



# Special Vehicle Autonomous Driving Industry Report, 2019-2020

Apr.2020

## STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

## REPORT OBJECTIVES

- ◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- ◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- ◆ To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- ◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- ◆ To help company to succeed in a competitive market, and

## METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications.

Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

## INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

## Abstract

### **Autonomous mining vehicle and autonomous sanitation vehicle markets take off.**

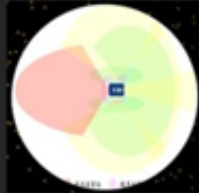

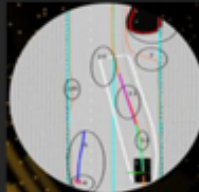

This report highlights progress of autonomous working vehicles in four fields: sanitation, airport, agriculture and mining. Autonomous working vehicles that run on relatively closed roads and fixed routes, are often free of public road traffic rules, making for popularization of highly automated driving technology. Although the COVID-19 pandemic hinders the development of autonomous driving at airports for the time being, autonomous driving technology for sanitation, agriculture and mining is developing by leaps and bounds.

### **Autonomous sanitation vehicle**

Urban autonomous sanitation street sweepers shall travel at speeds lower than 12km/h according to China's national standards. The use of autonomous driving technology in sanitation field enables all-weather and more efficient operation subject to strict specifications. In China, autonomous sweepers are being piloted in dozens of places nationwide, mainly for enclosed scenarios such as parks and scenic spots. As China spends RMB200 billion to RMB300 billion on sanitation and more than 100,000 sanitation vehicles are sold each year, autonomous sanitation vehicle sales and service market will be worth a staggering tens of billions of yuan considering sanitation vehicles are being replaced by self-driving ones.

In China, vision + radar solution currently prevails among technology roadmaps of autonomous sanitation vehicle manufacturers who differ greatly in underlying algorithms and sensor cost control. As pilot run and operation of autonomous sanitation vehicles are under way in some places of China, solution providers face challenges of cost control posed by mass production, so most of them turn to homemade sensors and low-cost computing platforms like ARM from NVIDIA.

## Typical Technical Solutions for Autonomous Sanitation Vehicle

	<p><i>Sensing-low cost</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Efficient integration of 23 sensors, 360-degree coverage without dead angle</li> <li><input type="checkbox"/> Recognize and track over 100 objects simultaneously</li> <li><input type="checkbox"/> Total sensor cost: &lt;RMB200,000</li> </ul>		<p><i>HD map-high precision stick-to-curb sweeping</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Automatic mapping</li> <li><input type="checkbox"/> SLAM localization accuracy: 3cm; independent of high accuracy GPS</li> <li><input type="checkbox"/> Stick-to-curb sweeping, with error below 5cm</li> </ul>
	<p><i>Planning-multi-road conditions</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Path planning based on multiple targets, considering running and sweeping functions</li> <li><input type="checkbox"/> Ability to travel on unstructured roads</li> <li><input type="checkbox"/> Sweeping trajectory overlay planning for maximum sweeping areas</li> </ul>		<p><i>ML Pipeline - continuous iteration</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Machine learning algorithm platform integrated with more than 100 AI algorithms</li> <li><input type="checkbox"/> Big data system allowing to upload and download 100T data on average per day</li> <li><input type="checkbox"/> Automatic fleet data uploading, storage, learning, online process</li> </ul>

Source: autowise.ai

Most start-ups build autonomous sweepers based on existing sweeping vehicles, while body frame and modules of Idriverplus VIGGO are developed specially for autonomous vehicle. VIGGO's electronic/electrical architecture consists of the following domains: Computing and Control, Powertrain, Body System, Steering System, Business System, and Information and Communication.

The new design that dispenses with driver's seat saves seat space for water tank or battery to increase effective operating radius.

By virtue of down-to-earth R&D and reliable products, Idriverplus acquired orders for 1,000 units of its 5G autonomous vehicles from China Mobile in July 2019. Hundreds of VIGGO sweepers have been sold.

