

# **GAST Automotive Industry & Technology Research Report**

## **No. 909\_July 7, 2023**

**Subject: Recent Developments of Intelligent Connected Vehicles (July 2023)**

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## Latest Developments of the Industry: MIIT Charts the Course of ICV Policies

- On June 21, MIIT said that it would support the commercial application of advanced AD functions (≥L3), release a new version of the guideline for ICV standards, and accelerate the R&D and promotion of key technologies and products

A high penetration rate of L2 (including L2+) AD functions → reaching the critical point of L3. In addition, L2+ functions allow users to experience fully AD features in some use cases

- OEMs successively roll out new vehicle models with enhanced combined driver assistance functions (XPeng, Li Auto, etc. are launching vehicles with City NOA features, which are upgraded from highway NOA systems)
- A raft of vehicle models with L2/L2+ AD functions have been available in the market
  - ✓ In the first four months of 2023, 239,600 passenger cars with NOA options had been delivered, up by 87.63% year on year. The installation rate of NOA reached 20.16%
  - ✓ In the first quarter of 2023, 639,100 vehicles with L2+ driver assistance systems had been delivered, up by 64.21% year on year
  - ✓ In the first quarter of 2023, 46,100 vehicles with C-V2X systems had been delivered, up by 151.91%

The technology path for developing “vehicles, roads, and clouds in an integrated manner” entails progress

- Connected infrastructure is becoming gradually available
  - ✓ 17 test demonstration zones + 16 selected cities for piloting the development of “ICVs and intelligent infrastructure” + 7 national IoV demonstration zones
  - ✓ Have completed the transformation and upgrade of more than 7,000km public roads with intelligent technologies, with over 7,000 sets of connected RSUs set in place
- Rich demonstration application scenarios: more than 15,000km roads have been opened for players to test ICVs

### Development directions of policies for the ICV industry

**Support the commercial application of L3/L3+ AD functions**

- Launch pilot projects for granting market access and permitting ICVs to run on the road, organize city-level demonstration application of “developing vehicles, roads, and clouds in an integrated manner”, and support the commercial application of L3/L3+ AD functions

**Accelerate the amendment of standards**

- Release a new version of the guideline for ICV standards as soon as possible → Focus on the formulation and amendment of standards for functional safety, cybersecurity, operating systems, etc.

**Speed up the R&D and adoption of new technologies and products**

- Move faster to promote the R&D and adoption of new technologies and new products, including key chips, high-precision sensors, operating systems, etc. → Support coordinated innovation activities in which major players play a leading role and small, medium-sized, and large businesses participate
- Accelerate the development of C-V2X, roadside sensors, and edge computing, build cloud control basic platforms based on edge clouds, regional clouds, and central clouds, and develop unified standards for interfaces, data, and communication

- ❑ In a short term, the access verification and potential responsibility costs of L3+ would remain high, whose large-scale adoption would remain to be seen. It is estimated that by the end of 2023, a handful of automakers would pilot the commercial application of L3/L3+ AD functions in pilot cities

## Latest Developments of the Industry: MIIT Supports the Commercial Application of L3/L3+ AD Functions

- To support the commercial application of L3/L3+ AD functions, the Ministry of Public Security promotes the formulation of standards for testing and evaluating the safe operation of ICVs. Meanwhile, Shenzhen is taking active steps to grant such vehicles the market access, which is expected to become the first pilot city in China

### Test and evaluate the safety of ICVs (with L3/L3+ AD functions)

Testing the safety of AD would refer to the driving test for human drivers to a great extent → AD systems are required to have the basic capabilities of human drivers

#### Test vehicles

- In the virtual world: test the core algorithms and rules
- On semi-closed roads: test driving capabilities of the AD system in typical use cases
- On semi-open and public roads: test the environmental adaptability of AVs

AVs should have the following capabilities: featuring basic driving skills, taking act of rescue, warning potential danger, obeying traffic rules, and yielding to pedestrians

The standards for testing and evaluating the safety of AVs are formulated by several ministerial authorities, which would eventually become national mandatory standards

### Permit AVs to access the market (Shenzhen)

In November 2022, MIIT released the Notice on Launching Pilot Projects for Granting ICVs Market Access and Permitting ICVs to Run on the Road (Exposure Draft), requiring the management over the market access of vehicles with L3 and L4 AD functions and launch city-level pilot projects → **Shenzhen took the lead**

- Infrastructure: complete the construction of enclosed parks by the second half of 2023 to test vehicles with L3/L4 AD functions
- License plates: release official license plates to ICVs by the end of 2023, which means that the standards for granting ICVs market access would also be issued by the end of 2023 → Vehicles with L3+ AD functions would be sold to private users in the market in Shenzhen

Allowing AVs to be sold in the market entails pilot projects. Once permitted to be sold, AVs would embrace massive production → leading automakers would have the priority

- **The progress of policies for “safety test + market access” can lay the foundation for the large-scale application of AVs from the perspective of policy → The government is attempting to commercialize advanced AD technologies**

## Latest Developments of the Industry: Gradually Implement the Standards for Securing ICV Data

- Recently, MIIT released the *Intelligent and Connected Vehicle — Data Storage System for Autonomous Driving (exposure draft)* and Beijing issued the *Measures for Managing Data Security in the ICV Policy Pilot Zone (trial implementation)* and established a data governance center

### *Intelligent and Connected Vehicle — Data Storage System for Autonomous Driving* becomes national mandatory standards

- The AD system is required to record **five** types of data, namely the basic information of the vehicle and the data recording system, the status and dynamic information of the vehicle, the running data of the AD system, the information of driving environment, and the operation and status of the driver

- ✓ Make it easy to determine the liability for a traffic accident and to analyze causes → promote the application of AD functions
- ✓ Help companies to avoid risks during the determination of responsibility and improve AD algorithms

### Beijing takes active steps to secure data

- In the middle of May, the Beijing Advanced Autonomous Driving Demonstration Zone released the *Measures for Managing Data Security in the ICV Policy Pilot Zone (trial implementation)* and the *Rules for Managing Data by Classification and Level* on June 30

- ✓ As a wind vane of the ICV industry, the Demonstration Zone introduced the *Measures*, allowing other cities to refer to the “Experience of Beijing” in managing data security

- In the middle of May, the “ICV Data Governance and Innovation Center” was established

- ✓ As a professional platform, the Center will focus on data classification, security evaluation, etc. to help companies to develop feasible data compliance solutions

- By the end of May, the evaluation of the safety of data to be transferred across the border from Hyundai Motor’s all business scenarios was approved (ICMA+DGXC\* for self-evaluation services)

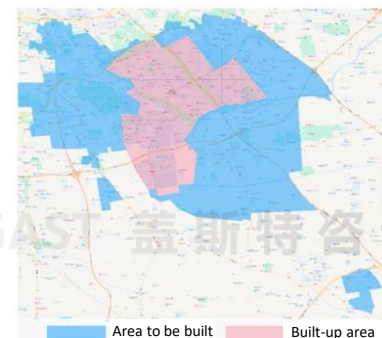
- ✓ Beijing provides a model for evaluating the safety of cross-border transfer of automotive data
- ✓ To better pass the evaluation, automakers can cooperate with professional data service companies and ask them to provide solutions

- **With the principles and measures for managing the security of ICV data becoming gradually available, data security risks of AD would be effectively controlled, which would boost the further application of AD technologies**

## Latest Developments of the Industry: Beijing Promotes the Infrastructure Construction in the Advanced AD Demonstration Zone (1/2)

