



## SIASUN AGV Introduction

Dept: Mobile Robot BG

Date: 2020.7





Brief Introduction Regarding Mobile Robot BG



AGV & System Configuration



AGV Technology



AGV Manufacturing & Quality



AGV Product Category



AGV Applications



Service & Support



Customized Solutions

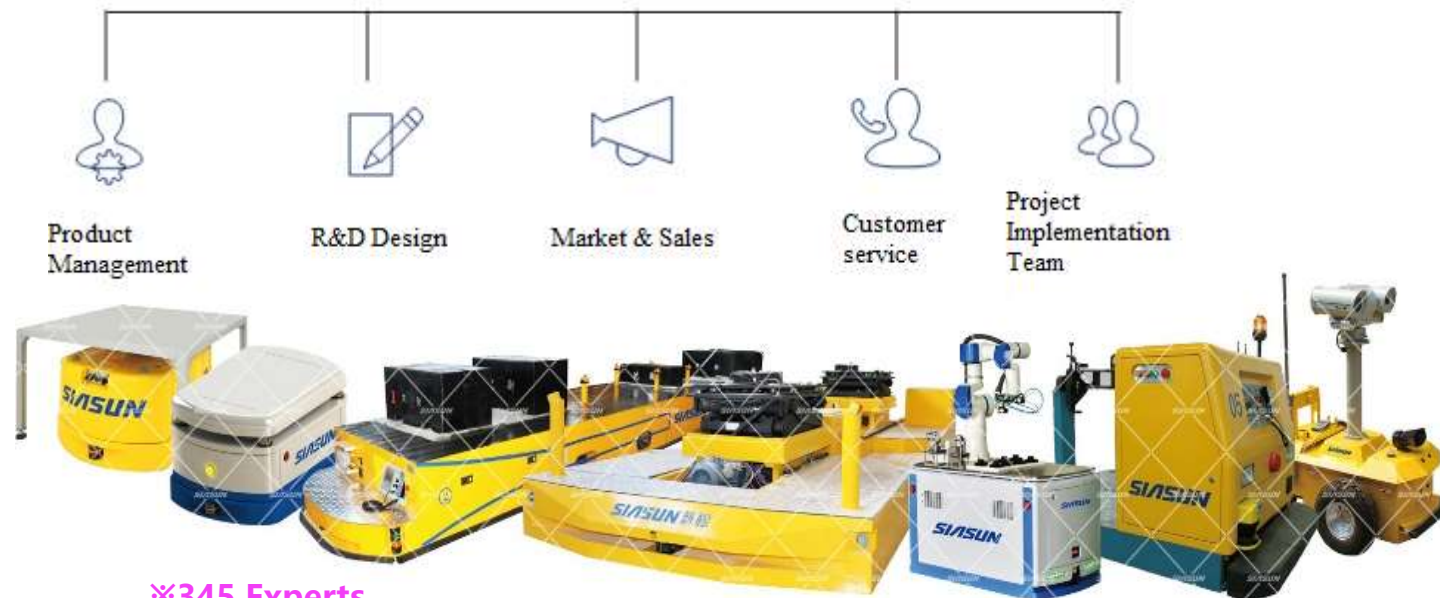


# Brief Introduction of Mobile Robot BG

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**We own**



※345 Experts

※12 Members for BG Management Group

※67 Engineers for Mechanical Team

※67 Engineers for Electrical Team

※44 Engineers for Software Team

※30 Engineers for R&D

※45 Engineers for Project Implementation and Management

※Sale Revenue: around 700 million CYN/ year

※60 Engineers for After-sales Service

※Around 200 projects per year

※Deliver more than 1000 sets of AGVs

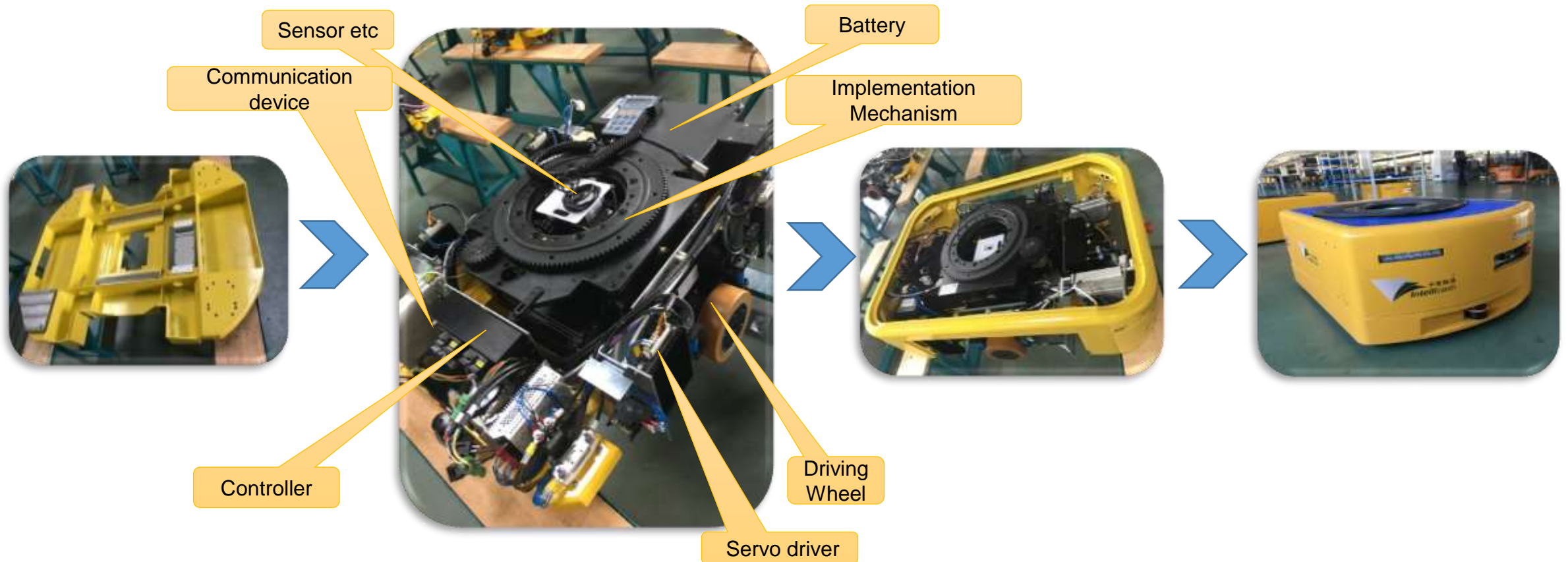
## Industrial position:

- ☐ The earliest AGV R&D supplier, who makes 1200 AGV projects;
- ☐ China, even the whole world, the largest AGV supplier with the full sets of AGV products;
- ☐ China Mobile Robot (AGV) Industry Union Board-Chinaman Unit.

