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# **SIASUN MOBILE ROBOT INDUSTRY**

**Shenyang SIASUN Robot & Automation CO., LTD**

**Mobile Robot BG**

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01

# Introduction

SIASUN Wisdom Park Mobile Robot Workshop

# SIASUN Introduction

- SIASUN was established in 2000, belonging to Chinese Academy of Science. It is a high-tech listed enterprise which regards robotic technology as the core.
- As the national industrial base on robot, SIASUN has a whole robotic product line and industry 4.0 total solution.
- SIASUN has a R&D and service network around China, and founded many branches in South Korea, Singapore, Thailand, Germany and Chinese Hongkong, etc.
- SIASUN has formed a whole value chain consists of independent core value, core parts, core products and industrial solutions.



NO.1

Listed enterprise in  
robotic industry

4000+

R&D talents

40+

Exported countries  
and areas

3000+

Value industrial  
customers

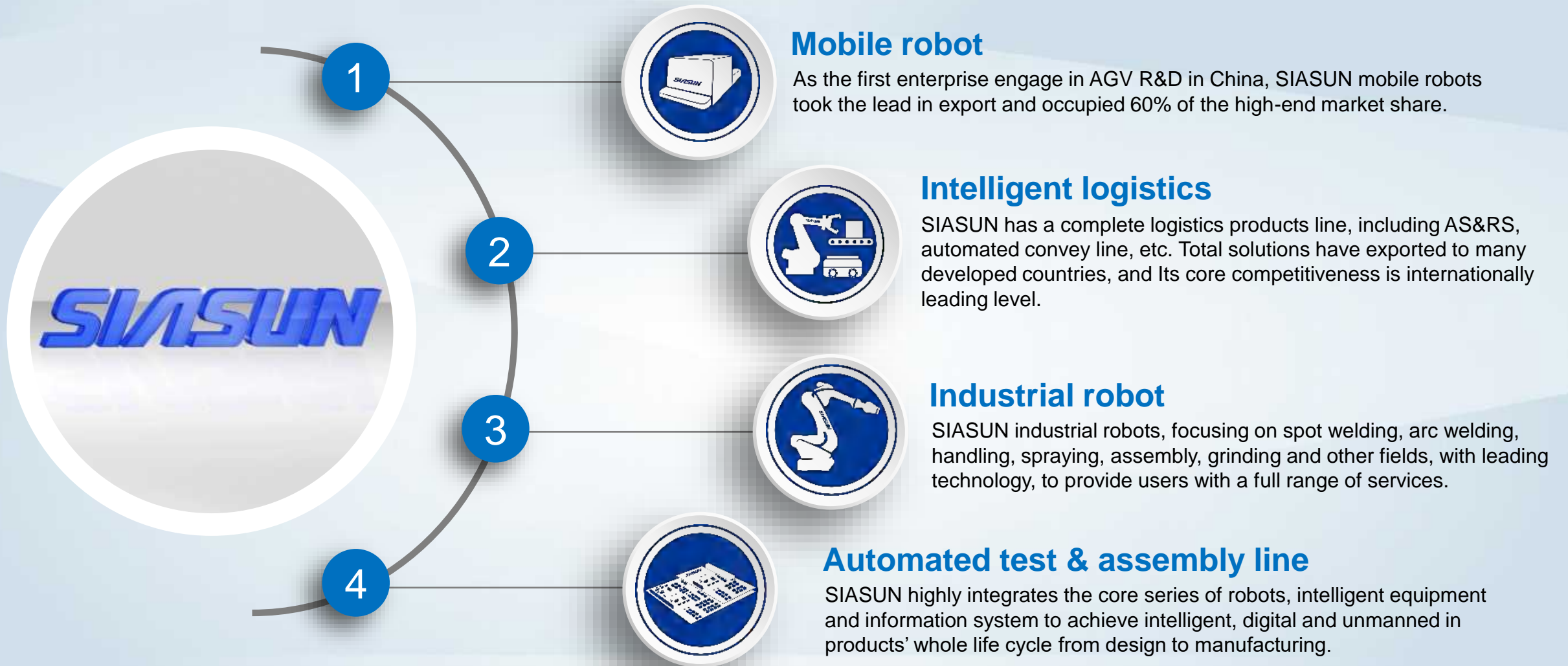
NO.1

National industrialization base  
on robotic

**Mobile Robot BG**

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# SIASUN industry layout (manufacture)