- The demonstration zone has completed the construction and transformation of infrastructure within the 60 square kilometers in Phase 1.0 and 2.0, and is vigorously promoting the construction of Phase 3.0 with 100 square kilometers as the construction unit

Expand the coverage of vehicle-road cloud integration	<ul style="list-style-type: none"> <li>➢ <b>Phase 1.0/2.0:</b> already cover 329 intersections and 750km (two-way) urban roads in the area of 60 square kilometers, as well as 10km (two-way) of Beijing-Taipei Expressway</li> <li>➢ <b>Phase 3.0:</b> the first area of 100 square kilometers has been built in Yizhuang New Town, involving 157 intersections, and the expansion to 500 square kilometers will be completed in the future</li> </ul>
Upgrade intersections with signal light control	<ul style="list-style-type: none"> <li>➢ <b>Phase 1.0/2.0:</b> ① upgrade and transform 317 intersections in 60 square kilometers → enable network connection and joint control; ② dynamically optimize 257 intersections, including 67 dynamic green wave roads (230 intersections) and 27 single-point adaptive intersections</li> </ul>
Optimize the intersection deployment plan	<ul style="list-style-type: none"> <li>➢ <b>Phase 3.0:</b> adopt differentiated system optimization solutions. Use a low-spec solution when there are no needs for public security and traffic control at intersections. Add law enforcement devices such as electric police bayonet integrated cameras as needed when there are needs for public security and traffic control at intersections</li> </ul>



### Service capabilities begin to take shape

- **All-element perceptual data service:** identify all traffic elements (motor vehicles, non-motor vehicles, pedestrians, obstacles, etc.) within the coverage area, and support the sharing of low-latency and highly reliable perceptual data in various data formats
- **Signal light data service:** transmit signal light data & information and real-time status information, and support red light warning, green wave speed guidance, etc. on a regular basis
- **V2I event reminders:** realize reminder of 12 events including driving in the wrong direction, occupying-road construction, vehicle failures, abnormal parking, speed limit reminders, bus lane reminders, speeding, pedestrians breaking into motor vehicle lanes, non-motor vehicles breaking into motor vehicle lanes, road congestion, signal light failures, and identification of thrown objects

- ❑ **The coverage of roadside infrastructure will continue to expand as the construction of the demonstration zone forges ahead, and the equipment deployment plan will continue to be optimized according to the needs of the test and demonstration application scenarios → the service capabilities of the demonstration zone will gradually take shape**

## Latest Developments of the Industry: Beijing Promotes the Infrastructure Construction in the Advanced AD Demonstration Zone (2/2)

- C-V2X networks and HD maps are important factors to drive the accelerated development of autonomous driving technologies and improve traffic efficiency

### Speed up the laying of EUTH wireless private network

- **Phase 1.0/2.0:** already cover 278 intersections and 335.6km (two-way) urban roads in the area of 60 square kilometers
- **Phase 3.0:** already launched construction in the first 100 square kilometers, and estimated to complete laying of the private network by mid-2023

- ✓ The communication latency is kept between 5~9ms, the uplink/downlink packet loss rate is around 0.008~0.2%, the uplink/downlink throughput rate is around 80~90Mbps, and the success rate of base station switching is retained at 100%
- ✓ Support services such as smart transportation, intelligent connected buses and comprehensive urban management, city smart brain, etc.
- ✓ Currently support tests and applications of intelligent connected buses, and sanitation vehicles, etc.

### Build HD map capabilities

- Enrich the map content (including non-motor vehicle lanes, associated signal lights, stop lines, etc.) based on the demands of test companies
- Expand to 46 standardized map APIs, and release the standardized map message interface RSU map
- Integrate dynamic and static data both on the vehicle and road ends → directly display on the map APP of the consumer end

- ✓ The entire demonstration zone supports using Baidu map and Tencent map to offer users functions and services such as light status reminders, electronic fences, lane-level event reminders, etc.



- ❑ **The C-V2X network has been providing information services for autonomous vehicles and production vehicles in the demonstration zone, supporting regular tests; to improve HD map service capabilities, the demonstration zone has joined hands with map vendors to explore the technology of updating maps by crowdsourcing**



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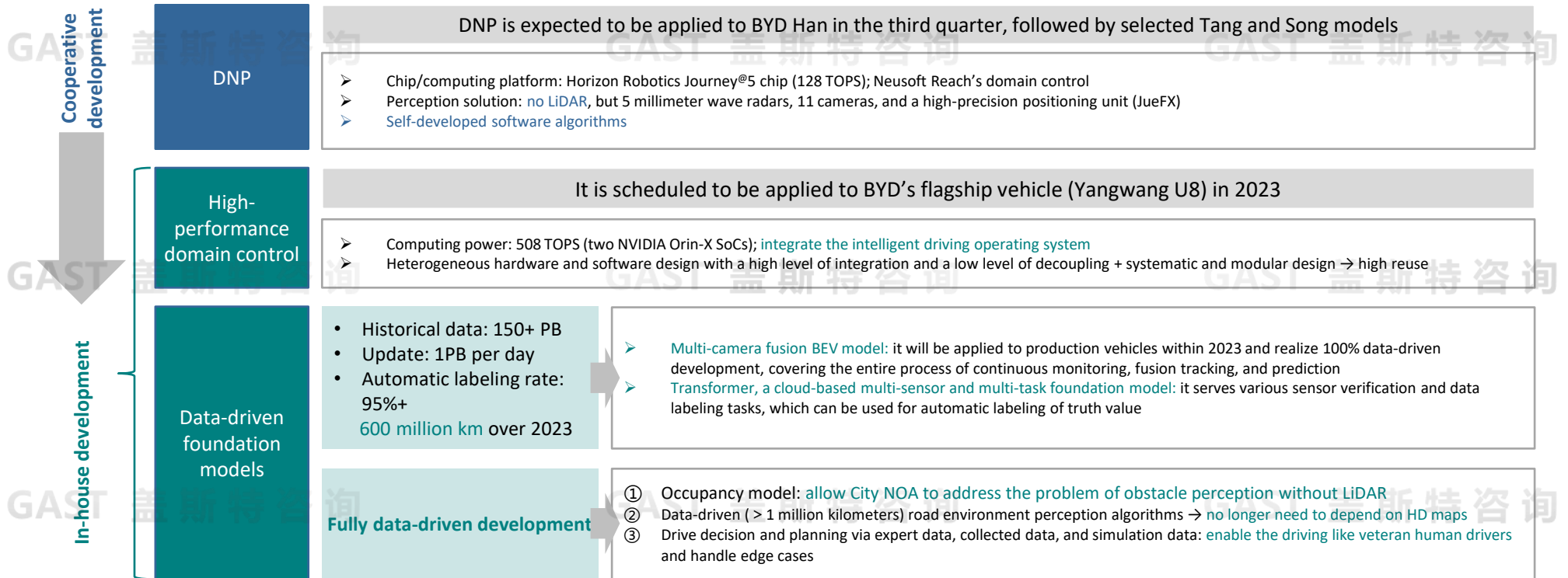
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## Latest Moves of OEMs: BYD's Strategy for Intelligent Driving Technologies