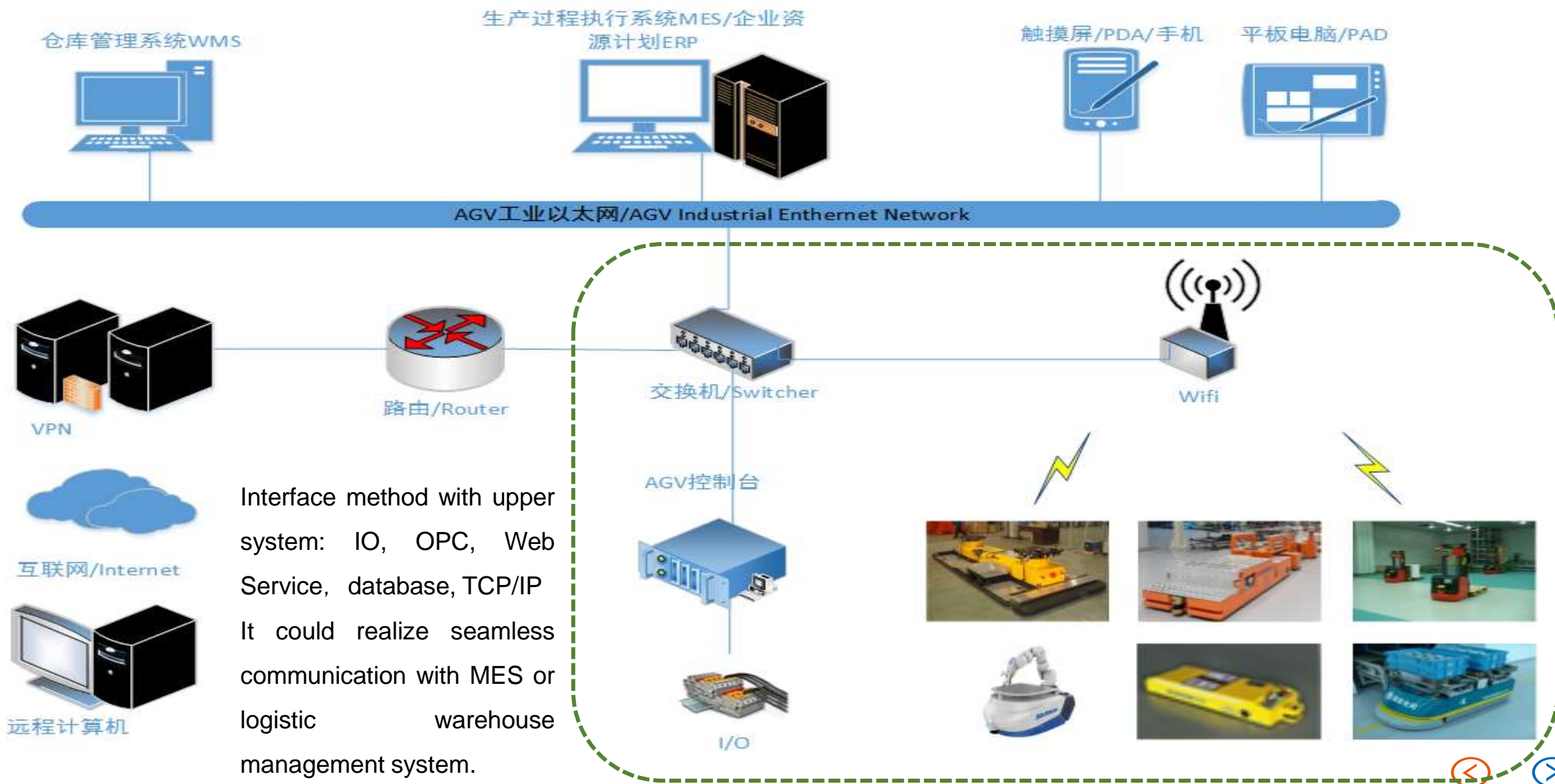


# AGV & System Configuration

AGV is mainly consisting of vehicle structure, driving wheels, servo system, control system, batteries, safety sensor, navigation device, HMI, and communication device etc.



# AGV & System Configuration



Interface method with upper system: IO, OPC, Web Service, database, TCP/IP  
 It could realize seamless communication with MES or logistic warehouse management system.

远程计算机

## AGV Technology— Multiple AGV Dispatching and Management

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With the method of centralized dispatching management, realize the flexible control and monitoring the real-time running state of AGV system.

In the GA shop of General Motors Wuhan plant, there are 150 sets of AGV and in the press workshop, there are 93 sets of AGVs.

- System monitor
- Task allocation
- Collision avoidance management
- AGV charging management

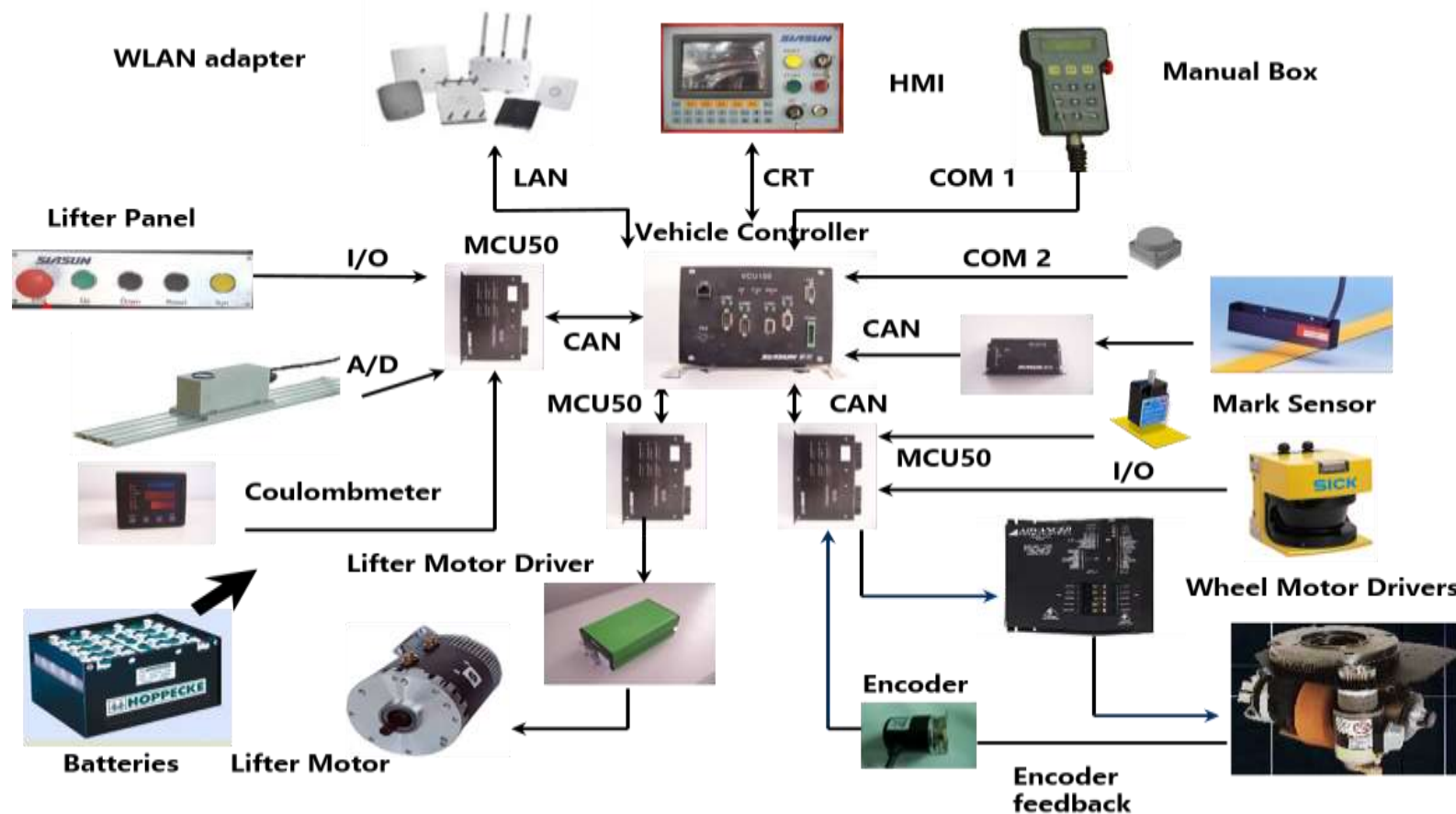
- Contact with production line
- Manually operate traffic controller
- System fault alarm