*Mobile Robot BG*

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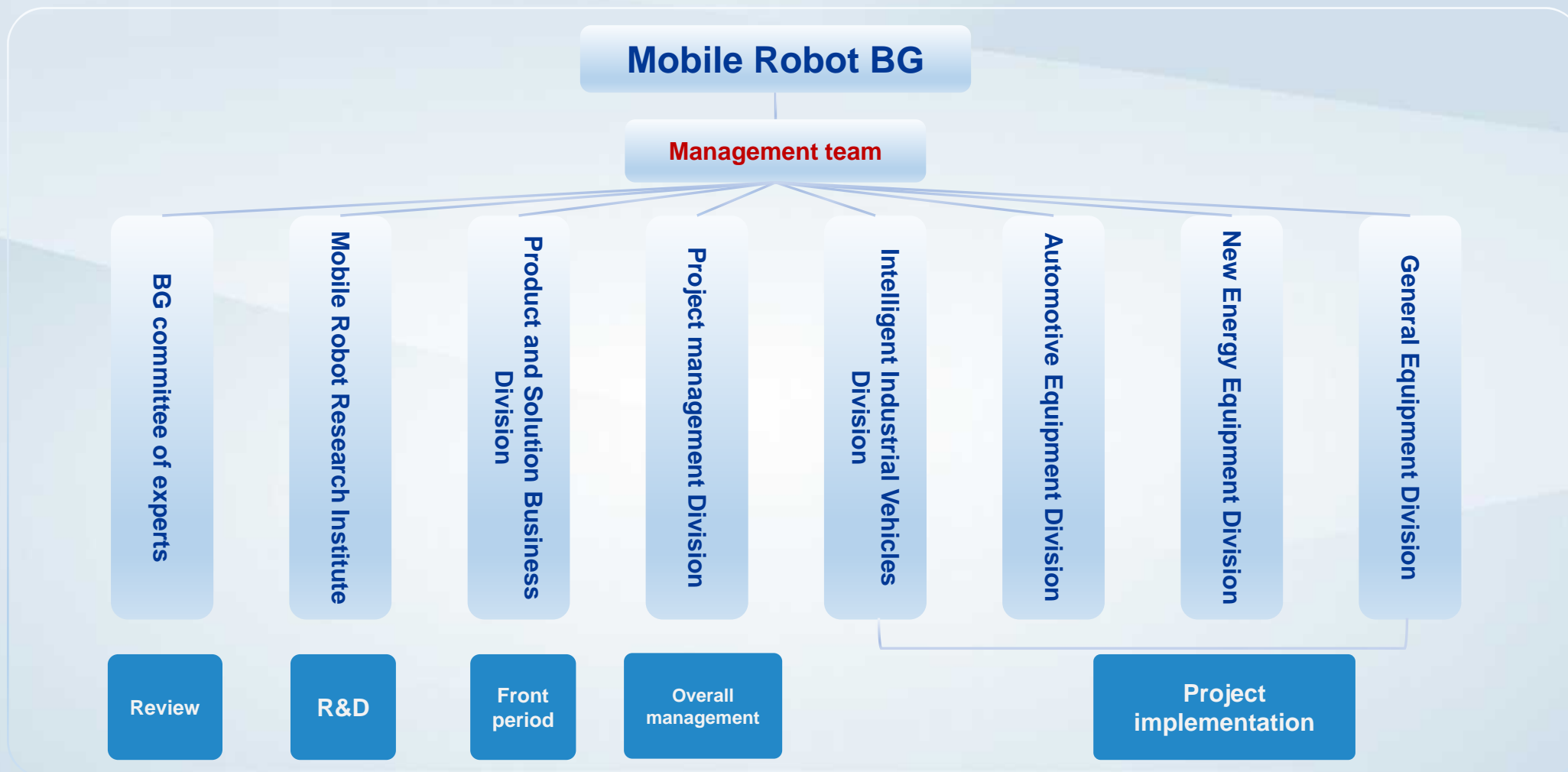


# Mobile Robot Industry

As the earliest domestic enterprise engages in research and development of mobile robot, SIASUN mobile robot successfully creates the history of exportation of domestic robot. Its products have widely been in the automotive, electrical, electronic, new energy, food, pharmaceutical, electric semiconductor business logistics, tobacco, finance and other key sectors of national economy fields, with customers from many countries and regions globally. Its overall technology has reached world leading level. In the past three years, SIASUN mobile robot annual order volume is about 700 million yuan, finished about 200 projects per year, and delivered more than 10,000 mobile robots belonging to various types. Completed more than 1500 projects , SIASUN also carried out the most mobile robot projects abroad in China.