In February 2020, Idriverplus also rolled out a spraying sterilizer vehicle for curbing coronavirus disease.



**Multi-domain Architecture**

Source: Idriverplus



Apart from VIGGO, cockpitless design is also found in AXL, a fully autonomous concept mining truck introduced by Scania. The vehicle represents a future trend for mining vehicle.



## **Autonomous mining vehicle**

Autonomous mining vehicles already find broad application in foreign countries. Autonomous mining vehicles of Fortescue Metals Group Ltd (FMG), an iron ore tycoon, have run a total of 33.5 million km and transported more than 1 billion tons of ores and materials, with production efficiency 30% higher than conventional manual transport. FMG has operated 137 self-driving mining vehicles.

In China, mining companies need to pay out tens of billions of yuan for workers to transport ores and materials each year, who cannot still ensure transport safety and efficiency. In major mining areas of China, road dump trucks featuring non-widebody and small tonnage are largely used with ownership of roughly 200,000 units, while around 5,000 units of off-road wide body dump trucks for mining are produced and sold annually, with ownership of just over 10,000 units. The refitted autonomous mining vehicle market (OEM and aftermarket) in China is valued at least RMB500 billion.



As concerns technology roadmap, mining trucks usually utilize the LiDAR + vision + radar solution for their common price of RMB800,000 at least makes manufacturers seldom weigh the cost of LiDAR. The three sensor fusion solution allows all-day, all-weather perception by sensing system in bad conditions at mines. That mining vehicles travel at low speeds and in simple environment means that LiDAR is optional so some companies also use vision + radar solution for a sharp cut in refit cost.

Major autonomous mining truck solution providers in China have actual projects carried out but all on small scale. Most of autonomous mining truck start-ups have closed one or two funding rounds, marking that capital has turned attention to the segment. At present, they are close to each other in technology roadmap but still need to improve their technology, with orders they announced often worth RMB100 million or so and few vehicles operated (generally dozens of units), which means no one plays a leading role.

## Autonomous Mining Truck Industry Chain



Source: Haier Industry Research Institute

Copyright 2012ResearchInChina

Following a contract for two new autonomous vehicles signed on July 4, 2019, Beijing Tage Idriver Technology Co., Ltd. and Inner Mongolia North Hauler Joint Stock Co., Ltd., China's largest mining truck manufacturer sweeping 80% of the domestic market, signed on April 8, 2020 a supply order for 10 sets of "autonomous driving control systems", which will be mounted on 10 units of new NTE200AT vehicles.

## **Autonomous agricultural vehicle**

Autonomous driving for agricultural machinery, the simplest one among all autonomous driving technologies for special vehicles, depends more on high-precision positioning systems and software algorithms. Mainstream hardware configuration is Beidou system + angle sensor + IMU, and vision is optional and available to users who need. In terms of technology roadmap, OEMs often use a hydraulic solution where electro-hydraulic proportional valves are used to drive steering wheel. In aftermarket, the electric steering wheel solution in which motors are used to simulate manual driving is largely used due to being easy to refit and low cost.

Globally, big agricultural machinery manufacturers all have a range of models pre-installed autonomous driving technology (GPS Ready). Examples include John Deere 8R Series, Case New Holland Magnum Series, and AGCO Auto Guide 3000 with standard configuration of Danfoss hydraulic valves. In the Chinese OEM market, hydraulic solutions rule the roost.

In aftermarket, hydraulic and steering wheel autonomous driving solutions take up a considerable proportion of installation and sales. In the Chinese market, flagship products of most system providers are steering wheel solution. Beijing UniStrong Science & Technology Co., Ltd. provides both hydraulic and steering wheel solutions but the hydraulic dominate; Shanghai AllyNav Technology Co., Ltd. has offerings of both, of which the hydraulic led previously and the steering wheel got vigorously promoted in 2019. Of the shipments of autonomous driving systems for agricultural machinery in China, electric steering wheel solutions shared roughly 20% and the hydraulic solutions swept 80% from 2018 to 2019.