# AGV Technology—AGV Control System

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SIASUN AGV adopts distributed control structure based on CAN buss communication. The AGV component layout is simple and reliable. The main controller is SIASUN patent product with sound stability and reliability. For some surrounded components, they are also from international famous brands.



# AGV Technology— Single and Mixed Navigation

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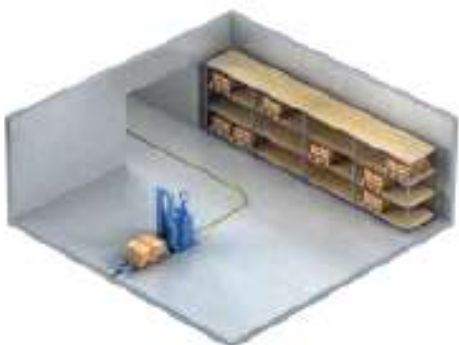
Magnetic Navigation



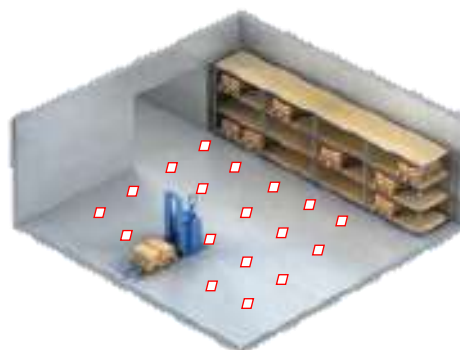
Laser Navigation



Inertial Navigation



Inductive power Navigation



Visual Navigation



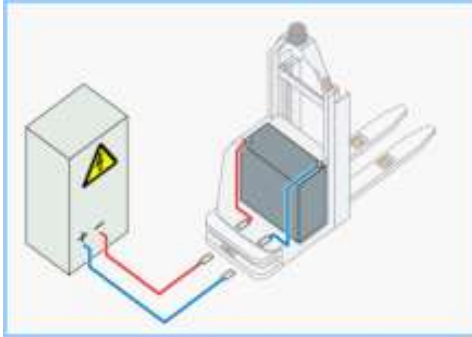
Nature Navigation





# AGV Technology—Battery and Charging Method

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## Automatic Charging

- With Nickel Cadmium batteries
- With lead-acid batteries
- With lithium batteries
- Inductive Power



## Automatic Battery Charging

•Battery Type	•Max Charging Current	•Charging type	•Remark
•Lead-acid Battery	•0.2C	•Exchange or on-line charging	•AGC or AGV with no strictly cycle time requirement
•Ni-Cad Battery	•2C	•On-line charging	•24 hours working
•Li Battery	•1C	•Exchange or on-line charging	•24 hours working with relatively safe & stable situation



# AGV Technology— Safety Technology



## Hardware design

- Laser bumper - optional
- E-Stop buttons
- Warning lights and alarm sound
- Redundancy and fail-safe components
- Watchdog circuit in the vehicle controller



## Software design

### “Out of Track” protection

*If the navigation error becomes too big, the vehicle will stop automatically*  
*Small fault in magnetic tape can be tolerated*

### “Missing Mark Tag” protection

*If a mark tag is missing (at the expected location), the vehicle will stop automatically*

### Automatic stop when wireless communication break

*Network connectivity is checked for every 1 second*  
*If the wireless communication breaks, all the vehicle will stop automatically (The communication break time is configurable)*



# AGV Manufacturing—Quality Management System

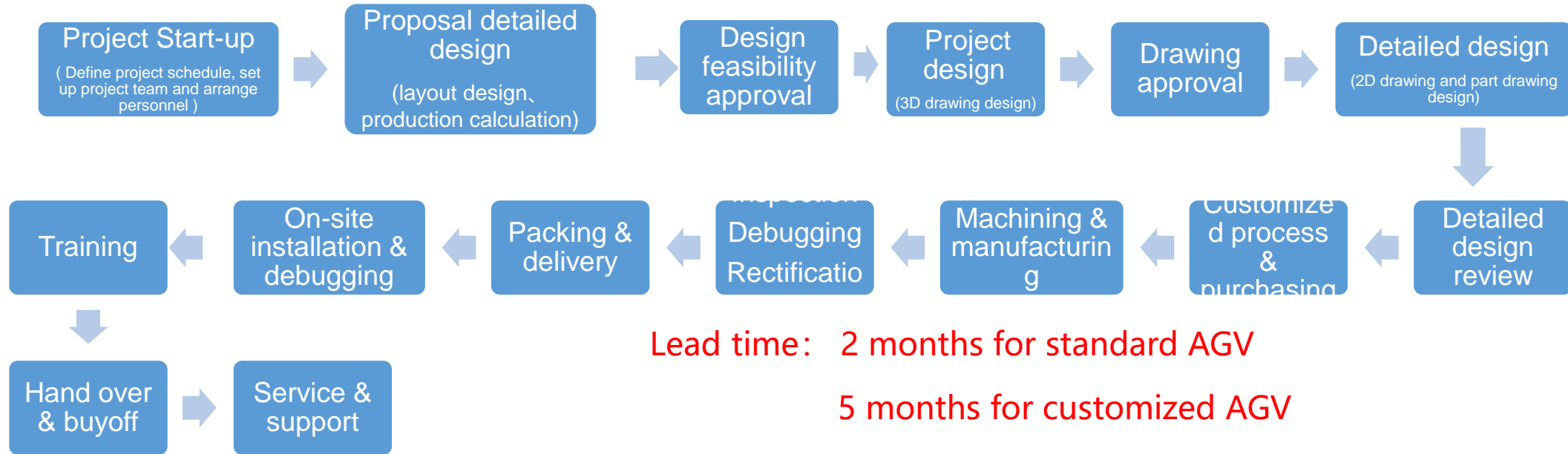


Create Product Quality      Details Determines Success



# AGV Manufacturing—Manufacturing Process & Lead Time

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Lead time: 2 months for standard AGV

5 months for customized AGV

Manufacturing capacity: 2000 set/year



# AGV Manufacturing

SIASUN AGV has good quality, which endures for long-term market tested. Today, the AGVs manufactured 18 years ago has been used at customer' s site.