# Organizational structure of Mobile Robot BG



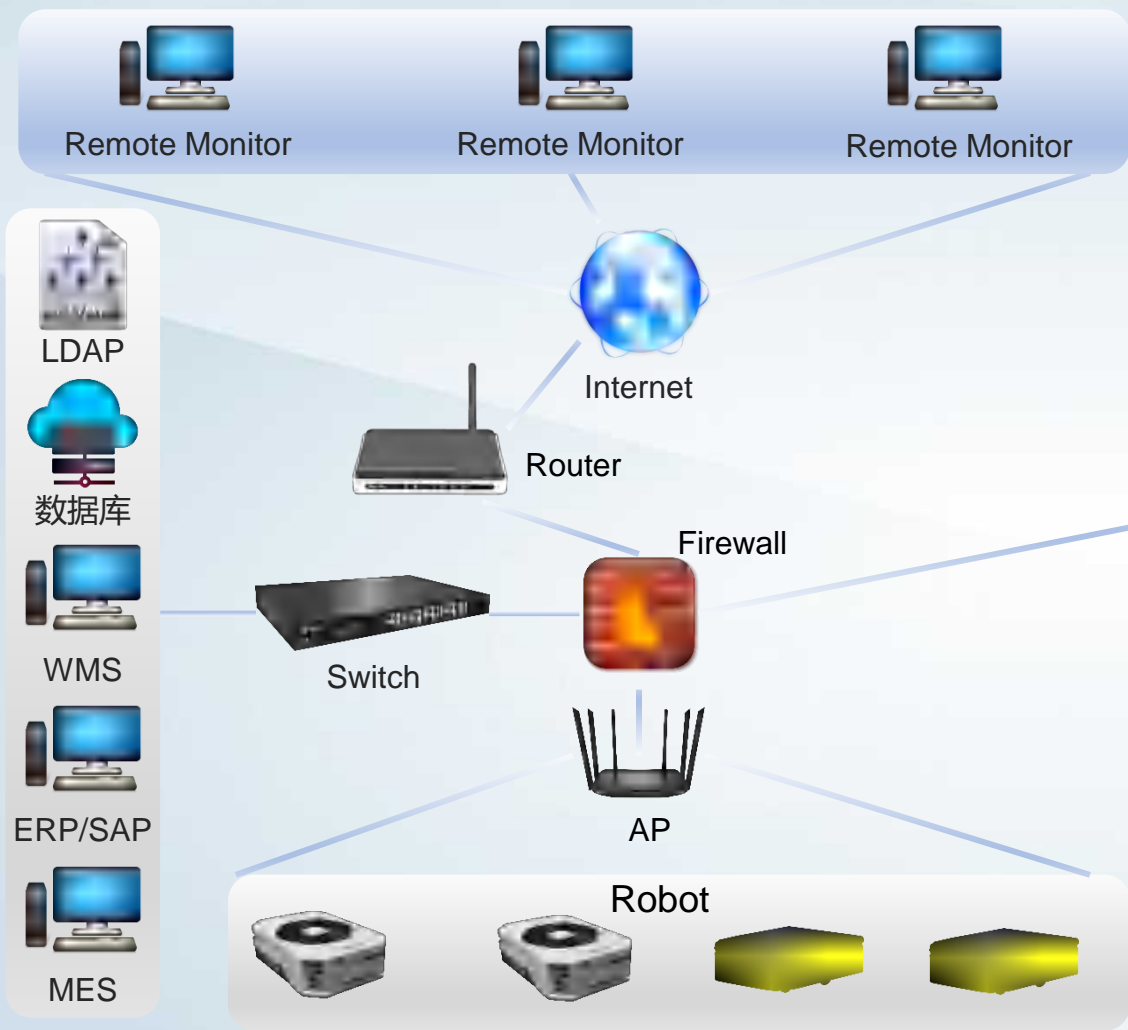
# Mobile robot hardware composition

Mobile robot is generally composed of vehicle body, drive wheel system, servo system, main control system, battery, safety sensor, navigation device, human-machine interface, communication device and so on.