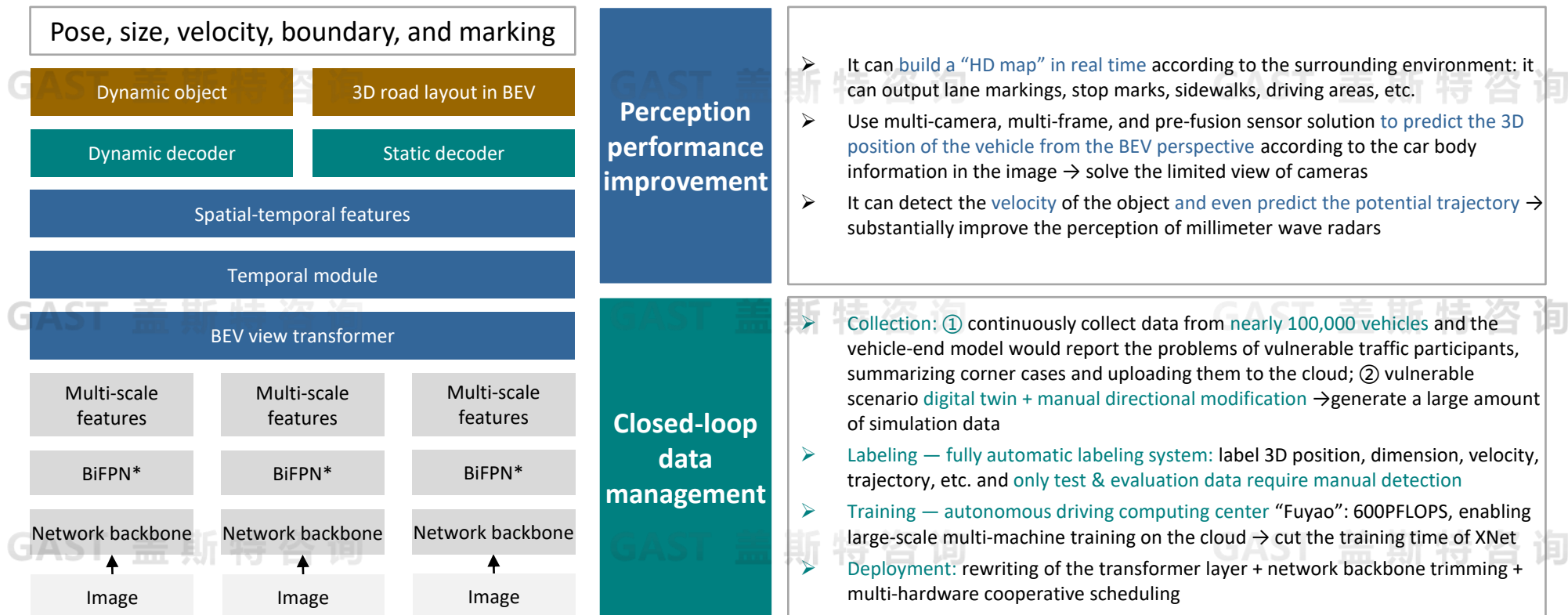
- BYD plans to apply Highway NOA, high-performance domain control, and BEV-based perception model to production vehicles, accumulating the expertise of data-driven foundation models



- Through multi-party cooperation, BYD has initially been able to self-develop intelligent driving technologies. After the application to production vehicles, BYD would accumulate data rapidly. However, the actual improvement of intelligent driving technologies brought by data-driven foundation models remains to be seen

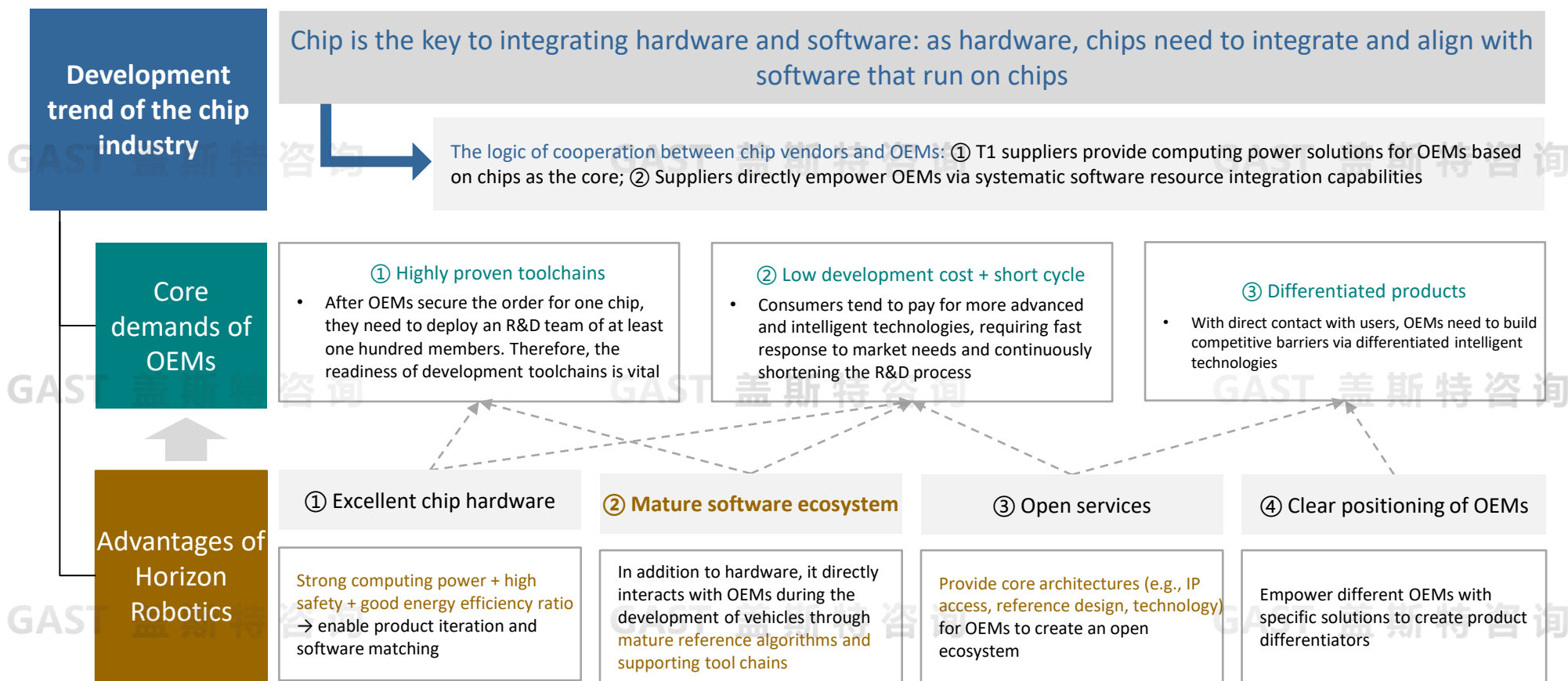
## Latest Moves of OEMs: XPeng's Perception Architecture XNet

- XNet is the core technology for XPeng's ADAS system to go without maps in all scenarios



- ❑ While relying on HD maps to enable ADAS functions, XPeng is developing perception technologies without HD maps, which may accelerate the application of City NOA → thus accelerating the algorithm iteration based on closed-loop data management

# Latest Moves of Chip Vendors: Horizon Robotics and Automakers



❑ **The core competitiveness of cooperation between Horizon Robotics and OEMs: strong enough chip hardware (the premise); chip-centric tool chain services and software ecosystem (the core) → build a multi-party cooperation ecosystem with a clear division of duties between players**

