 2+ in China** with larger feature portfolio.
In our **P3 ADAS Benchmark Europe 2025** event, BYD Seal showed **low to medium system performance** with solid availability of Intelligent Cruise Control on highways at speeds higher than 80 km/h. Lane keeping system showed problems while staying in lane.

Update

Honda offers SotA **SAE L2 ADAS features in main global markets**. Through the **partnership with helm.ai** and **Momenta** for next gen ADAS system for SAE L3, **significant ADAS performance advancements** are expected.

Update

Hyundai mainly **"outsourced"** ADAS development, besides major partnerships for SAE L4, to its **subsidiary Hyundai Mobis** where the partnership with Qualcomm can lead to ADAS performance advancements. Hyundai offers in the ADAS segment **L2+ features** in main global markets.

Update

Latest news

Huawei announced deployment of ADS 4.0 with SAE L3 capabilities from July 2025 onwards at Shanghai Autoshow 2025.

(22.04.2025)

Update

BYD announced that base ADAS functions of "God's Eye" will be available for free (without additional costs) along the entire vehicle fleet.

(11.02.2025)

Update

Honda collaborates with Momenta to develop advanced driver assistance systems utilizing DeepSeek AI technologies.

(24.04.2025)

Honda announced to cooperate with helm.ai for next generation ADAS system.

(08.01.2025)

Update

Partnership between Qualcomm and Hyundai Mobis to develop next generation ADAS systems.

(06.01.2025)

Update

ADAS Asia

P3 Evaluation

Toyota offers SotA Level 2 features in main global markets where **partnership between Woven and Waymo** has the potential **to leverage significant knowledge and expertise** for ADAS development.

Update

Nissan offers **NoP (L2+) on US and Japanese highways** with **automated ramp-offs** where they offer SAE L2 features in the EU and China on par with competitors. Partnership with Wayve contributes to **enhance next generation ADAS features significantly**.

Update

Polestar offers a **state-of-the-art L2+ system** in Europe. In our P3 ADAS Benchmark Europe 2025, Polestar 4 showed **average ADAS performance** where settings for **ADAS features can be found easily** via center display. Perception of **new speed limits** and **automated speed adjustment unreliable**.

Update

Latest news

Partnership between Woven (by Toyota) and Waymo to join forces with focus on ADAS development.

(30.04.2025)

Update

Nissan announced to launch next generation of ProPilot technology in 2027 together with Wayve AI Driver.

(10.04.2025)

Update

Polestar announced the new Polestar 5 to be launched in 2025 using LiDAR technology for ADAS.

(15.05.2024)

Update

ADAS.NAR Players

ADAS Status, Evaluation & Latest News

Source: Tesla

ADAS NAR | Tesla

UPDATE

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2+	Rural	SAE-Level 2+	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-					-	-			-	-	Only speed control
Rural			-						-					
Highway							-		-					

Available – Not available N/A

ADAS Snapshot

- Tesla's driver assistance functions are **easily activated via the lever to the right of the steering wheel** where the system available in Europe showed **deviating distances to followed vehicles while using e.g. ACC** during ADAS Benchmark Event 2025.
- The **new FSD V13** is provided via OTA software update for Tesla models equipped with **Hardware 4 (HW4/AI4)** in the U.S. FSD 13.2 significantly improves the **resolution of cameras** and **exterior audio signals** are considered, so that emergency vehicles can be detected. Further, park-to-park and reversing significantly expand functionality.
- The **one-time purchase price for FSD** has been **cut to $7,500** from a high of $15,000 in 2022 for end-customers. Tesla also offers a monthly subscription for FSD, which was reduced to $99 per month in the U.S.
- In Europe, Tesla offers, as of now, L2+ system with only reduced features available from FSD offered in the U.S. **Tesla starts to expand outside USA by receiving a 2-year FSD testing permission in Norway**.
- In 2024, Tesla launched its parking function **Actually Smart Summon (ASS)** where users **call their cars** to them in a **parking lot** or **driveway** using the Tesla app and **the car drives autonomously to them**.

Sensor Setup***

- 9x cameras
- 0x radars
- 0x lidar
- 1x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS NAR | General Motors

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-	-	-	-		-	-		-	-	-	-
Rural			-	-	-	-			-					
Highway				-	-		-		-					

Available | – Not available | N/A

ADAS Snapshot

- **GM's "Super Cruise" L2+ system is available on selected U.S. highways** and can be activated by pressing a button on the steering wheel (when light bar turns green, it is available).
- When it is engaged, **Super Cruise uses a Driver Attention System** that monitors the system status and works to detect your head and eye positioning, reminding you to pay attention to the road.
- In newer versions of Super Cruise which is available in **Cadillac, Chevrolet an GMC models**, the **system can automatically change lanes** proactively in certain situations, like when approaching slower traffic.
- In various Cadillacs, Super Cruise is a $2,855 option or a $25 monthly subscription for end-customers.