In view of application, agricultural machinery self-driving systems are still expensive (RMB70,000-RMB80,000/set), and massively used in areas with large farmlands, like Xinjiang and Northeastern China. Agricultural machinery autonomous driving system market in China will be valued at RMB4 billion to RMB5 billion given that virtually 200,000 units of mid- and high-end tractors are sold a year and penetration of such systems is 50%. In future, autonomous driving and variable operations will bring a larger market.

**Comparison of Solutions between Agricultural Machinery Autonomous Driving Providers**

Company	Agricultural Machinery Autonomous Driving System	Oriented Market	Technology Roadmap	Autonomous Driving Solution	Sensor Configuration	Computing Platform
Zoomlion Heavy Machinery	-	OEM	Hydraulic	Vision + Beidou navigation + angle sensor + IMU	1 angle sensor + 3 stereo cameras	Apollo
Lovol Heavy Industry	-	OEM	Hydraulic/electric	Vision + Beidou navigation + angle sensor + IMU	1 angle sensor + 2 stereo cameras	Apollo
FJ Dynamics	Jiangyu agricultural machinery AD system	AM	Electric	Vision + Beidou navigation + angle sensor + IMU	2 angle sensors + 3 stereo cameras	-
Shanghai AllyNav Technology	AF300 Beidou/GNSS steering wheel AD system	AM	Electric	Vision + Beidou navigation + radar + IMU	1 angle sensor + 2 stereo cameras	ARM i.MAX6
Wuxi Kalman Navigation Technology	KM507 AD system	AM	Electric	Beidou + inertial navigation + radar + vision	1 angle sensor + 2 stereo cameras + 1 radar	-
ComNav Technology	AG302 electric steering wheel system AG600 hydraulic system	AM	Electric/hydraulic	Beidou navigation + angle sensor + IMU	1 angle sensor + 1 IMU	-
Beijing UniStrong Science & Technology	RinoSteer AD system	AM	Electric/hydraulic	Beidou navigation + angle sensor + IMU	1 angle sensor + 1 IMU	-

### 1 Overview of Special Vehicle Autonomous Driving Industry

- 1.1 Definition of Special Autonomous Vehicle and Applied Scenarios
- 1.2 Classification of Special Autonomous Vehicle
- 1.3 Application Roadmap of Autonomous Driving
- 1.4 List of Special Autonomous Vehicles Put into Trial Operation

### 2 Autonomous Sweepers and Companies

- 2.1 Sanitation Vehicle Market
  - 2.1.1 Overview of Sanitation Equipment Industry Chain
  - 2.1.2 Sanitation Vehicle Market Size in China
  - 2.1.3 Competitive Pattern of Sanitation Vehicle Market in China
  - 2.1.4 Sanitation Vehicle Market Structure by Type in China
- 2.2 Technology Trends of Sanitation Vehicle
  - 2.2.1 Technology Trends (1)
  - 2.2.2 Technology Trends (2)
  - 2.2.3 Technology Trends (3)
  - 2.2.4 Technology Trends (4)
- 2.3 Autonomous Sanitation Sweeper Technology and Market Trends
  - 2.3.1 Long-enduring Problems in Demand for Autonomous Sweepers
  - 2.3.2 Technical Solutions for Autonomous Sweeper

- 2.3.3 It is Easier for Sanitation Sweeper Field to Introduce Autonomous Driving Technology
- 2.3.4 Application of Autonomous Sweeper
- 2.3.5 China's Autonomous Sanitation Vehicle Manufacturers' Technical Solutions and Application
- 2.3.6 Autonomous Sanitation Sweeper OEM Market Size
- 2.4 COWAROBOT
  - 2.4.1 Profile
  - 2.4.2 Main Products
  - 2.4.3 Main Technologies (1)
  - 2.4.4 Main Technologies (2)
  - 2.4.5 Main Technologies (3)
  - 2.4.6 Autonomous Driving Path Planning
  - 2.4.7 Hardware Configuration of Autonomous Sweeper
  - 2.4.8 Partners in Autonomous Sanitation Field
- 2.5 Autowise.ai
  - 2.5.1 Profile
  - 2.5.2 Main Products
  - 2.5.3 Autonomous Sweeper: Technology Strategy
  - 2.5.4 Autonomous Sweeper: Progress in Commercialization
  - 2.5.5 Autonomous Sweeper: Product Testing
  - 2.5.6 Autonomous Sweeper: Application Cases