# Latest Moves of Chip Vendors: Qualcomm Launches a Complete Set of Intelligent Solutions

- Qualcomm rolled out the Snapdragon Digital Chassis based on the integration of the previous automotive products, which encompasses four platforms, namely Snapdragon Ride, Snapdragon Cockpit, Snapdragon Auto Connectivity, and Snapdragon Car-to-Cloud

## Qualcomm Snapdragon Digital Chassis — product solution

### ① Snapdragon Ride

- Combination of smart driving vision and software stack sensor (camera, radar, etc.)
- Scalable SoC portfolio

### ② Snapdragon Cockpit

- Camera
- Dashboard
- HUD
- Center console
- Multimedia
- App ecosystem

### ③ Snapdragon Auto Connectivity

- EV charging technology
- Communication connectivity (satellite/5G)
- C-V2X

### ④ Snapdragon Car-to-Cloud

- Cloud service platform
- Map data
- OTA

## Snapdragon Ride Flex, an integrated computing platform based on one SoC

Every solution of Snapdragon Digital Chassis allows for customization and scalability, enabling OEMs and T1s with flexible product solutions

### Product customization

- Enable different combinations of SW and HW: e.g., Snapdragon Ride flexibly enables the development of different functions, ranging from ACC to City NOH
- Combine resources across platforms: e.g., customers can select solutions that highlight smart cockpit or intelligent driving

### Scalability

- Highly open, every platform enables the scalability of HW and SW → continuous updates

### Application

#### OEM

- Cooperate with BMW and Volkswagen to create smart driving and smart cockpit solutions

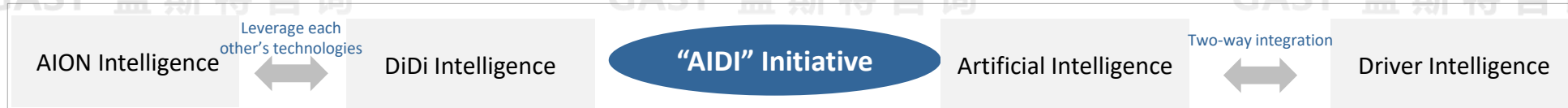
#### T1

- Co-develop ADAS/AD systems with Desay SV, Haomo.ai, Zongmu, etc.

- As a chip and underlying platform provider, Qualcomm integrates products of the Snapdragon Family and launches flexible platform solutions, making strategic preparation for developing intelligent driving and smart cockpit in an integrated manner**

## Latest Moves of Technology Companies: Didi Explores the Customization of Vehicles with L4 AD Functions for Robo-taxi Service

- Didi and GAC Aion cooperate on the mass production of autonomous vehicles: customizing production vehicles for the robo-taxi service



### Didi and AION promote the mass production of robo-taxis in the form of establishing a joint venture



**AD companies are deeply interweaved with automakers in terms of benefits, who should fully leverage each other's advantages → Didi can reduce costs and provide user-specific services**



- ❑ **Cooperation between AD companies and automakers is an important way to build a closed loop of business models. Didi and AION cooperate to realize the application of AD technologies to production vehicles, which can develop a robo-taxi service ecosystem and make profits at scale**

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# Latest Moves of OEMs: Li Auto Released City NOA Without Maps and Self-developed Cognitive Large Model

- On June 17, Li Auto comprehensively elaborated on the upgrade of its intelligent technologies on the Family Tech Day: in terms of intelligent driving, City NOA without maps is expected to run beta testing starting from June, and the commute NOA will be available in the second half of this year; in terms of smart cockpit, it plans to install Mind GPT cognitive large model on vehicles

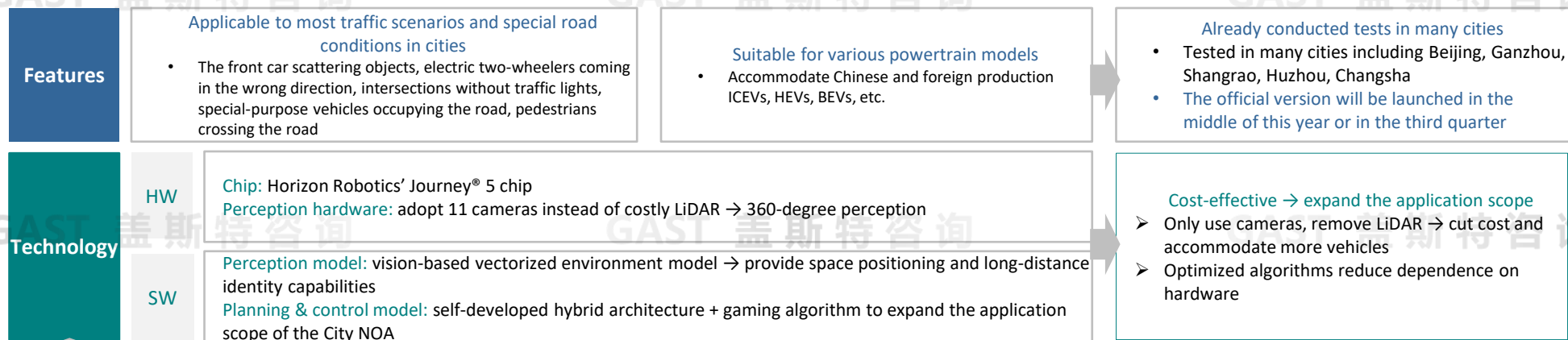
Intelligent driving	City NOA without maps Available in Beijing and Shanghai first	<ul style="list-style-type: none"> <li>Perception algorithm: AD Max 3.0 introduces NPN* characteristics and TIN* network to enhance the BEV model → remove HD maps <ul style="list-style-type: none"> <li>NPN extracts and stores road parameters in advance via the cloud foundation model, and integrates with the characteristics of the real-time BEV model, serving as a supplement to road characteristics → handle complex intersections in cities that are beyond perception or blocked</li> <li>TIN is trained based on the response of a large amount of human drivers to traffic lights and can identify signal lights based on image and video inputs → no need to set map rules manually, no need to identify the shape of traffic lights/specific location</li> </ul> </li> <li>Planning &amp; control algorithm: simulation learning – train based on the behavior of many human drivers → make decisions more like human drivers</li> </ul>
	Commute NOA	<ul style="list-style-type: none"> <li>Users can set their own routes, and the vehicle learns NPN characteristics: achieve NOA along fixed routes on all road sections</li> <li>Vehicles can be activated for simple routes in less than 1 week and trained for more complex routes in 2-3 weeks</li> </ul>
	Data platform support	<ul style="list-style-type: none"> <li>The computing power of the AD training cluster reaches up to 1,200 PFLOPS, and the AD training mileage registers 600 million+ km</li> <li>Collection, mining, labeling, training, and shadow verification can be done automatically and efficiently</li> </ul>
Smart cockpit	Spatial multi-modal perception	<ul style="list-style-type: none"> <li>Enable cockpit visual perception and 3D reconstruction locally on the vehicle end → sense who is the initiator of the interaction, where to sit, where to point, and what is needed</li> </ul>
	Multi-modal interaction	<ul style="list-style-type: none"> <li>Voice separation algorithm: able to combine voice signal and spatial visual perception information → more accurate positioning of the sound zone</li> <li>Large speech perception model: multilingual, multi-dialect, multi-task, and emotional speech perception enhancement</li> </ul>
	Self-developed cognitive large model Mind GPT	<ul style="list-style-type: none"> <li>Base model training (utilize 1.3 trillion tokens)</li> <li>Fine-tuning of supervision instructions + intensive learning (million-level data)</li> <li>Establish a Lixiang knowledge map LiKG 1.0 based on use cases</li> <li>Built-in memory network + online enhancement capability</li> </ul>