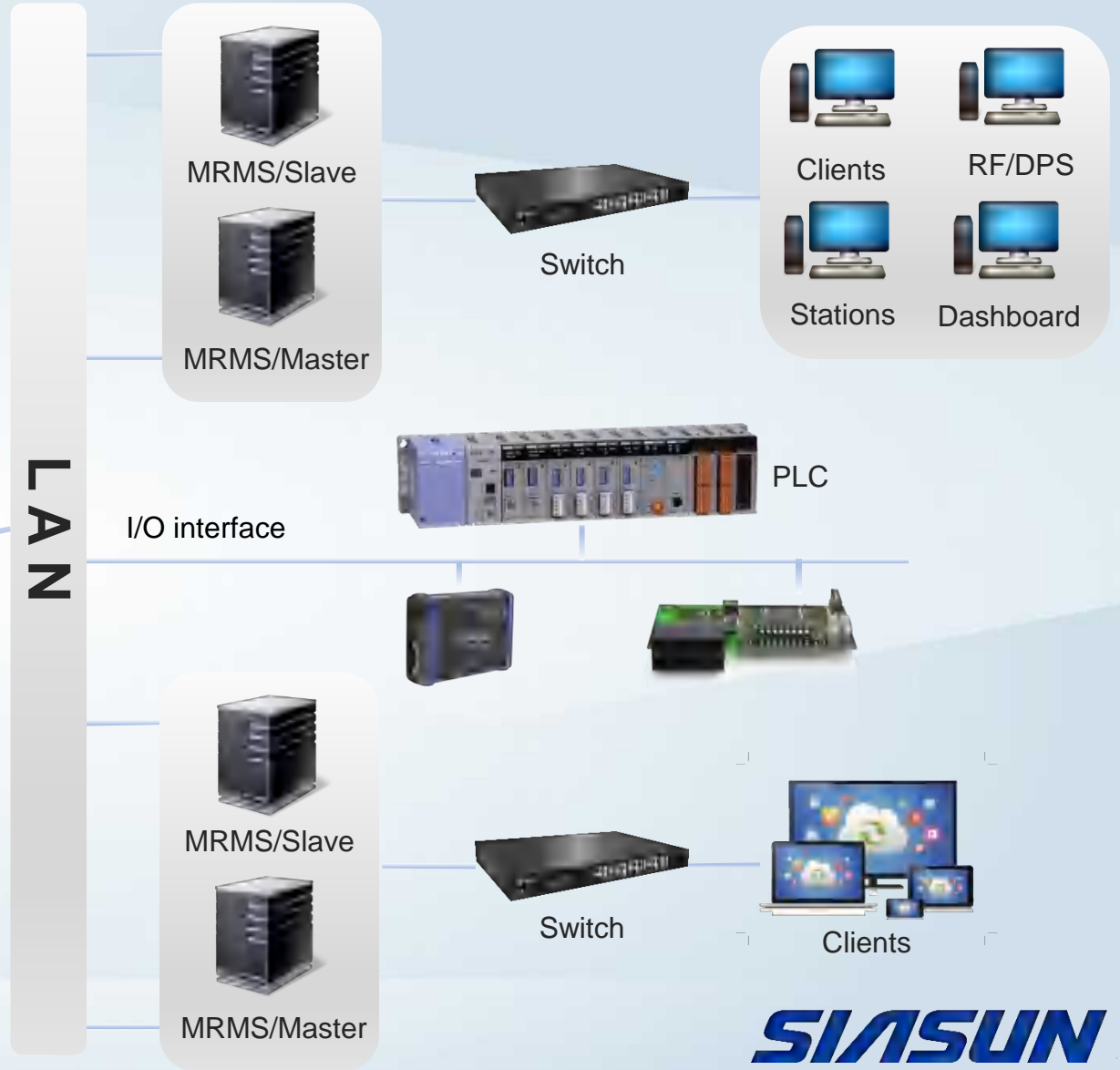




# iMRS IT frame



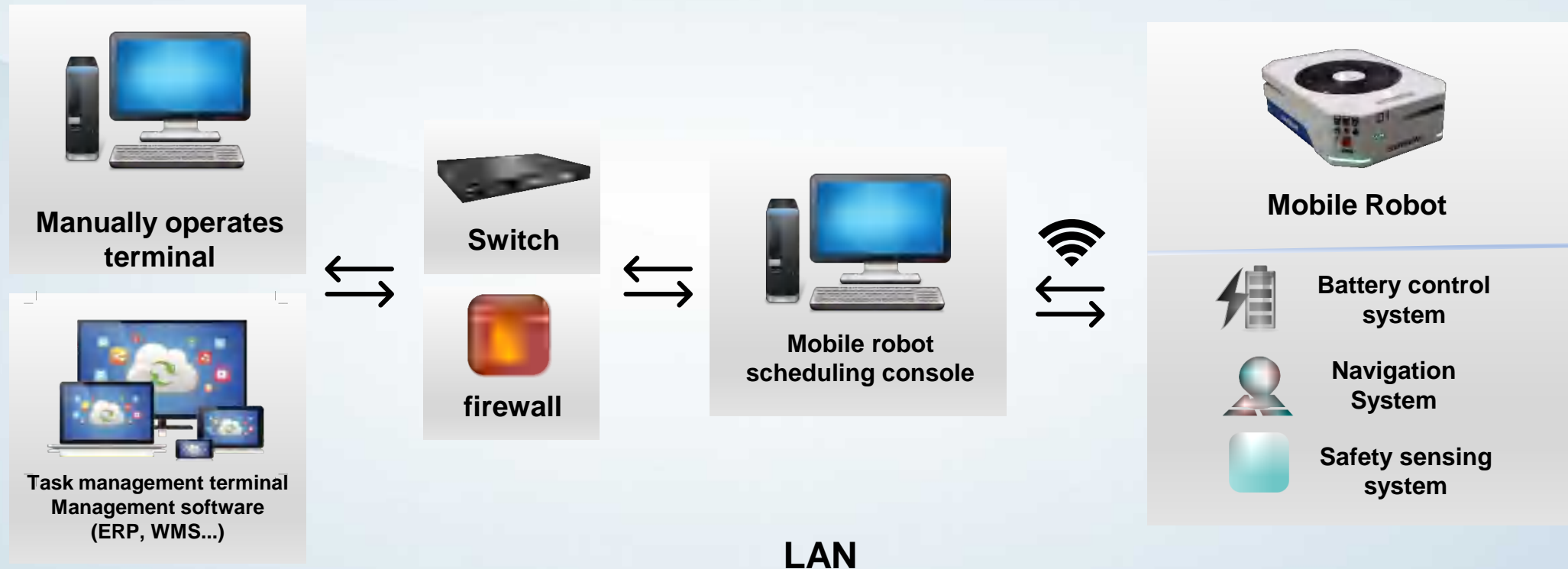
Mobile Robot BG



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# Mobile robot system composition

Mobile robot system is generally composed of mobile robot, navigation system, charging system, communication system, scheduling system, external information acquisition, interface software and so on.





# Mobile Robot System Introduction

Navigation system:



Magnetic stripe



Electromagnetic



inertial



Laser



SLAM

Power system:



**Online automatic charging:**

Automatic charging is carried out automatically under the control of the console, and the charging strategy without human intervention is completed by the internal scheduling of the system



**Battery exchange**

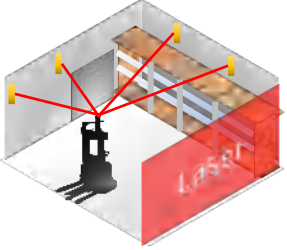
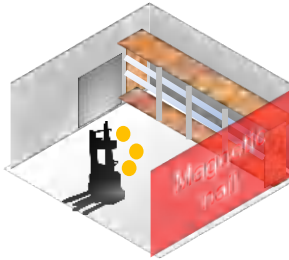
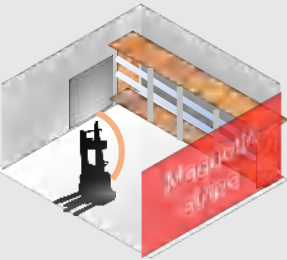
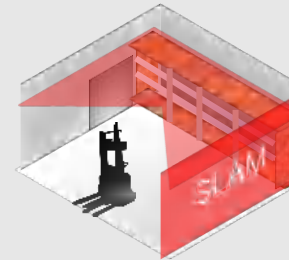
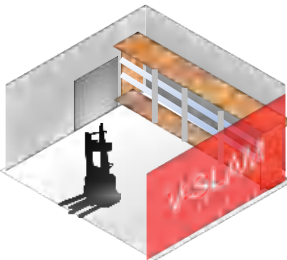
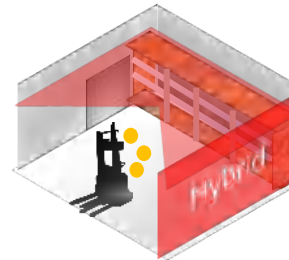
Manual or automatic battery exchange to replenish power



**Inductive power supply:**

AGV is powered through the ground embedded cable using non-mechanical contact mode

# Advantages and disadvantages of mainstream navigation

Navigation	Advantages	Disadvantages	Navigation	Advantages	Disadvantages
	<ul style="list-style-type: none"> <li>● Convenient installation</li> <li>● No disruptive installation</li> <li>● Accurate positioning</li> <li>● High speed</li> <li>● No maintenance cost</li> </ul>	<ul style="list-style-type: none"> <li>● Route changing requires professional team</li> <li>● Cost is higher</li> </ul>		<ul style="list-style-type: none"> <li>● No restrictions to environment</li> <li>● Accurate positioning</li> <li>● No cost to maintain</li> </ul>	<ul style="list-style-type: none"> <li>● Simple to install, but more complex than magnetic stripe</li> <li>● Tape is faster to install and easier to change paths</li> </ul>
	<ul style="list-style-type: none"> <li>● Convenient installation</li> <li>● Easy path change</li> <li>● No disruptive installation</li> <li>● Accurate positioning</li> <li>● Reliable</li> <li>● Low cost</li> </ul>	<ul style="list-style-type: none"> <li>● The magnetic stripe needs to be maintained</li> <li>● Cost of magnetic stripe</li> <li>● Not suitable for complex paths</li> </ul>		<ul style="list-style-type: none"> <li>● High reliability and mature technology</li> <li>● Intuitive drawing, high precision, no cumulative error</li> <li>● Maps can be used for path planning</li> </ul>	<ul style="list-style-type: none"> <li>● Limited by LiDAR detection range</li> <li>● Installation has structural requirements</li> <li>● Maps lack semantic information</li> </ul>
	<ul style="list-style-type: none"> <li>● Convenient installation</li> <li>● Easy to add or change paths</li> <li>● Low installation cost</li> <li>● No disruptive installation</li> <li>● No cost to maintain</li> </ul>	<ul style="list-style-type: none"> <li>● Cost is higher</li> <li>● Compared with other navigation methods, the accuracy is lower</li> </ul>		<ul style="list-style-type: none"> <li>● QR code + inertia, laser + magnetic nail, SLAM + magnetic stripe and other ways, can adapt to a variety of complex scenes, high positioning accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>● Change requires a professional team</li> <li>● Cost is higher</li> </ul>