Sensor Setup***

- 5x cameras
- 3x radars
- 0x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS NAR | Ford

Consideration of most advanced ADAS vehicle

Urban | SAE-Level 2 | Rural | SAE-Level 2 | Highway | SAE-Level 2+

ADAS Function Overview*

Function	L2/L2+ Functions						L3 Functions			Parking Functions				
	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-	-	-	-		-	-		-	-	-	-
Rural				-	-	-			-					
Highway					-		-		-					

Available | – Not available | N/A

ADAS Snapshot

- **Ford's "BlueCruise"** is available to customers of **Mustang Mach-E, F-150, F-150 Lightning and Expedition** vehicles purchased in countries with designed Highways (Blue Zones).
- It can be used in a **total of 15 European countries**, following approval by the European Commission.
- Drivers using BlueCruise in Blue Zones can drive with **hands off the steering wheel** so long as they continue to pay attention to the road ahead.
- A **driver-facing camera** located below the instrument cluster checks the driver's eye gaze and head position.
- Ford's BlueCruise costs $1,450 for 3 years upfront, or $800/year or $75/month after a trial for end-customers.

Sensor Setup***

~5x cameras

~2x radars

0x lidar

0x mic.

Market Availability

L2+ | L2+ | L2

Supplier Overview**

Camera

Radar

LiDAR

ADAS SW

SoC/ECU

HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS NAR | Rivian

RIVIAN

NEW

Consideration of most advanced ADAS vehicle

Urban | SAE-Level 2 | Rural | SAE-Level 2 | Highway | SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-		-	-		-	-	-	-	-	-	-
Rural			-		-	-			-					
Highway					-	-	-		-					

Available | – Not available | N/A

ADAS Snapshot

- Rivian's **Driver+** ADAS system encompasses **L2 and L2+ features** which are available in the Gen 1 vehicle models (R1T and R1S).
- The most advanced ADAS system **Autonomy Platform+** is available on Gen2 vehicles (model year 2025 and onward) and contains the additional functions **"Lane Change on Command"** and **"Enhanced Highway Assist".**
- **L2+ hands-off feature "Enhanced Highway Assist"** is available only on dedicated highways in USA and Canada. The feature uses **DMS for driver monitoring** and is made available to the R1 via **OTA SW updates.**
- **Driver+ as well as the "Enhanced Highway Assist"** are already **included in the vehicle price** with no additional cost where future pricing seems to include one-time purchase or a subscription model.

Sensor Setup***

- 11x cameras
- 5x radars
- 0x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS NAR | Lucid

NEW

Consideration of most advanced ADAS vehicle

Urban	SAE-Level 2	Rural	SAE-Level 2	Highway	SAE-Level 2+

ADAS Function Overview*

	L2/L2+ Functions						L3 Functions			Parking Functions				
Function	ACC	LKA	LCA	TSR	TLR	NoP	Highway Pilot	Urban Pilot	Traffic Jam Pilot	Automated Parking	Remote Parking	Trained Parking	Reverse Assist	Maneuver Assist
Urban			-		-	-		-	-		-	-	-	-
Rural			-		-	-			-					
Highway					-	-	-		-					

Available – Not available N/A

ADAS Snapshot

- Lucid's ADAS packages are splitted in **DreamDrive** and **DreamDrive Pro** which cover **L2** and **L2+ features.**
- **DreamDrive Pro** has the capability of **hands-off driving in curves on highways**, advanced visualizations in instrument panel, **triggered automated lane changes on highways**, Driver Monitoring System (DMS) and usage of LiDAR technology.
- From model year 2025, DreamDrive will be included as standard in all Lucid Air models.
- DreamDrive Pro is integrated as standard in higher-end models such as the **Lucid Air Grand Touring** and the **Dream Edition** as well as in the **Lucid Gravity** later in 2025.
- The **DreamDrive Pro** to cost around **€4,200 on top** for end-customers.

Sensor Setup***

- 11x cameras
- 5x radars
- 1x lidar
- 0x mic.

Market Availability

Supplier Overview**

- Camera
- Radar
- LiDAR
- ADAS SW
- SoC/ECU
- HD Map

- Upon request -

* Function description on Slide 22-25

** Based on Desk Research. Not considering specific markets Non exhaustive

*** Several USS, not considered in Sensor Setup due to SotA

ADAS NAR

P3 Evaluation

New parking functions serves to **improve the overall user experience** and **functionality** of Tesla's autonomous driving technology. It seems that it will only be available in the U.S.
With the announcement of required **update of Hardware 3 vehicles sold between 2019 and 2023 with Full-Self-Driving (FSD)** represents a **cost-intensive measure** which confirms that **Elon Musk overpromised** regarding its driver assistance system.
In our **P3 ADAS Benchmark Europe 2025 event**, the Tesla Model Y **showed average ADAS performance** with good centering in the lane on all types of roads where new speed limits are often not recognized (correctly).