### 2.6 Idriverplus

#### 2.6.1 Profile

#### 2.6.2 Development History

#### 2.6.3 Low-speed Autonomous Driving Solutions

#### 2.6.4 Automated Vehicle Operating System (AVOS): Architecture

#### 2.6.5 Automated Vehicle Operating System (AVOS): Design Philosophy

#### 2.6.6 AVOS Key Technologies: HD Mapping & Positioning

#### 2.6.7 AVOS Key Technologies: Target Behavior & Trajectory Prediction

#### 2.6.8 VIGGO: Sensor Selection and Layout

#### 2.6.9 VIGGO: Electronic/Electrical Architecture

#### 2.6.10 VIGGO: Interface Wiring Harness Design

#### 2.6.11 VIGGO: Software Architecture

#### 2.6.12 VIGGO: Applied Scenarios

#### 2.6.13 Other Special Autonomous Vehicle Products

### 2.7 Gaussian Robotics

#### 2.7.1 Profile

#### 2.7.2 Development History

#### 2.7.3 Main Products and Functions

#### 2.7.4 Main Technologies (1)

#### 2.7.5 Main Technologies (2)

#### 2.7.6 Main Technologies (3)

#### 2.7.7 Main Technologies (4)

### 2.7.8 Main Technologies (5)

#### 2.7.9 Autonomous Sanitation Vehicle: Sensor Configuration

#### 2.7.10 Autonomous Sanitation Vehicle: Application Cases

### 2.8 DeepBlue Technology

#### 2.8.1 Profile

#### 2.8.2 R&D System and Core Technologies

#### 2.8.3 AI-driven Intelligent Sweeper: Main Functions

#### 2.8.4 AI-driven Intelligent Sweeper: Specifications

#### 2.8.5 Strategic Cooperation with Yantai Haide Special Vehicle Co., Ltd.

#### 2.8.6 Intelligent Manufacturing Open Platform was Released and Smart Manufacturing Factory was Kicked off

### 2.9 Eva Robot

#### 2.9.1 Profile

#### 2.9.2 Autonomous Sweeper: Control System Architecture

#### 2.9.3 Autonomous Sweeper: Sensor Configuration

#### 2.9.4 Orders

### 2.10 TC Robot

#### 2.10.1 Profile

#### 2.10.2 Intelligent Cleaning Robot: System Architecture

#### 2.10.3 Intelligent Cleaning Robot: Parameters

#### 2.10.4 External Collaborations

#### 2.10.5 Trial Operation Cases

### 3 Airport Autonomous Vehicles and Companies

#### 3.1 Airport Carrier Vehicle Market

##### 3.1.1 Airport Shuttle Bus Market

##### 3.1.2 Airport Logistics Vehicle Market

#### 3.2 Application Trends of Airport Autonomous Vehicle

##### 3.2.1 Applied Scenarios

##### 3.2.2 Market Forecast

##### 3.2.3 Companies' Products and Application

#### 3.3 UISEE Technology

##### 3.3.1 Profile

##### 3.3.2 Products and Technologies

##### 3.3.3 Autonomous Luggage Vehicles

##### 3.3.4 Application Cases of Airport Logistics Vehicle

#### 3.4 Charlatte Autonom

##### 3.4.1 Profile

##### 3.4.2 Airport Autonomous Logistics Vehicle: Hardware Parameters

##### 3.4.3 Airport Autonomous Logistics Vehicle: Application Cases

#### 3.5 Aurrigo

##### 3.5.1 Profile

##### 3.5.2 Airport Autonomous Luggage Vehicles Pilots

#### 3.6 Eazy Mile

##### 3.6.1 Profile

##### 3.6.2 Autonomous Luggage