# Safety System

In actual production, mobile robots usually need to work with human. In order to ensure the safety of mobile robots during operation, especially the safety of men and all kinds of equipment, SIASUN mobile robot system adopts various safety measures.



**Software protection:** deviation from navigation line protection, component fault protection, communication fault protection, out-of-tolerance protection, stall protection, etc.



**Laser sensor:** a non-contact laser anti-collision sensor is installed on the moving direction of the mobile robot. And one can set the deceleration parking area and emergency stop area.



**Emergency stop button:** there are emergency stop switches around the mobile robot, press the switch at any time, the robot will stop running immediately.



**Fault protection:** Once the computer system fail happens, offline protection unit, collision prevention safety unit and emergency switch will force the mobile robot to stop or complete basic operations



**Audible and visual alarm:** when failure occurs, the mobile robot will automatically use audible and visual alarm. A malfunctioning mobile robot can be operated offline and out of the working area to a safe location using a manual pendant.



Pyeongchang Winter Olympics 'Beijing 8 minutes'  
24 SIASUN mobile robots danced with dancers

## Beijing 8 minutes



## Beijing 8 minutes

In the 23rd Olympic Winter Games Closing Ceremony, "Beijing 8 Minutes", directed by Zhang Yimou, made an amazing appearance.

24 mobile robots from SIASUN perfectly coordinated and precisely interacted with 24 dancers. This show also created a new record in scope of using mobile robots in outdoor performance globally.



# Customers



A photograph of a factory floor featuring several yellow SIASUN AGVs (Automated Guided Vehicles) in the foreground. Each AGV is carrying a large, complex engine component. The background shows a well-organized industrial environment with metal shelving units filled with various parts and components. The scene is dimly lit, with a dark overlay on the right side where the text is placed.

02

Products & Cases





# Complete product line

## Mobile robot family tree



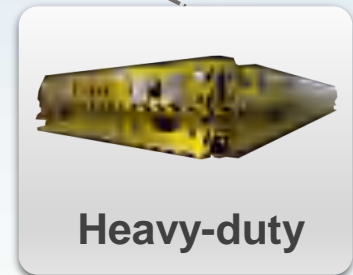
Assembly



Forked lift



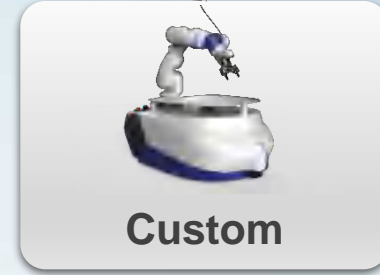
Transportation



Heavy-duty



Auxiliary assembly



Custom

- Single-lifter
- Dual-lifter
- Tri-lifter
- Four-lifter

- Low stowed
- High stacking
- Plane handling
- Custom

- Push-pull transfer
- General purpose roller table load
- Shelf robot
- Latent conveyer
- Traction conveyer
- ...

- 5 tons
- 15 tons
- 20 tons
- 40 tons
- 60 tons
- 80 tons

- Engine assembly
- Gearbox assembly
- Front axle assembly
- Rear axle assembly.....

- Dual vehicle coupling type
- Clean room mobile robot
- Hybrid robot
- High precision
- ...



## Assembly Mobile Robot

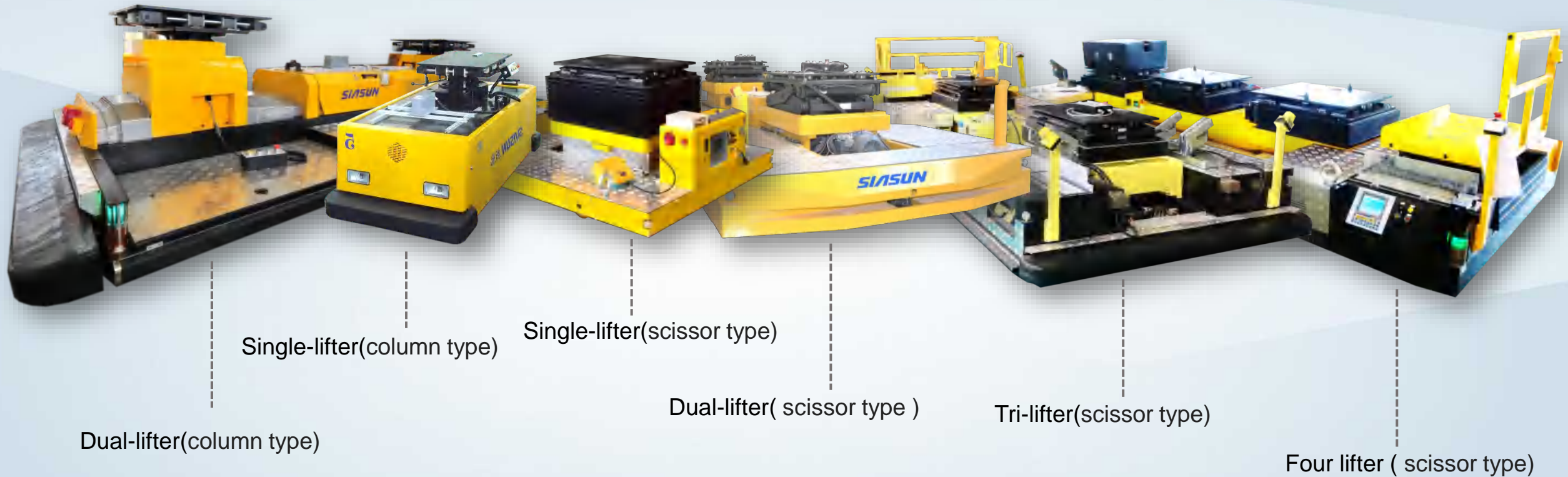
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Which are used in the final assembly of automobile chassis and body-in-white. Owing to the trackless characteristics of mobile robot, the system has high flexibility. Robots running lines can be flexibly adjusted according to assembly process requirements.

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# Assembly Mobile Robot



# Typical Application



*Mobile Robot BG*



## Forklift Mobile Robot

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Which are modified from the forklift, maintain the structure and rigidity of its original vehicle, and add control, navigation, communication system and so on. Forklift mobile robot usually use magnetic navigation, laser navigation or hybrid navigation.



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# Forked Lift Mobile Robot





# Typical Application



*Mobile Robot BG*

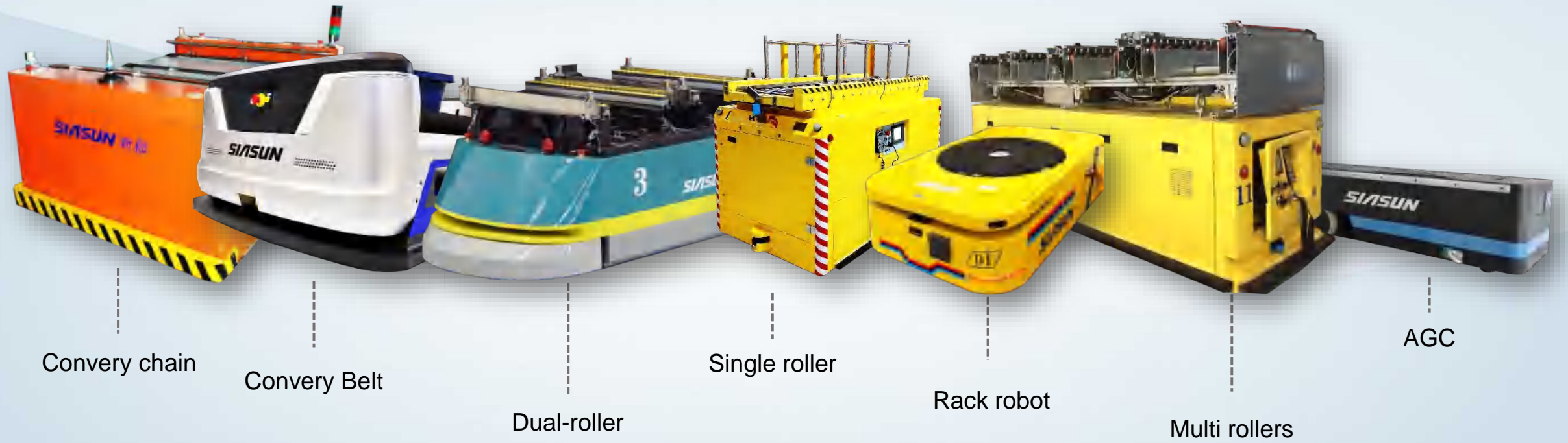
# Transport Mobile Robot

Transport Mobile Robot is consisted of mobile robot and transport platform. It can carry roller conveyor, chain conveyor and other transmission mechanisms, and automatically connect to the roller conveyor or chain conveyor on the ground. Pallet can be used as carrier to realize automatic horizontal transfer of pallet goods. They are ideal application for automatic transfer and load docking in front area of AS/RS or different production lines.





# Transfer Mobile Robot



# Typical Application



Mobile Robot BG

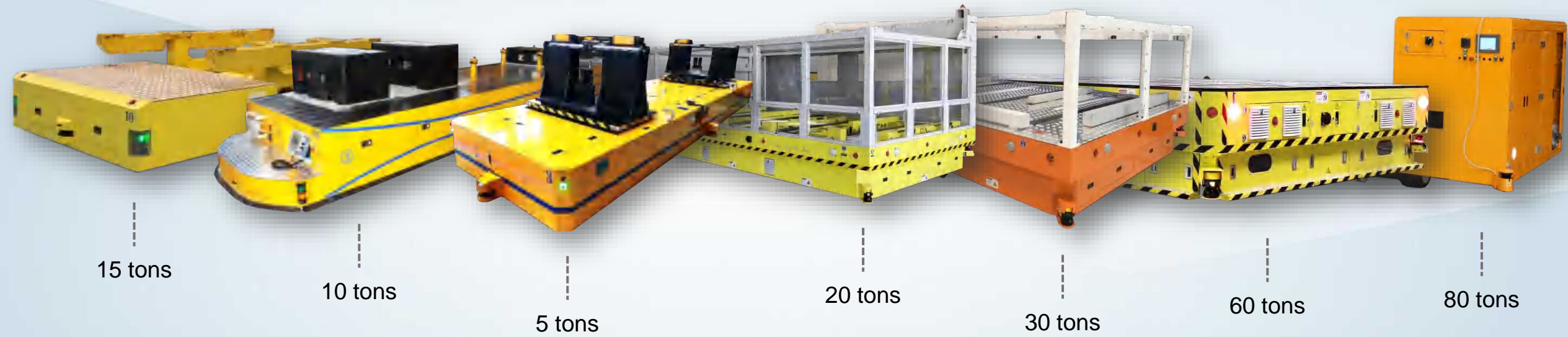
## Heavy-load Mobile Robot

Heavy-load mobile robot refers to load capacity larger than 5 tons. SIASUN mobile robot load capacity can reach to 120 tons. Most heavy-duty mobile robots operate in all directions without turning radius. The navigation modes generally use magnetic navigation, laser navigation and SLAM navigation.

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# Heavy-load Mobile Robot



# Typical Application



*Mobile Robot BG*

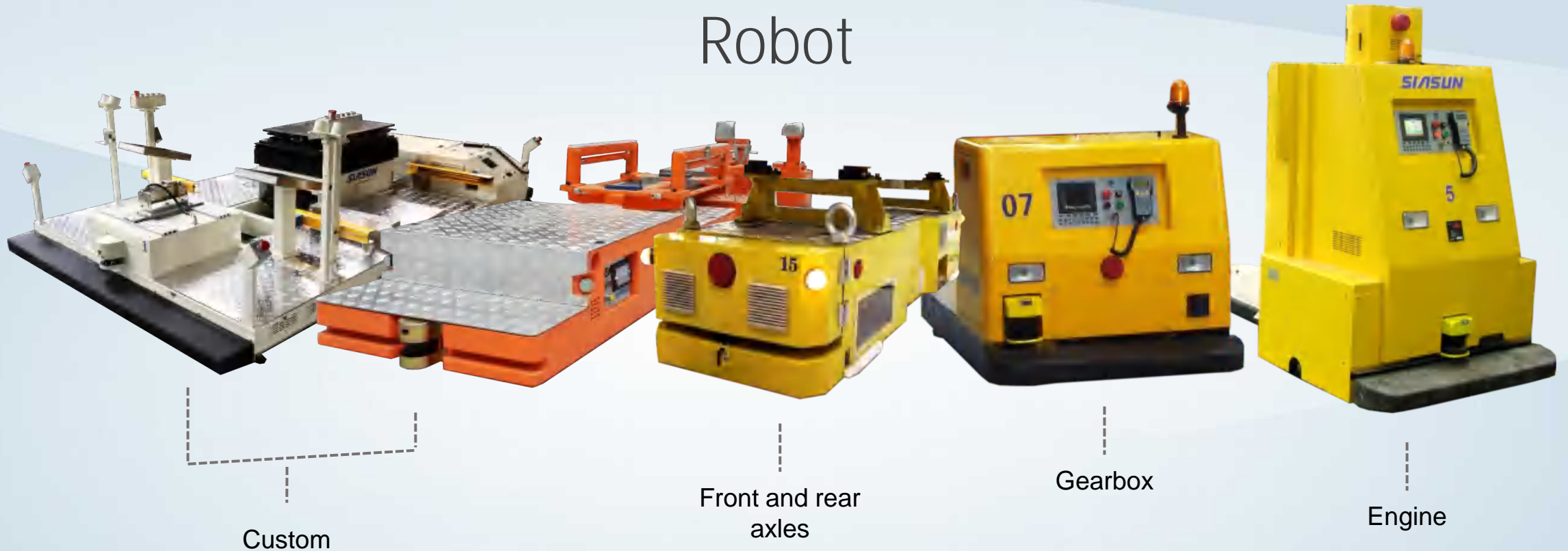


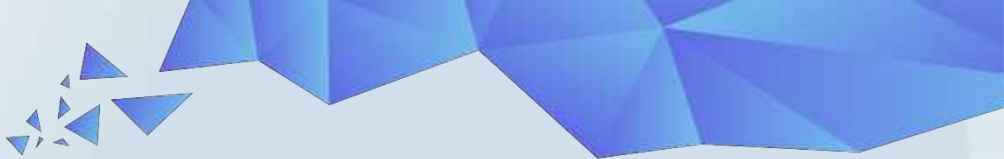
## Assisting Mobile Robot

Combined with the vehicle properties, assisting mobile robot is equipped with mechanical devices such as lifting, turning, stretching and load shifting, to realize the efficient assembly and testing of the engine, front and rear axle, gearbox, complete machine equipment and other products. The robot can be customized according to the characteristics of the product, to meet the requirements of different products' process assembly. Build intelligent and flexible assembly platform for customers.

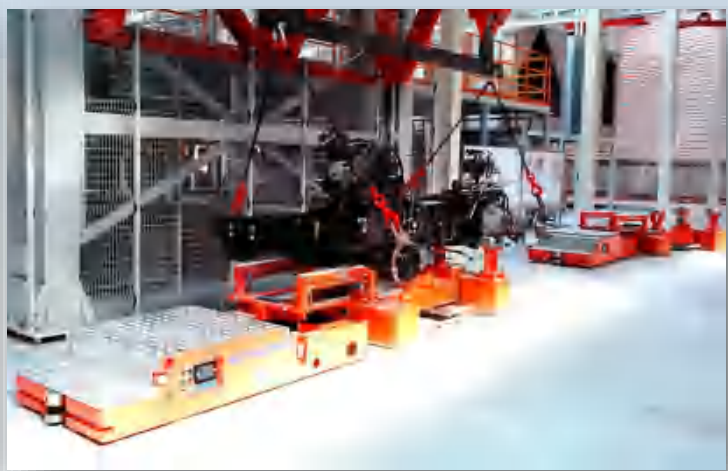
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# Assembly Assisting Mobile Robot





# Typical Application



*Mobile Robot BG*





## Custom Mobile Robot

Custom mobile robot is tailored to the specific needs of users. According to different industries, products and technologies, they can be divided into hybrid robots, multi-vehicle mobile robots, high-precision mobile robots, clean room mobile robots and so on.

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# Custom Mobile Robot



Others

Hybrid

High precision

Service



# Typical Application



*Mobile Robot BG*





03

# Advantages

Forklift AGV in application



# Core Advantages

- SIASUN has independent mobile robot core controller, vehicle body control software and scheduling software.
- With rich experience in mobile robot product customization development and application.
- Has a comprehensive quality control and management system. Products passed CE certification, UL certification, GOST certification, CR certification.

20+

Years of product development

1200+

Project implementation experience

13+

Export country and areas

60+

Different kinds of mobile robots

40%

Share of high-end market

12000+

Sets of AGVs



China's first mobile robot provider with whole system passed CE certification



UL Certification



Russia GOST certification



China CR Certification



Electrical Safety Authority

Canada ESA Certification

# Technical Advancement



## | Control System

- **Flexible Scheduling:** a single system supports up to 8 models and more than 300 sets of AGVs.
- **Intelligent Management:** Central management of battery (life and maintenance), provides data storage, analysis and statistics, and supports deadlocking mechanism to avoid deadlocks. Supports cross-floor scheduling. Provides remote on-line, download, monitoring and maintenance functions.
- **Humanized Design:** support dual-system hot backup, 24X7 uninterrupted operation. Implementation of statistical functions and data analysis.



## | Controller

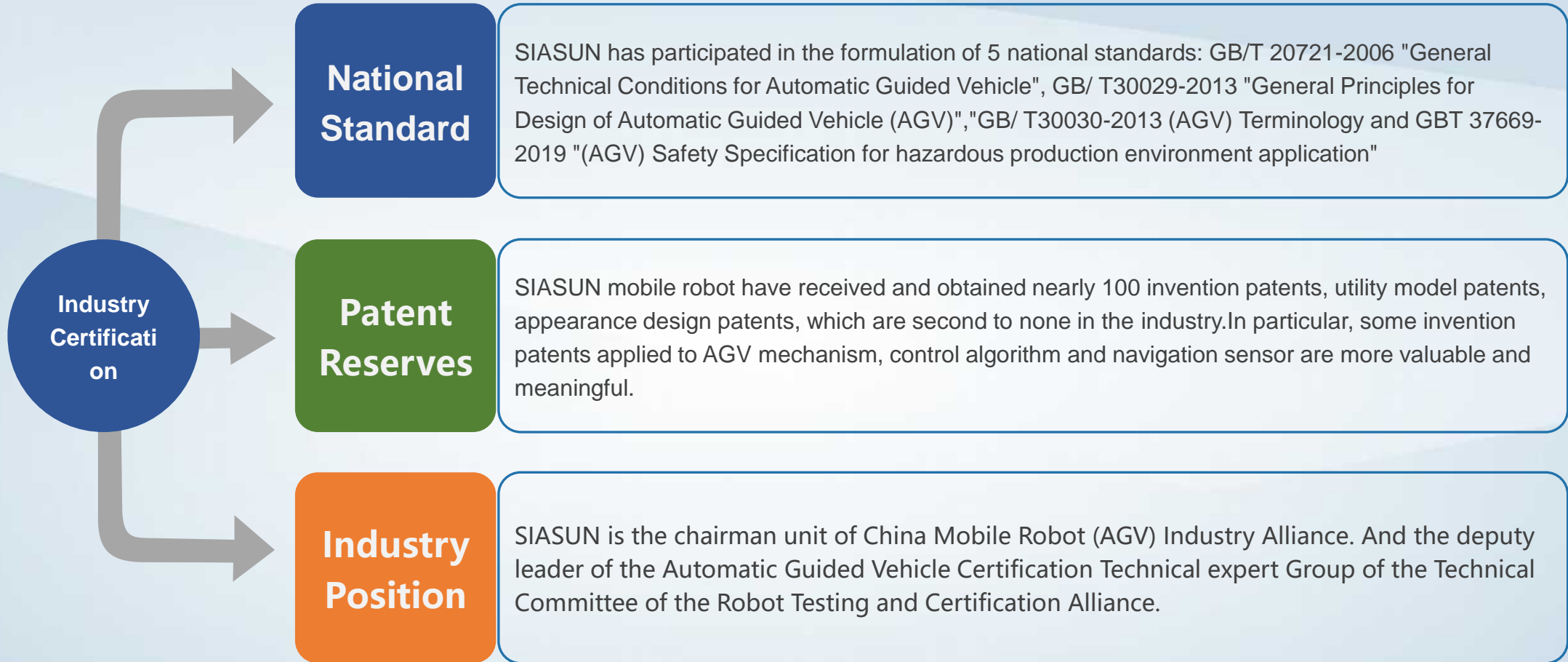
- **Main controller:** the main controller VCU300, which is independently developed by SIASUN, with embedded CAN bus, integrates the components and communication components required by high-speed computing hosts such as mainboard, electronic disk, network card, CAN communication port and serial port.
- **Motion controller:** Motion control module MUC50, besides control and motion algorithm, increases the protection function of stall protection, overload protection and overcurrent protection.
- **Standard:** Passed the European CE certification standard



## | Navigation System

- **Navigation:** magnetic navigation, laser navigation, inertial navigation, ribbon navigation, electromagnetic navigation, two-dimensional code visual navigation, GPS navigation, natural navigation and other navigation methods.
- **Complex navigation:** it can realize multiple navigation complex technologies, such as magnetic navigation + inertial navigation, magnetic navigation + laser navigation, two-dimensional code navigation + natural navigation, etc.
- **New navigation:** combined with advanced SLAM algorithms and other new navigation methods.

# Industry Certification



# Industrial Position



Chairman Unit of China Mobile Robot (AGV/AMR) Industry Alliance  
Leader unit of National Robot Standardization Group  
National Technology Center  
National Engineering Research Center  
863 plan intelligent robot theme industrialization base  
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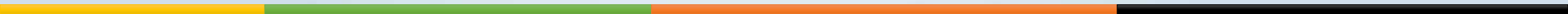




# Service & Support



-  Spare parts service
-  Product hardware & software upgrade service
-  Remote Technical Support
-  Equipment maintenance
-  Training and licensing services





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