SIASUN AGV has obtained many international certificates such as UL, CE, CSA, Gost-R etc.



# AGV Product Category



## References



## AGV Applications

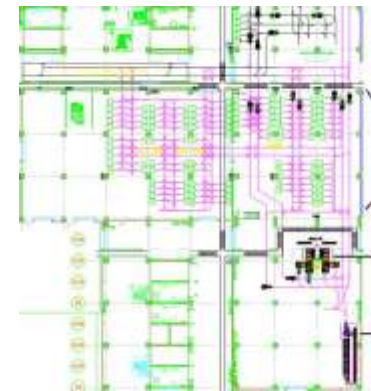
Application 1— BMW Engine Plant, core workshop, automatic logistic storage system

Project Time: 2014 (There are two engine plants for BMW in the world. SIASUN AGV is the first AGV project into the engine plant)

AGV Type and Quantity: Forklift AGV, 21 sets

Technical Feature: continuous running for 24 hours, automatic battery change, core management system management WMS (time management and type management), strong distributing system

WCS (The route is very complicated in small area).



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Item	Linde-L14
Dimension	2200 mm* 860 mm*2100mm
Load Capacity	1100kg
Speed	0 ~ 72m/min 33 m/min (working speed)
Max. Load Capacity	1400kg
Lift Height	0-2500mm
Vehicle Battery Type	Lead-acid (Original one from Linde)
Navigation Method	Laser Navigation
Stop Accuracy	± 10mm
Communication	802.11 b/g WLAN
Operation Mode	Auto/Semi-auto/Manual
Charging Method	Automatic battery change station.

# AGV Applications



Forklift AGVs are also used in below customers





# AGV Applications

Forklift AGV Projects: till Dec 31<sup>st</sup>, 2018, more than 300 sets of AGVs for 104 projects.

序号	项目号	客户名称	项目年度	货物描述	数量	行业
1	202044	西安西开高压电气股份有限公司	2002	LGW激光导引车	1	汽车
2	204015	武汉理工大学物流工程学院	2004	激光导引车 (LGV) 系统	1	教学
3	204019	浙江经济职业技术学院	2004	LGW自动输送系统	1	教学
4	205010	重庆卷烟厂	2005	辅料库LGW自动输送系统	4	烟草
5		山东福瑞达药业	2005	LGW自动输送系统	1	制药
6	206091	内蒙古蒙牛高科乳业有限公司	2006	LGW自动输送系统 (其中4台叉车带夹抱)	6	食品
7	207006	珠海醋酸纤维有限公司	2007	辅料库LGW自动输送系统	2	化工
8	207126	华北电网公司北京电力公司	2007	LGW激光导引车	2	电力
9	208099	大庆油田	2008	岩芯LGW自动输送系统	1	化工
10	208011	昆明醋酸纤维有限公司	2008	辅料库LGW自动输送系统	2	化工
11	208116	吉林烟草工业有限责任公司	2008	LGW自动输送系统	4	烟草
12	209075	山东太阳纸业股份有限公司	2009	AGV自动输送系统	3	造纸
13		天津天士力制药股份有限公司	2010	LGW自动输送系统	2	医药
14	210275	重庆卷烟厂	2010	激光导引车 (LGV)	2	烟草
15	211089	太原东杰装备有限公司	2011	横梁抱吊件一期叉车式AGV输送系统	1	制造
16	212155	天津卷烟厂	2012	LGW自动输送系统	12	烟草
17	212205	沈阳道市有限公司	2012	LGW自动输送系统	6	印钞
18	213245	上海三菱电梯	2013	AGV自动输送系统	1	制造
19	214521	延吉烟厂	2014	LGW自动输送系统	1	烟草
20	214493	上海永乾机电有限公司	2014	LGW输送系统	2	电力
21	214037	重庆电力	2014	AGV自动控制系统	4	电力
22	214103	大庆油田	2014	LGW自动输送系统	1	制造
23	214452	四川大西洋焊接材料股份有限公司	2014	AGV自动化输送系统	3	制造
24	214452	四川大西洋焊接材料股份有限公司	2014	AGV自动化输送系统(6台+3台)	9	制造
25	214452	四川大西洋焊接材料股份有限公司	2014	AGV自动化输送系统	2	制造
26	214319	天津卷烟厂	2014	LGW自动输送系统	3	烟草
27	214323	顺丰速运	2014	叉式AGV系统	1	物流
28	215670	西安印钞新建工房	2015	AGV自动输送系统	6	印钞
29	215289	上海永乾机电有限公司	2015	南京国轩AGV自动输送系统	3	新能源
30	215670	中石化北京分公司	2015	中石化北京分公司AGV设备	1	石油
31	214200	华晨宝马汽车有限公司	2015	宝马铸造车间砂芯物流AGV	8	汽车
32	215211	首都航天机械公司	2015	自动化物流仓储系统	1	制造
33	215336	中银 (宁波) 电池有限公司	2015	样板车间AGV输送系统	2	新能源
34	215385	天津力生制药AGV输送系统	2015	AGV输送系统	2	医药
35	215380	上海威派格AGV系统	2015	上海威派格环保科技有限公司	8	制造
36	216046	中车株洲电机有限公司	2016	AGV自动输送系统	3	制造
37	216098	西安印钞有限公司	2016	西安印钞有限公司AGV小车	3	印钞
38	216171	北京机械工业自动化研究所	2016	安然纳米有限公司AGV自动输送系统	1	制造
39	216191	华晨宝马汽车有限公司	2016	铸造车间-90U砂芯物流系统	6	汽车
40	216246	武汉宁德仓储设备有限公司	2016	新疆安琪酵母AGV自动输送系统	1	制造
41	216290	北京工业技术学校	2016	AGV自动输送系统	5	教学
42	216421	国网上海市电力公司	2016	上海国网电力公司AGV	2	电力
43	216431	杭州老板电器股份有限公司	2016	杭州老板电器钣金车间AGV配送	5	家电
44	216470	福州京东方光电科技有限公司	2016	AGV系统	2	半导体
45	216540	湖北黄冈伊利乳业有限公司黄冈分公司	2016	伊利武汉黄冈 L14叉车	4	食品
46	216548	蒂森克虏伯转向系统 (常州) 有限公司	2016	叉式AGV系统	2	制造
47	216631	大连捷云自动化有限公司	2016	J7变频器项目AGV输送系统	2	制造
48	216645	北京机械工业自动化研究所	2016	正大食品 (襄阳) 熟食自动化冷库AGV系统	2	食品
49	216701	南通天蓝环保能源成套设备有限公司	2016	叉式AGV系统(户外)	2	环保设备
50	216760	福州京东方光电科技有限公司	2016	AGV系统	2	半导体
51	216877	上海延峰江森汽车有限公司	2016	自动化物流搬运系统	1	汽车
52	217071	合肥中外运物流发展有限公司	2017	库房自动化设备	1	轮胎