- The intelligent technologies developed by Li Auto are user experience-oriented: the essence of commute NOA is to first apply City NOA in fixed high-frequency scenarios, and use the smart cockpit foundation model to enable “better functions and experience” → constantly meet users’ needs



# Latest Moves of AD Players: Leadgentech released Tiansi-City, a City NOA Solution Enabled by Pure Vision Technology

- Optimize the city-oriented perception system by relying less on maps, deploying cameras, and adopting a hybrid architecture decision-making algorithm



Build a data R&D closed-loop of “products-data-scenarios-simulation-algorithms-products”, drive the iteration and upgrade of algorithms/models



- ❑ Optimized software drives the development of intelligent driving solutions that rely less on maps and adopt the pure vision approach → cost-effective configuration would boost the large-scale application of City NOA, but the key lies in how to convince OEMs to buy them as most AD solutions have not been verified on production vehicles

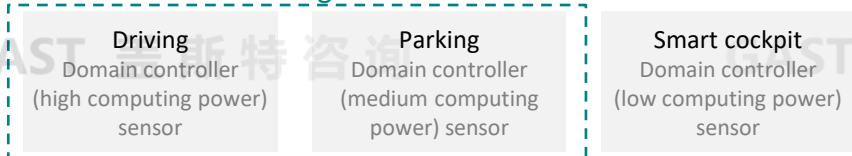
# Latest Moves of AD Players: Smart Cockpit and Intelligent Driving Integration Solutions (Driving and Parking Integration vs Cockpit and Parking Integration)

- As the EEA evolves toward domain concentration and then to central concentration, it would achieve smart cockpit and intelligent driving integration, with two transitional solutions as follows

**Smart cockpit and intelligent driving integration in real sense: integrate the functions of smart cockpit and intelligent driving on a single SoC to achieve cross-domain integration**

## Solution 1: driving and parking integration

Integrate intelligent driving and advanced parking functions in a single domain controller



Connect driving functions with advanced parking functions including computing power, algorithms, and sensors  
(HPP, AVP, etc. require in-depth participation of the driving perception system)

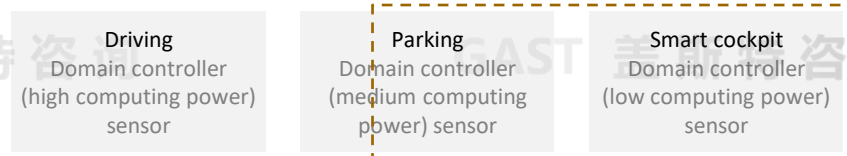
Intelligent driving system integration: ① effective co-sharing of computing power;  
② consistent scenario experience

**Require high computing power of software and hardware → high cost → suitable for medium-end and premium models**

VS

## Solution 2: cockpit and parking integration

Integrate smart cockpit and low-end parking functions in a single domain controller



Connect smart cockpit functions with basic parking functions including computing power and sensors  
(the cockpit domain controller receives parking signals, enabling APA/RPA)

① Take full advantage of the computing power of the cockpit domain; ② Improve HMI experience during parking

**Require low computing power of software and hardware → low cost pressure → suitable for low-end models**

- From the long-term perspective, the driving and parking integration solution is a sure path toward the smart cockpit and intelligent driving integration, while the cockpit and parking integration is a temporary solution under the constraints of chip supply, software technologies, cost, etc.

## Latest Moves of AD Players: Domain Controller Product Solutions for Driving and Parking Integration and Cockpit and Parking Integration

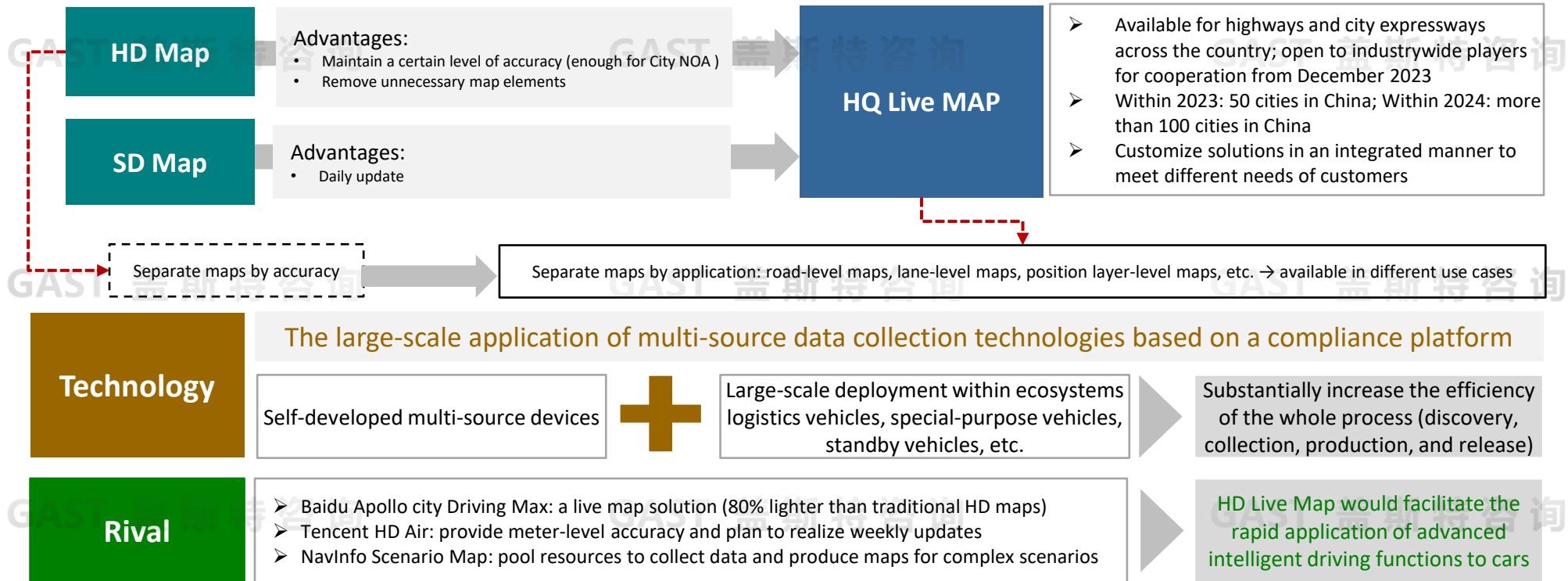
- Transitional domain controller solutions for smart cockpit and intelligent driving integration: ① lightweight domain controllers for driving and parking integration; ② high-performance domain controllers for driving and parking integration; ③ cockpit and parking integration

Positioning	Solution		Computing power of chips	Achieved features		Mass production
				Parking	Cockpit/driving	
Lightweight domain controllers for driving and parking integration	Hyperview	BDC-3.1 domain controller	Horizon Robotics J3 5 TOPS	• APA, RPA → upgradable to HPP	• ADAS • Highway NOA	2023 Q2
	Yihang Intelligent	Driving and parking integrated domain controller	2*TDA4 VM 16 TOPS	• APA, RPA • Short-distance HPP	• Highway/Expressway NOA	2022 Q2 (Volkswagen, etc.)
High-performance domain controllers for driving and parking integration	NeuSAR	X-Box4.0 domain controller	J5 + SemiDrive X9U 129 TOPS	• Memory-based parking	• Highway NOA • Certain features of City NOA	2023 H2 (already obtained designated mass production orders)
	Fretech	ADC30 domain controller	3*J5+2*TDA4VH+2*TC397 448 TOPS	• L3 parking → upgradable to AVP	• L3 AD functions on highways/urban roads	2024 (designated orders from FAW Hongqi)
Domain controllers for cockpit and parking integration	DESAY SV	DS06C domain controller platform	SemiDrive X9SP 8 TOPS	• 360-degree surrounded view • APA	• Multi-screen display • DMS, voice recognition, etc.	2023 H2
	Visteon ECARX	Cockpit and parking integrated domain controller solution	2*SE1000 2*8 TOPS	• APA, RPA	• Simultaneous display of multiple 4K screens • Large 3D games	2023 Q3 (first installed on Lynk & Co 08)

- **Lightweight domain controllers for driving and parking integration value cost performance and mass production efficiency, while high-performance ones highlight the optimal consistent intelligent driving experience; domain controllers for cockpit and parking integration have lower requirements on computing power, mainly underpinned by low-cost domestic chips**

## Latest Moves of Technology Companies: AutoNavi Rolled out HQ Live MAP

- Focusing on its self-developed multi-source visual technologies, AutoNavi developed “HD Live Map” solutions to satisfy customer needs



- ❑ It is hard to accommodate all key indicators of HD maps in a short term, while it is pressing for players to bring intelligent driving functions to urban areas. Map providers develop HD live maps and focus on improving the freshness → help players to reduce the cost of City NOA solutions and make them faster available in more cities

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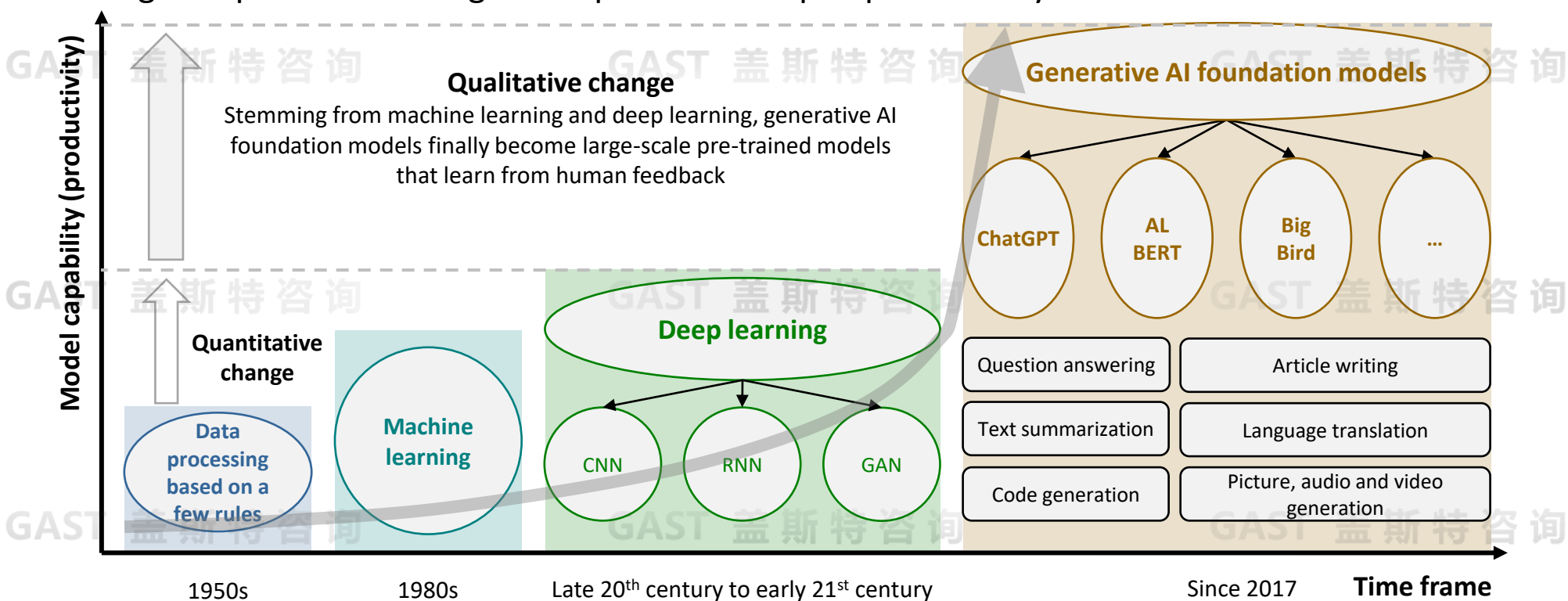
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## Essential Characteristics of Foundation Models: Productivity Change

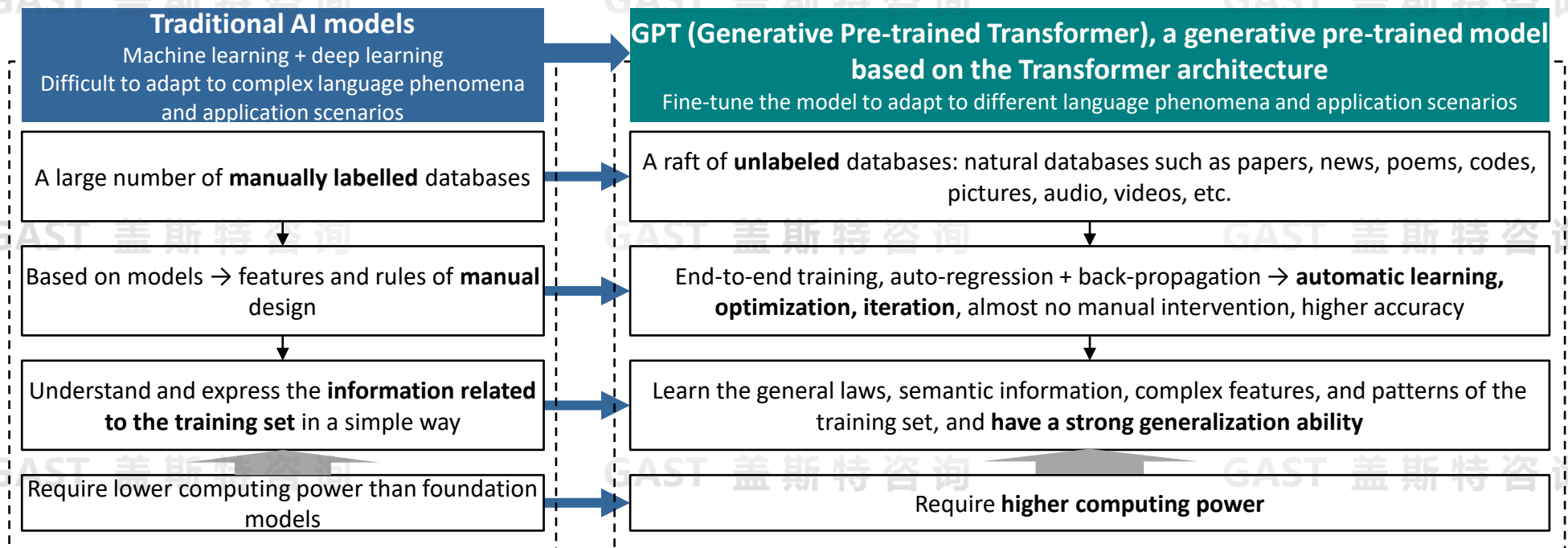
- Foundation models are the tipping point where traditional AI models shift from quantitative change to qualitative change → a qualitative leap in productivity