Vehicle: Products

##### 3.6.3 Autonomous Luggage Vehicle: Parameters

### 4 Autonomous Agricultural Machineries and Companies

#### 4.1 Overview of Agricultural Machinery Market

##### 4.1.1 Types of Agricultural Machinery

##### 4.1.2 Role of Agricultural Machinery in Agriculture Industry Chain

##### 4.1.3 Agricultural Machinery Market Size

##### 4.1.4 Status Quo of Agricultural Machinery Market

#### 4.2 Technologies about Autonomous Agricultural Machinery

##### 4.2.1 Agricultural Machinery Autonomous Driving System: Composition

##### 4.2.2 Agricultural Machinery Autonomous Driving System: Functions

##### 4.2.3 Agricultural Machinery Autonomous Driving Companies

#### 4.3 Status Quo and Trends of Autonomous Agricultural Machinery

##### 4.3.1 Mainstream Autonomous Driving Solutions for Agricultural Machinery

##### 4.3.2 Development Status of Agricultural Machinery Autonomous Driving

##### 4.3.3 Recent Financing and Fundraising Project Progress of Autonomous Agricultural Machinery Companies

- 4.3.4 Comparison of Solutions between Major Agricultural Machinery Autonomous Driving Providers
- 4.3.5 Development Trends of Agricultural Machinery Autonomous Driving
- 4.3.6 Rosy Prospect of Autonomous Agricultural Machinery Market
- 4.4 Zoomlion Heavy Machinery
  - 4.4.1 Profile
  - 4.4.2 Smart Agriculture and Autonomous Driving
  - 4.4.3 Main Agricultural Machinery Autonomous Driving Technologies
  - 4.4.4 Cooperation with Landing.AI: Co-development of Intelligent Agricultural Machineries
- 4.5 Lovol Heavy Industry
  - 4.5.1 Profile
  - 4.5.2 R&D System
  - 4.5.3 Complete Machine: Electronic/Electrical Architecture
  - 4.5.4 Complete Machine: Intelligent System
  - 4.5.5 Complete Machine: Intelligent System Operation Mode
  - 4.5.6 Complete Machine: Electronic Control Planning
  - 4.5.7 T-box Development Mode
  - 4.5.8 Development Roadmap of Intelligent Agricultural Machinery
  - 4.5.9 Cooperation with Baidu
- 4.6 FJ Dynamics
  - 4.6.1 Profile
  - 4.6.2 Business Model
  - 4.6.3 Autonomous Farm Solutions
  - 4.6.4 Cooperation with Microsoft Azure
  - 4.6.5 Autonomous Agricultural Machinery Product Lines
  - 4.6.6 5G Intelligent Harvesters
  - 4.6.7 Autonomous Driving System
  - 4.6.8 Cooperation with Jiangsu Provincial Agricultural Reclamation and Development Co., Ltd.
- 4.7 ISEKI & CO., LTD.
  - 4.7.1 Profile
  - 4.7.2 Autonomous Agricultural Machinery Development Plan
  - 4.7.3 Manned Monitoring-based Robot Tractors
- 4.8 YTO Group
  - 4.8.1 Profile
  - 4.8.2 Autonomous Driving System
  - 4.8.3 Cooperation with Beijing Unistrong Science & Technology Co., Ltd. and Huawei
  - 4.8.4 5G Autonomous Tractors
- 4.9 Kubota
  - 4.9.1 Profile
  - 4.9.2 Smart Agriculture System
  - 4.9.3 Autonomous Agricultural Machinery Business Development