序号	项目号	客户名称	项目年度	货物描述	数量	行业
53	217071	合肥中外运物流发展有限公司	2017	库房自动化设备	1	轮胎
54	217081	北京伍强科技有限公司	2017	叉式AGV自动输送系统	2	医药
55	217081	北京伍强科技有限公司	2017	太极药业叉式AGV自动化输送系统	1	医药
56	217235	中车株洲电力机车有限公司	2017	立体库房及AGV小车采购项目	2	制造
57	217235	中车株洲电力机车有限公司	2017	立体库房及AGV小车采购项目	3	制造
58	217277	厦门正新橡胶工业有限公司	2017	正新轮胎AGV项目	2	轮胎
59	217283	福建中科兰剑智能装备科技有限公司	2017	agv自动引导系统 (叉车)	1	新能源
60	217285	北京伍强科技有限公司	2017	叉式AGV激光导引车	4	医药
61	217368	武汉长飞光纤光缆股份有限公司	2017	套管盘配送自动化输送系统	5	光纤
62	217430	北京正大置业发展有限公司	2017	北京正大置业自主激光叉车AGV输送	1	食品
63	217550	上海烟草集团有限责任公司天津卷烟厂	2017	上海烟草集团有限责任公司天津卷烟厂AGV自动输送系统	1	烟草
64	217597	天津雄邦压铸有限公司	2017	AGV自动输送系统	5	制造
65	217621	立信染整机械 (广东) 有限公司	2017	中山工厂ATC实验室AGV输送系统 (叉车)	1	纺织
66	217637	立信染整机械 (广东) 有限公司	2017	山东烟台林AGV输送系统 (叉车)	2	印染
67	217703	肇庆遨游动力电池有限公司	2017	PACK物流采购系统	2	新能源
68	217847	内蒙古伊利实业集团股份有限公司乌兰察布	2017	伊利内蒙古乌兰察布AGV项目	4	食品
69	217936	上汽菲亚特红岩动力总成有限公司	2017	新增AGV输送系统	7	汽车
70	217A33	江苏安方电力科技有限公司	2017	省中心库设备 (平置自动库AGV) - 重载	7	电力
71	218005	蒂森克虏伯转向系统 (常州) 有限公司	2018	叉式AGV转运系统-3AGV	1	制造
72	218160	北京新联铁科技发展有限公司	2018	成都动车检修段AGV搬运系统	1	制造
73	218146	无锡中鼎集成技术有限公司	2018	芜湖长春汽车AGV系统	5	制造
74	218182	山东新华医疗设备机械股份有限公司	2018	AGV系统	1	医疗设备
75	218186	金驰能源材料有限公司	2018	车用锂电池正极材料产业化及环保技改项目AGV自动输送系统	9	新能源
76	218198	杭州新松机器人自动化有限公司	2018	3M中国有限公司物流搬运AGV系统	2	制造
77	218212	重庆长安NE1发动机机缸盖铸造线-AGV输送系统	2018	重庆长安NE1发动机机缸盖铸造线-AGV输送系统	2	汽车
78	218217	重庆力劲机械有限公司	2018	重庆长安NE1系列发动机曲轴箱铸造后处理搬运AGV系统	3	汽车
79	218221	天津市人维科技发展有限公司	2018	重庆长安 H5期车间的AGV自动输送系统合同	3	汽车
80	218269	蒙山印刷 (上海) 有限公司	2018	叉式AGV输送系统	2	印刷
81	218677	辽宁机电技术学院	2018	叉式AGV输送系统	1	教学
82	218332	常熟奇瑞捷豹路虎汽车有限公司	2018	发动机工厂叉式AGV转运	2	汽车
83	218422	3M中国有限公司	2018	上海漕河泾工厂物流搬运AGV系统	1	制造
84	218453	吉林大华机械制造有限公司	2018	立体仓库成套设备和配套软件项目	2	制造
85	218716	武汉宁德货架	2018	安琪酵母云南德宏项目	1	制造
86	218735	上海翔港包装科技股份有限公司	2018	AGV物流输送系统	4	包装
87	218783	蒂森克虏伯转向系统 (常州) 有限公司	2018	叉式AGV转运系统-4th AGV	1	制造
88	218809	江苏上上电缆集团有限公司	2018	AGV运输系统	3	电缆
89	218816	广州印钞有限公司	2018	自动化立体仓库物流系统	11	印钞
90	218826	内蒙古金川伊利乳业有限公司	2018	AGV智能搬运系统成套设备	7	食品
91	218842	长飞光纤光缆股份有限公司	2018	VAD车间物流智能化成套装备	1	光纤
92	218919	中国重汽集团济南橡塑件有限公司	2018	国六后处理项目后处理器总成焊装装配生产线	2	汽车
93	218963	宁波富邦电池有限公司	2018	电池搬运AGV项目	1	新能源
94	218969	泛亚汽车技术中心有限公司	2018	金桥园区相关物流设备设施	1	汽车
95	218A40	北京伍强科技有限公司	2018	常州同方视威	2	医疗设备
96	218A95	南京佛宁电气有限公司	2018	托盘搬运T30	6	制造
97	218C37	上海汉申精机	2018	智能物流设备AGV	1	制造
98	218C45	东北制药有限公司	2018	智能物流系统	4	医药
99	218C45	东北制药有限公司	2018	智能物流系统	6	医药
100	218C61	中国东方电气集团有限公司	2018	东方电机定子冲片自动化物流运行系统	4	电机制造
101	218C61	中国东方电气集团有限公司	2018	东方电机定子冲片自动化物流运行系统	1	电机制造
102	218C69	江苏汤臣汽车零部件有限公司	2018	自动化总装装配线、智能上料与仓储产线项目	2	汽车
103	218D32	湖北华强科技有限责任公司	2018	201工房智能仓储系统	3	制造
104	218D37	兖矿鲁南化工有限公司	2018	全自动包装仓储管理系统	1	化工



## AGV Applications

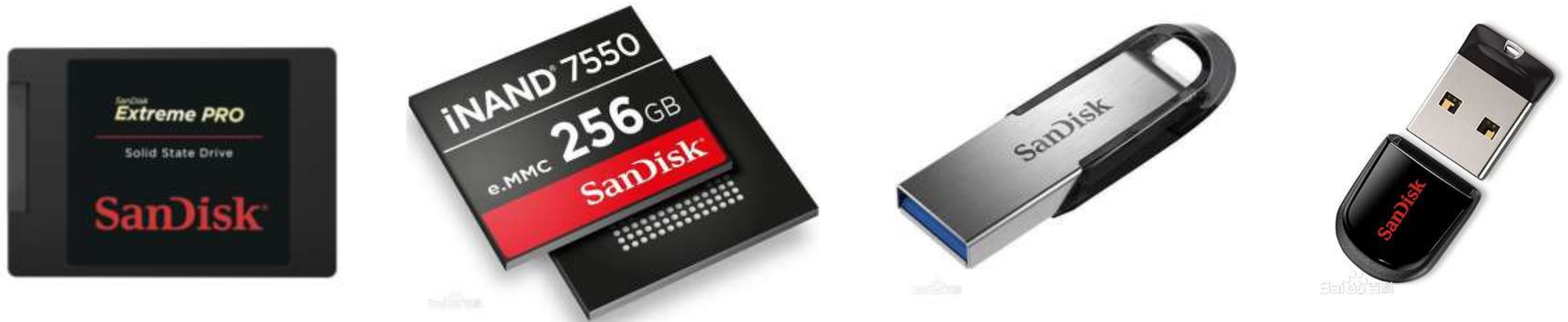
Application 2 —— AGV Transport System for SanDisk Semi-conductor (Shang Hai) Co., Ltd

SanDisk Semi-conductor (Shang Hai) Co., Ltd is founded on Aug 1<sup>st</sup>, 2006. It is an US. And China Joint Venture.

The core product of SanDisk is the digital camera and other consumption electronic product, full functional mobile robot and USB flash drive. SanDisk is the leading company in the flash drive and sales area, which possess around 30% of the market share.

Project Time: 2014 to 2019, it is around 11 projects including Shanghai, Malaysia etc .

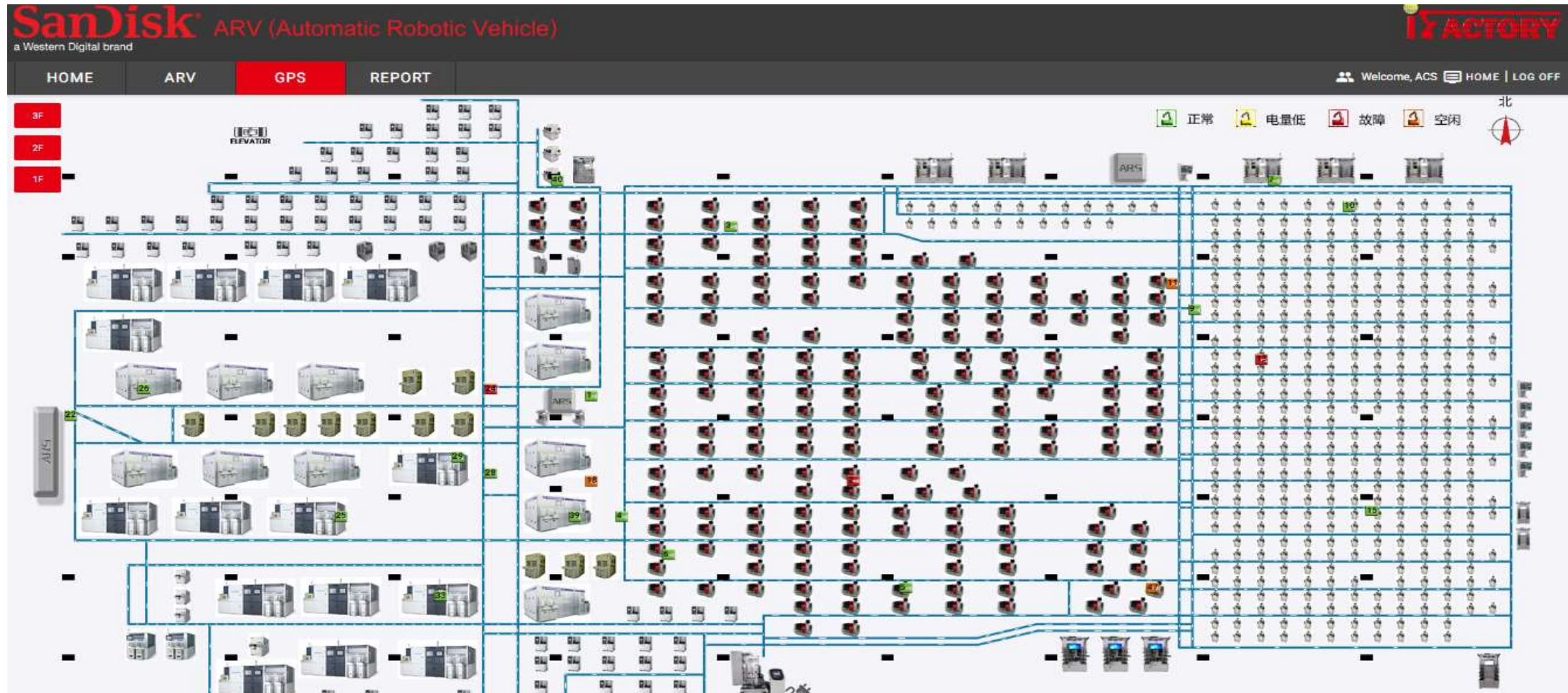
AGV Type and Quantity: Sorting AGV , 18 Sets; Compound AGV 91 Sets , 1000 level cleanness .



# AGV Applications

Application 2——Transport AGV System for SanDisk Semi-conductor (Shang Hai) Co., Ltd

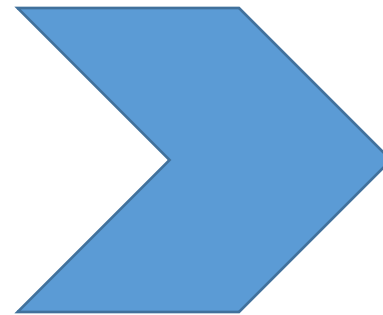
Below is the layout of SanDisk site, covering the overall technical process including Back Grinding—Wafer Saw—Die Attach—Wire Bonding—Molding—Package Saw—Memory Test· · · · ·



# AGV Application

Application 2——Transport AGV System for SanDisk Semi-conductor (Shang Hai) Co., Ltd

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The inbound and outbound for material and product method is changed from manual taking to sorting AGV.



# AGV Applications

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Application 2——Transport AGV System for SanDisk Semi-conductor (Shang Hai) Co., Ltd



The automated transfer of magazine and material upload and download is changed from the traditional low efficiency manual operation to ARV(Automatic Robotic Vehicle).



## AGV Applications

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Application 2——Transport AGV System for SanDisk Semiconductor (Shang Hai) Co., Ltd



The automated transfer of core tray and material upload and download is changed from the traditional low efficiency manual operation to ARV(Automatic Robotic Vehicle).