- Subvert the traditional way of HMI and redefine product experience and competitiveness
- Empower products throughout the life cycle, assist human → replace human, changes in the working methods → leaps in productivity

# Essential Differences Between Foundation Models and Traditional AI Models: Self-learning, Generation, Strong Generalization Ability

- The essential difference between foundation models and traditional AI models is that they learn and process information in different ways

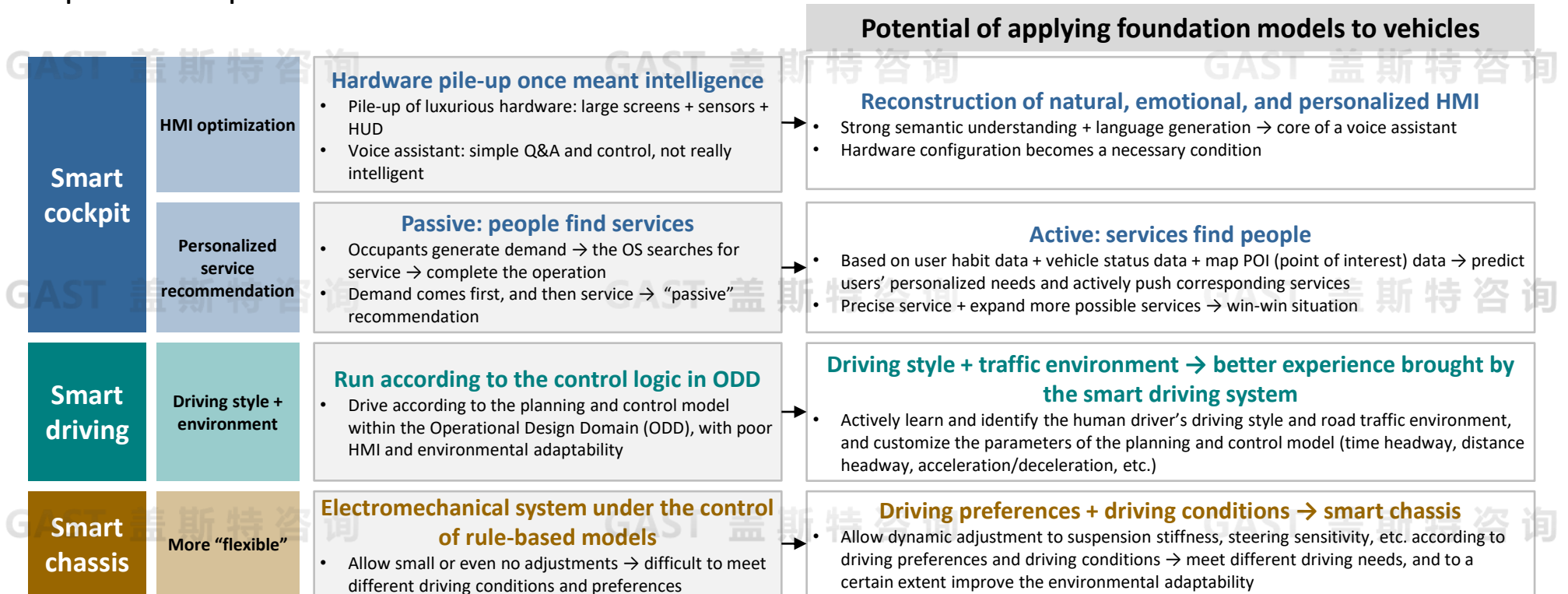


- **Foundation models feature stronger generalization ability and are more versatile than traditional AI models, and they are more adept at self-learning and generation**



# Impact of Foundation Models on the User Experience of Smart Vehicles

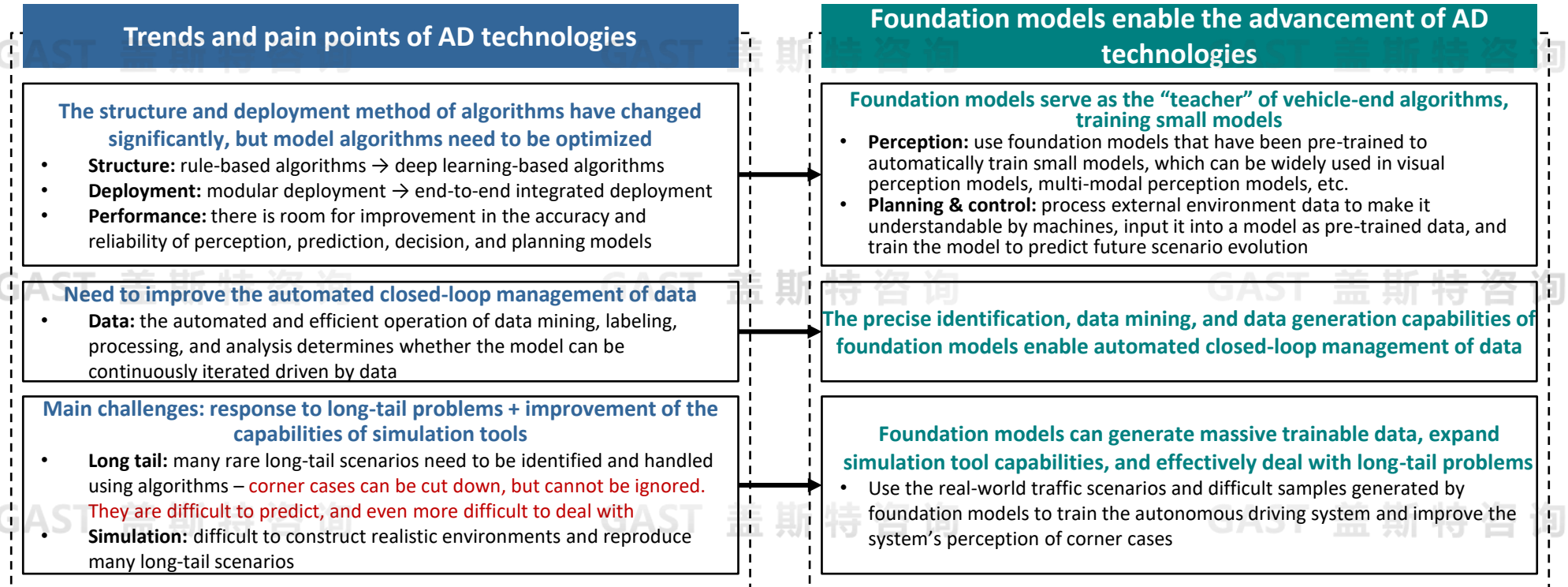
- ① Adequate software and data + ② Necessary hardware → foundation models will redefine the product experience



- The potential of smart cockpit, smart driving, and smart chassis will be further unlocked, and product competition will revolve around the reconstruction of foundation models