4.9.4 Autonomous Agricultural Machinery Business Planning

4.9.5 Tractor Self-driving Functions

4.10 Shanghai AllyNav Technology

4.10.1 Profile

4.10.2 Beidou Precision Agriculture Solutions

4.10.3 Autonomous Driving System

4.10.4 Application of Agricultural Machinery Autonomous Driving System

4.11 Wuxi Kalman Navigation Technology

4.11.1 Profile

4.11.2 Agricultural Machinery Autonomous Driving System

4.11.3 Autonomous Agricultural Machinery: System Architecture

4.11.4 Autonomous Agricultural Machinery: Application Cases

4.12 ComNav Technology

4.12.1 Profile

4.12.2 Tractor Navigation System

4.12.3 Tractor Autonomous Driving Hydraulic System

4.13 Beijing Unistrong Science & Technology

4.13.1 Profile

4.13.2 Development History

4.13.3 Autonomous Driving System

4.13.4 Hydraulic Autonomous Driving System

## 5. Autonomous Mining Machineries and Companies

5.1 Mining Vehicle Market

5.1.1 Autonomous Mining Vehicle Industry Chain

5.1.2 Mining Truck Autonomous Driving Application Trends

5.1.3 Mining Truck Market Size

5.2 Key Technologies for Autonomous Mining Vehicle

5.2.1 Applied Scenarios of Autonomous Mining Vehicle

5.2.2 Autonomous Mining Vehicle Solutions

5.2.3 Positioning Technology and Navigation

5.2.4 Perception and Decision Algorithms

5.2.5 Telematics Communication Technology

5.2.6 Cloud Scheduling Management System

5.3 Autonomous Mining Vehicle Market and Development Trends

5.3.1 Application of Autonomous Mining Vehicle Worldwide, 2019

5.3.2 Key Autonomous Mining Vehicle Companies' Technical Solutions and Application

5.3.3 Development Trends of Autonomous Mining Vehicle

5.4 Beijing TAGE Idriver Technology

5.4.1 Profile



- 5.4.2 Development History
- 5.4.3 Composition of Mining Autonomous Driving System
- 5.4.4 Sensor Configuration of Autonomous Mining Truck
- 5.4.5 On-site Testing Process for Autonomous Mining Vehicle
- 5.4.6 Application Cases of Autonomous Mining Truck
  
- 5.5 Inner Mongolia North Hauler Joint Stock
  - 5.5.1 Profile
  - 5.5.2 Cooperation with Beijing TAGE Idriver Technology
  
- 5.6 Qingdao Huituo Intelligent Machine (VIPioneers)
  - 5.6.1 Profile
  - 5.6.2 Development History
  - 5.6.3 Autonomous Mine Solutions
  - 5.6.4 Parallel Driving Solution 3.1
  - 5.6.5 Autonomous Mine Operation Chain
  - 5.6.6 Hardware Configuration of Autonomous Mining Truck
  - 5.6.7 Commercial Application Cases of Autonomous Transport System
  
- 5.7 Beijing EQ Technology
  - 5.7.1 Profile
  - 5.7.2 Mining Truck Autonomous Driving Solutions
  - 5.7.3 Mining Vehicle Autonomous Driving System
  - 5.7.4 Mining Vehicle Autonomous Driving: Hardware Configuration
  - 5.7.5 Mining Vehicle Autonomous Driving: Application Cases
  
- 5.8 Caterpillar
  - 5.8.1 Profile
  - 5.8.2 Mining Truck Autonomous Driving System
  - 5.8.3 Hardware Configuration of Autonomous Mining Truck
  - 5.8.4 Application Cases of Mining Vehicle Autonomous Driving
  
- 5.9 Komatsu
  - 5.9.1 Profile
  - 5.9.2 Development History of Autonomous Driving
  - 5.9.3 Architecture and Hardware Configuration of Mining Truck Autonomous Driving System
  - 5.9.4 Development Roadmap of Mining Vehicle Autonomous Driving
  - 5.9.5 Autonomous Mining Truck: Application Worldwide
  - 5.9.6 Autonomous Mining Truck: Models and Deployments
  - 5.9.7 Application Cases of Mining Vehicle Autonomous Driving
  