# AGV Applications

## Sorting AGV

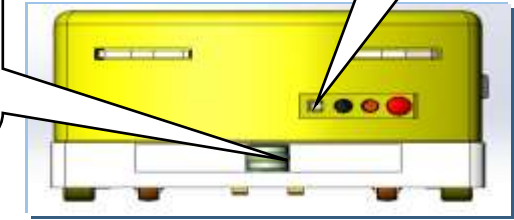
Item	Parameter	Unit
Dimension	1000(L)700(W)300(H)	mm
Dead weight	260	KG
Max.lifting height	60	mm
Load capacity	500	KG
Height from bottom to the floor	30	mm
Max.running speed	1.5	m/s
Empty load acceleration	1	m/s <sup>2</sup>
Empty load deceleration	1	m/s <sup>2</sup>
Full load acceleration	0.3	m/s <sup>2</sup>
Full load deceleration	0.5	m/s <sup>2</sup>
Self-spinning speed	1.5	Rad/s
Lift up/down speed	0.02	m/s
Navigation accuracy	±10	mm
Stop accuracy	±10	mm
Angle accuracy	±1	degree
Battery voltage	48	V
Battery capacity	26	Ah
Charging cruising capacity	2-3	H

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## AGV-V-T500D(2)500KG



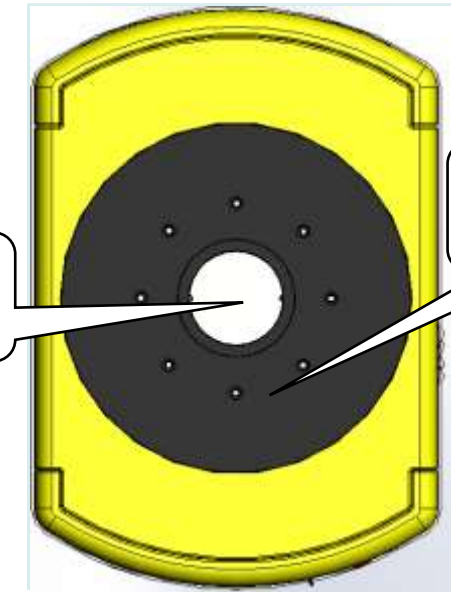
Laser scanner



AGV data interface



Optical reader



Load platform



## AGV Application

ARV(Automatic Robotic Vehicle), we call it as compound AGV.

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# AGV Applications



上海汇众

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Application 3——Rear axle assembly line for Yantai Huizhong

Project Time : 2011。

AGV Type & Quantity : 25 sets of transport AGVs.

Technical Feature: As the carrier of rear axle, AGV transport the rear axle to the stations in the rear axle assembly line, which ensures the automatic locating accurately and realize the pre-operation based on the production request. This project has improve the flexibility of the productions line and the automatic efficiency of the workshop, which is a typical application of Industrial 4.0.



Battery Pack Line(65 AGVs for FAW VW, Qingdao)



一汽-大众  
FAW-VOLKSWAGEN



Gear box assembly(Fast, Xi' an)



Fast



# AGV Applications

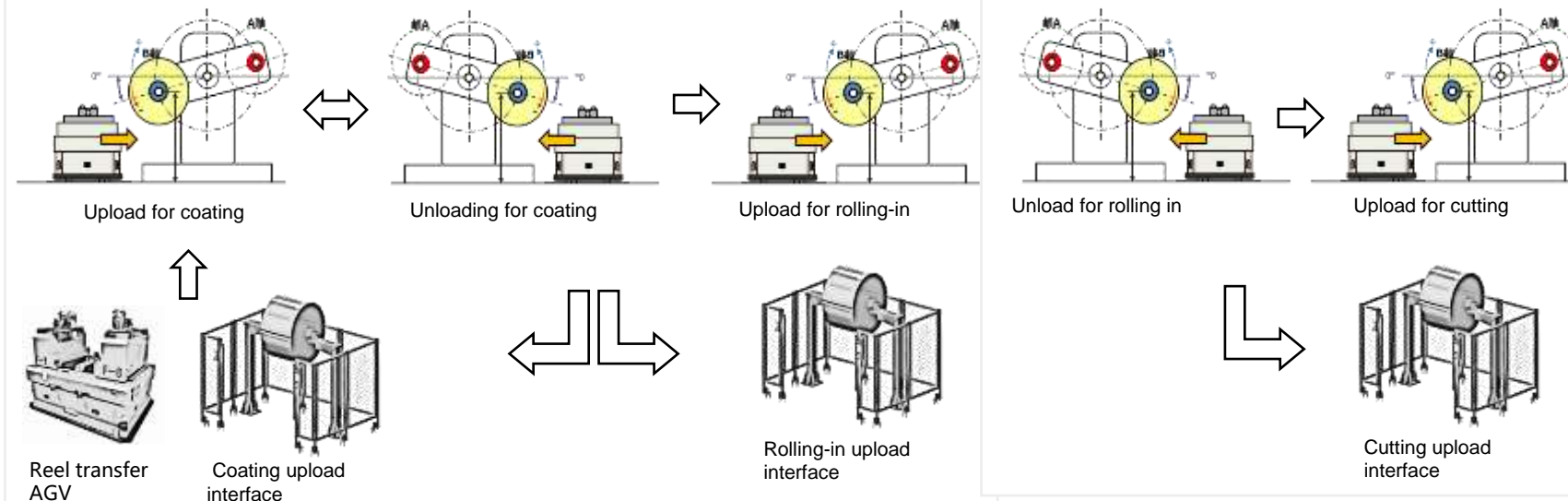
Application 4—— High accuracy coating AGV project for CATL

Project Time: 2016

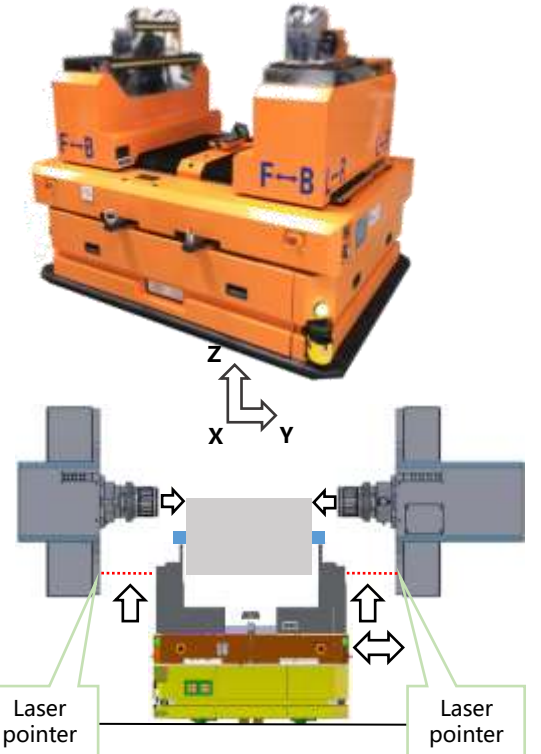
AGV Type and Quantity: 25 sets of high accuracy AGVs.

Technical Feature: This type of AGV is used for the pre-working process of the upload and unload of the tinfoil real etc and interface with the working platform. The interface accuracy could reach  $\pm 2\text{mm}$ , which better solve the problems such as heavy and dangerous manual load & unload operation and high accuracy need. By adopting of this type of AGV, the transfer production is more rapid and safe.

This AGV is sued for upload & unload of coating → upload & unload for drying machine → upload & unload for roll-in machine → upload & unload of cutting machine.



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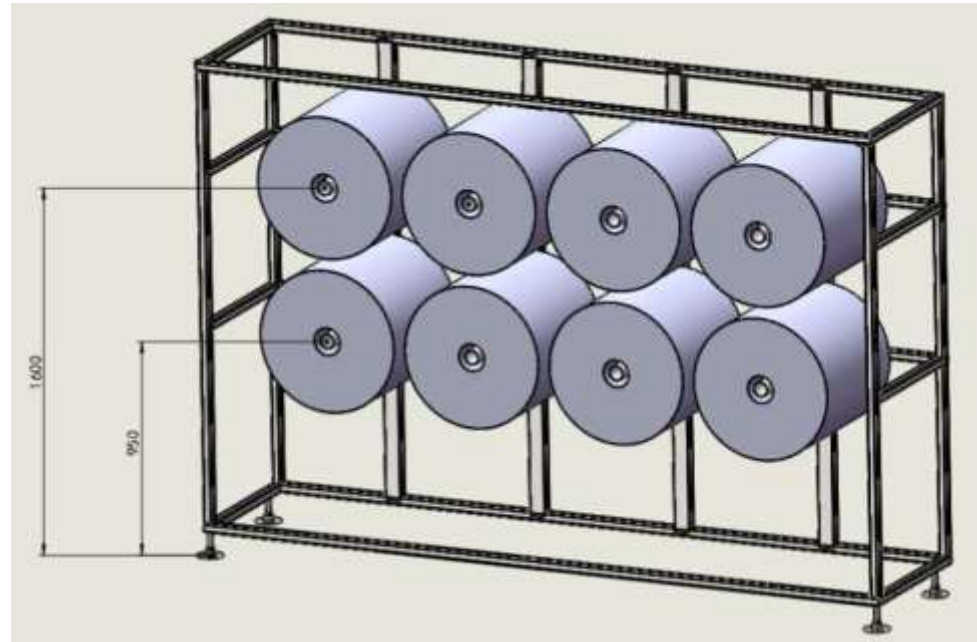
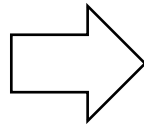
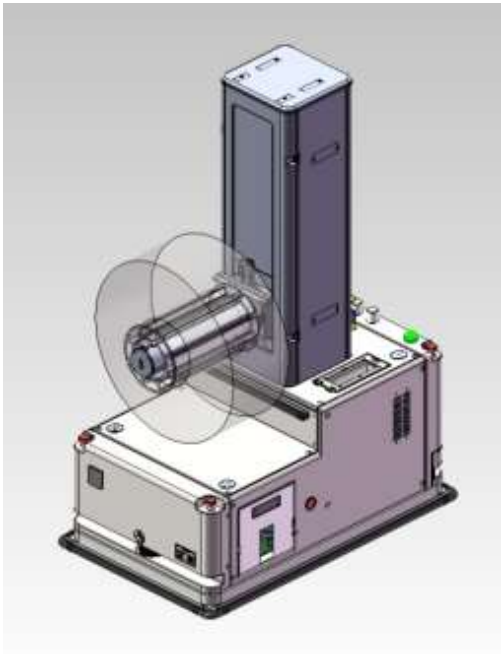
## AGV Applications

Application 5——High accuracy coating AGV project for CATL

Project Time: 2016

AGV Type and Quantity: 43 sets of single arm AGVs

This AGV is used for the unload of the materials from the cutting machine. After unload, AGV takes the reels to the sealing box storage area. After the operation completed at the interface, AGV leaves the storage area. AGV arm axle could realize the accurate interface with the cutting machine and the sealing box reel support.



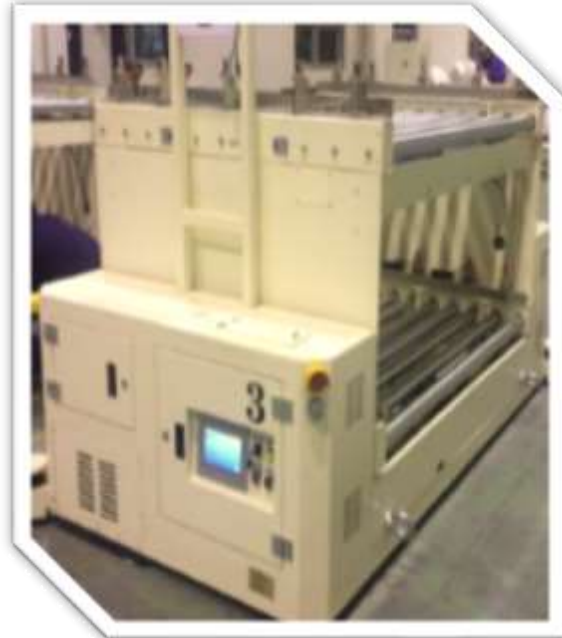
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## Other Transport AGV

- Roller AGV is based on the transport platform with roller conveyor or chain conveyor etc, which could realize the automatic transfer of the goods and pallet. The loading capacity is from several kilos to tons etc. It is often used for transport transfer before the ASRS and other interface transfer for different production lines.

Storage area ↔ Production line, warehouse ↔ production line ,  
production line ↔ flexible transfer for the production line



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# Service and Support

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## Our Service & Support

- SIASUN Robot & Automation Co., Ltd (Headquarter)
- SIASUN Co., Ltd (International headquarter)

- Korea SHINSUNGFA
- SIASUN Automation Co., Ltd (Singapore)
- Hong Kong SIASUN Robot Co., Ltd (International)
- Thailand SIAM SIASUN Robot Intelligent Co., Ltd
- Shanghai SIASUN Robot & Automation Co., Ltd

- Hangzhou SIASUN Robot & Automation Co., Ltd
- Qingdao SIASUN Robot & Automation Co., Ltd
- Tianjin SIASUN Robot & Automation Co., Ltd
- Ningbo SIASUN Robot & Automation Co., Ltd
- Beijing SIASUN Jiahe Electronic System Co., Ltd

- Tianjin Centre for Northern Region
- Suzhou Centre for Eastern Region
- Wuhan Centre for Middle Region
- Guangzhou Centre for Southern Region
- Xi' an Centre for Northwest Region
- Chongqing Centre for Southwest Region
- Chengdu Centre for Northwest Region
- Hefei Region

SIASUN has provided customer with full range of service and support, especially the after-sales service and support, which is implemented by telephone, email, site support, periodical visitation and profound training etc.

There are 20 sales and distributor centers all over the world . In mainland China, there are 3 professional AGV service centers. At Thailand and Singapore, there are service points. In Europe, SIASUN has long-term partnership with ATG. Therefore, SIASUN could provide support and service for the ease of customers.



# Customized Solutions

## Propose Solutions based on Customer's Needs

We



Listen for



Communicate



think deeply



Pay out



Promise



# SIASUN

www.siasun.com



新松服务号



新松订阅号



新松机器人自动化股份有限公司  
SIASUN ROBOT & AUTOMATION CO., LTD.

“8 minutes for Beijing” Show in  
Winter Olympics

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