# Foundation Models Enable the R&D of Autonomous Driving Technologies

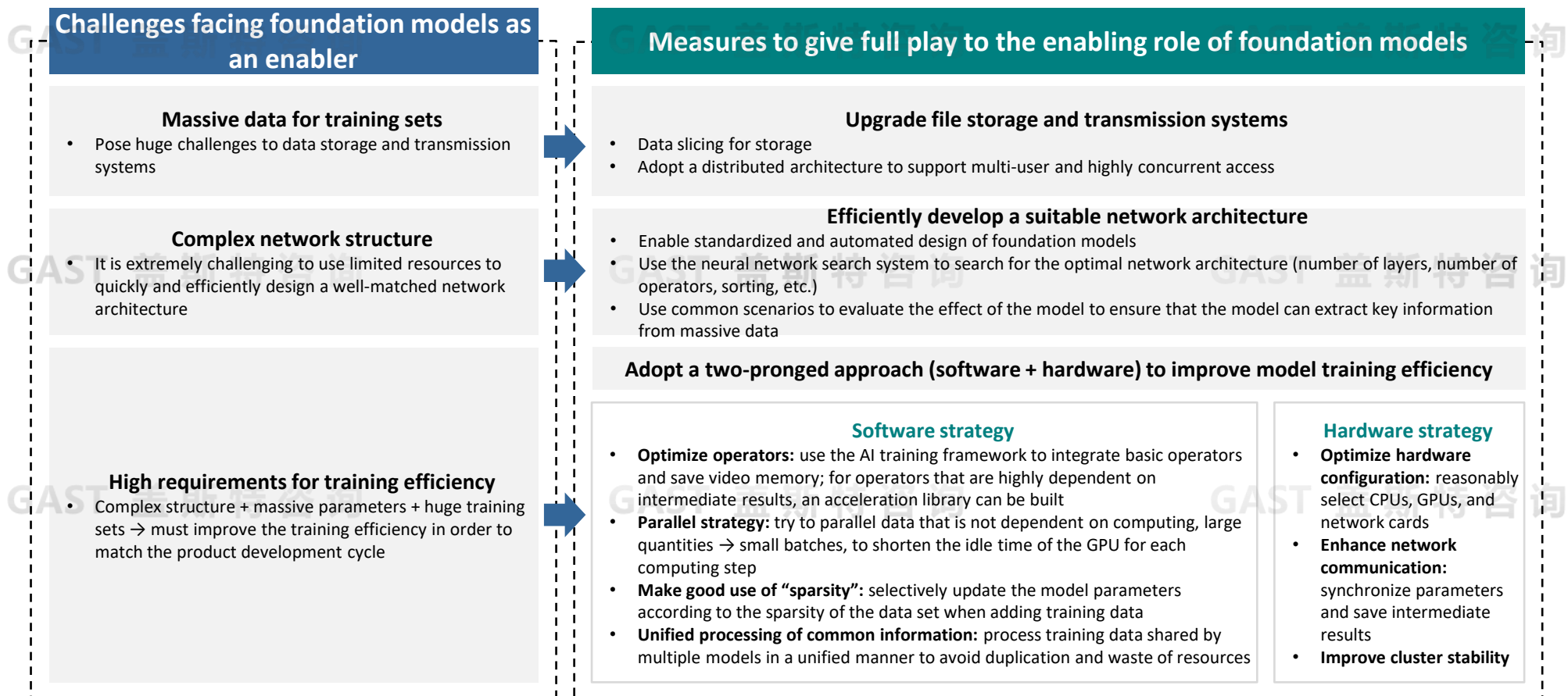
- Foundation models will promote the advancement of autonomous driving technologies from the dimensions of algorithms, data closed loop, simulation, etc.



- In essence, foundation models react to input information, and autonomous driving is a subset of this kind of behavior → expected to achieve the integration of perception and decision-making

# Vital Measures to Give Full Play to the Enabling Role of Foundation Models

- Improving engineering capabilities from various aspects is an important measure to effectively meet the challenges facing the application of foundation models as an enabler



## Existing Foundation Models in China and Their Application in Auto Business

- Many domestic ICT companies have released foundation models and actively promoted their applications in auto business such as AD technology development and smart cockpit interaction

Company	AI foundation model	Released on	Parameter scale	Application in the auto business
Baidu	ERNIE Bot	Mar. 16, 2023	Hundreds of billions	<ul style="list-style-type: none"> <li><b>Enable the mining of long-tail data:</b> ① Use text and image input encoders to pre-train the original model to realize vector search; ② Use algorithms to identify, locate, and divide street view image data → form a database; ③ Search and mine for specific scenarios through text, images, etc.</li> <li><b>Enable the iteration of perception algorithms:</b> Use semi-supervised method to train a perception foundation model through 2D and 3D data → Use the foundation model to empower and enhance small models' long-distance 3D vision perception + Use the foundation model to empower multi-modal perception</li> </ul>
Haomo.ai	DriveGPT	Apr. 10, 2023	Hundreds of billions	<ul style="list-style-type: none"> <li><b>Unlock the ability to recognize driving scenarios in the cloud:</b> Users upload driving scenarios to the cloud platform, and the platform can quickly mark out all lane lines and traffic participants in the picture → cut cost by up to 90%</li> <li><b>Help realize a variety of functions:</b> realize functions such as City NOH, street view recommendation, intelligent sparring, and scenario escape. The cloud-based foundation model will open the interface to provide capabilities including smart driving capabilities and driving scenario recognition</li> </ul>
Alibaba	Tongyi Qianwen	Apr. 11, 2023	Trillion	<ul style="list-style-type: none"> <li><b>Build full-stack AI capabilities based on the foundation model in the cloud:</b> scenario customization + multi-source data + professional knowledge + service access + behavior prediction</li> <li><b>User layer:</b> safe, smooth, personalized, and emotional experience → truly realize the “user-defined cockpit”</li> <li><b>Platform framework layer:</b> SOA based on the foundation model allows faster construction by OEMs and OS companies</li> <li><b>Basic system layer:</b> automatic code generation → improve programming efficiency</li> </ul>
iFLYTEK	SparkDesk	Jun. 9, 2023	Tens of billions	<ul style="list-style-type: none"> <li><b>Realize generalization in the auto industry based on a common model:</b> ① Free interaction across services and scenarios; ② Multi-mode perception, multi-dimensional expression, and diverse styles; ③ Self-learning of vehicle and user data; ④ Standardization of ecological interfaces</li> </ul>



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## Company Profile

Setting its foothold in China automotive industry, GAST Strategy Consulting, LLC is oriented to the globe to focus on the ecosystem of the whole automotive industry and starts from three dimensions (industry, enterprise and technology) to carry out in-depth study on strategy design, business positioning, management improvement, system building, business process reengineering, product planning, technology choices and business models. It is dedicated to providing governments at all levels with decision-making support and implementation advice and enterprises in the automotive industry chain and relevant industries with all-dimensional high-level professional consulting services in strategies, management and technologies. Since the establishment, GAST is dedicated to becoming a world top auto think tank as the vision and sharing wisdom as the mission. Adhering to creating value for clients and focusing on actual effects, GAST commits itself to forging long-term partnership and providing guidance service. It has fostered strategic partnership with and is providing services for nearly 100 domestic and international enterprises, organizations in the automotive industry and governments at all levels by virtue of comprehensive, systematic, advanced and pragmatic consulting methods.

## Range of Service

Provide diversified and open services and flexible ways of cooperation for customers, including but not limited to:

- Executive-oriented strategy, management and technology consulting services
- All-round and customized special project research: covering macro strategy, industrial development, interpretation of policies and regulations, the internet, business models, corporate strategy and management, auto market, product research, product design methodology, research on auto shows, interpretation of forums, energy conservation and emission reduction, new energy vehicles, intelligent vehicles and comprehensive automotive technologies
- Serve as reliable resource that can win customers' long-term dependence and provide open cooperation that can meet customers' specific requirements at any time
- Provide a high-end sharing platform (CAIT) for industrial communication, exchange and in-depth research
- The company provides nearly 1,000 research reports in Chinese, English and Japanese at present

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