Update

GM is continuously developing its ADAS functionalities under the name "**Super Cruise"**. With rolling out its L2+ "Super Cruise" system on further models in 2025, competitive advantage to be proven.

Update

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.

Latest news

Tesla achieved two-year exemption for supervised testing of FSD in Norway.

(24.04.2025)

Elon Musk announced that Tesla's equipped with Hardware 3 (older version of computer) will need an update to support unsupervised self-driving software.

(30.01.2025)

Update

GM announced that the L2+ Super Cruise will roll out in more models in 2025.

(12.03.2025)

Cruise's robotaxi service will shut down and cuts 1,000 jobs as GM pulls its funding and integrates AD/ADAS development inhouse.

(10.12.2024/04.02.2025)

Update

Ford announced that SAE L3 function is completely developed in-house and will be offered in the high-class vehicles, planned for 2026.

(05.03.2025)

Update

ADAS NAR

P3 Evaluation

Rivian offers **L2+ system with automated lane change feature** under suitable conditions in the U.S. which has to be triggered manually. Main target market represents the U.S. where footprint in the EU is rather small. This is subject to change due to **partnership with Volkswagen**.

Update

Lucid as premium luxury automaker focuses on **SotA L2 ADAS features** where with new Gravity model, it aims to introduce more advanced features.

Update

Latest news

Rivian announced that enhanced highway assist (L2+) is available in Gen 2 vehicles (R1).

(11.03.2025)

Update

Lucid and Saudi Arabia's KAUST announce partnership to further enhance AD/ADAS capabilities.

(05.05.2025)

Lucid introduced the new Gravity model with further ADAS features beyond "Dream Drive".

(04.12.2024)

Update

Further ADAS-related News.

Further ADAS-related news

Latest news

After expanding to USA, Wayve starts testing their ADAS system in the south of Germany. Additionally, Wayve opened a testing and development center in Japan, accelerating the development of their Embodied AI approach.

#Safety

(22.04.2025)

After US banned AD/ADAS technology from Chnin and Russia, a final rule by NHTSA was set into force to adapt FMVSS No. 127 for mandatory implementation of ADAS features (e.g. AEB) in passenger cars and light-duty vehicles from 2029 onwards.

#Policy

(29.04.2025)

ZHUOYU revealed its new ZYT AD system by implementing AI-driven models aiming for an E2E approach, combination of camera and LiDAR in a single compact unit and increasing computing power through partnership with NVIDIA.

#Technology

(25.04.2025)

According to a survey from AAA in the U.S., 13% of U.S. drivers are willing to ride in AD/ADAS vehicles where six out of ten drivers still report fear towards these vehicles. Another key aspect of the survey is that the confusion of ADAS descriptions and naming have to solved.

#Safety

(03.03.2025)

Chinese authorities (Chinese Ministry of Industry and Information Technology (MIIT)) have directed carmakers to stop using terms “smart driving” and “autonomous driving” in advertisements for ADAS features after fatal Xiaomi SU7 crash.

#Policy

(17.04.2025)

Key Takeaways.

Summary and assessment

UPDATE

Strong performance and functionality of Chinese systems in their home market, especially for Level 2+ systems which have highest market shares in the next years.

		USA	Europe	China
Level 2	Lane keeping & Active Cruise Control	Industry standard	Industry standard	Industry standard
Level 2+	Navigation on Pilot **on Highway**	Available by Tesla FSD Beta and GM, Ford	Available by BMW but limited in performance / ODD	Available for most CN highways
	Navigation on Pilot **in City Routes**	Available by Tesla FSD Beta 12.5.	N/A	Available even in most dense traffic situation in major cities
Level 3	**Traffic Jam Pilot** (max 60 km/h) (no driver supervision)	Limited availability by only small number of OEMs	Limited availability by BMW / MB (extended to 95 km/h)	Legislation pending– planned for 2025
	Highway Pilot (max 130 km/h) (no driver supervision)	Not available yet	Not available yet – planned for 2025	Legislation pending – planned for 2025

As major tipping points have been reached and **wide-spread adoption** is expected, the fierce competition in the ADAS market is intensified by **fast-learning Chinese players which shifted fast to L2+ functions, leveraging local suppliers** and **strong AI capabilities**. OEMs and suppliers need to set a **clear strategic path** to prevail in the market.

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