- 5.10 Xuzhou Construction Machinery Group (XCMG)
  - 5.10.1 Profile
  - 5.10.2 Mining Vehicle Autonomous Driving Technology
  - 5.10.3 Autonomous Driving Scenarios (1)
  - 5.10.4 Autonomous Driving Scenarios (2)
  - 5.10.5 Autonomous Driving Scenarios (3)
  
- 5.11 Changsha Intelligent Driving Institute (CiDi)
  - 5.11.1 Profile

- 5.11.2 Mining Truck Autonomous Driving Solutions
- 5.11.3 Functional Modules and Hardware Architecture of Mining Truck Autonomous Driving
- 5.11.4 Autonomous Mining Truck Technologies (1)
- 5.11.5 Autonomous Mining Truck Technologies (2)
- 5.11.6 Autonomous Mining Truck Technologies (3)
- 5.11.7 Mining Truck Remote Autonomous Driving Solutions
- 5.11.8 Total Solutions for Smart Mine
- 5.11.9 Partners and Application Cases
  
- 5.12 Shanghai Boonray Intelligent Technology
- 5.12.1 Profile
- 5.12.2 Products and Solutions
- 5.12.3 Smart Mine Solutions
- 5.12.4 Application Cases of Autonomous Mining Vehicle

**You can place your order in the following alternative ways:**

1. Order online at [www.researchinchina.com](http://www.researchinchina.com)
2. Fax order sheet to us at fax number: +86 10 82601570
3. Email your order to: [report@researchinchina.com](mailto:report@researchinchina.com)
4. Phone us at +86 10 82600828

<b>Party A:</b>			
Name:			
Address:			
Contact Person:		Tel	
E-mail:		Fax	

<b>Party B:</b>			
Name:	Beijing Waterwood Technologies Co., Ltd (ResearchInChina)		
Address:	Room 2-626, 6th Floor, No.1, Shanyuan Street, Haidian District, Beijing, 100080		
Contact Person:	Liao Yan	Phone:	86-10-82600828
E-mail:	<a href="mailto:report@researchinchina.com">report@researchinchina.com</a>	Fax:	86-10-82601570
Bank details:	Beneficial Name: Beijing Waterwood Technologies Co., Ltd Bank Name: Bank of Communications, Beijing Branch Bank Address: NO.1 jinxiyuan shijicheng, Landianchang, Haidian District, Beijing Bank Account No #: 110060668012015061217 Routing No #: 332906 Bank SWIFT Code: COMMCNSHBJG		

Title	Format	Cost
<i>Total</i>		

**Choose type of format**

- PDF (Single user license) .....3,200 USD
- Hard copy ..... 3,400 USD
- PDF (Enterprisewide license)..... 4,800 USD

**※ Reports will be dispatched immediately once full payment has been received.**

**Payment may be made by wire transfer or credit card via PayPal.**

### About ResearchInChina

ResearchInChina ([www.researchinchina.com](http://www.researchinchina.com)) is a leading independent provider of China business intelligence. Our research is designed to meet the diverse planning and information needs of businesses, institutions, and professional investors worldwide. Our services are used in a variety of ways, including strategic planning, product and sales forecasting, risk and sensitivity management, and as investment research.

### Our Major Activities

- *Multi-users market reports*
- *Database-RICDB*
- *Custom Research*
- *Company Search*

**RICDB** (<http://www.researchinchina.com/data/database.html>), is a visible financial data base presented by map and graph covering global and China macroeconomic data, industry data, and company data. It has included nearly 500,000 indices (based on time series), and is continuing to update and increase. The most significant feature of this base is that the vast majority of indices (about 400,000) can be displayed in map.

After purchase of our report, you will be automatically granted to enjoy 2 weeks trial service of RICDB for free.

After trial, you can decide to become our formal member or not. We will try our best to meet your demand. For more information, please find at [www.researchinchina.com](http://www.researchinchina.com)

For any problems, please contact our service team at: