Smart Road: Intelligent Roadside Perception Industry Report, 2020

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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

Research on Roadside Perception: With Greater Policy Support, the RMB10 Billion Intelligent Roadside Perception Market Takes Off

In our Smart Road: Intelligent Roadside Perception Industry Report, 2020, we analyze policies, industry chain and technologies, market size, business model and suppliers in the intelligent roadside perception industry (including RSU, roadside sensor, MEC and cloud control platform).

With the advancement of cooperative vehicle infrastructure system, China and the industry have come to know that the priority should be given to coordinated development between infrastructure and vehicle more than just vehicle. A plurality of policies was issued for intelligent road construction in China in 2020 alone. Wherein, the Guiding Opinions on Promoting the Construction of New Infrastructures for Transportation released in August 2020 makes it clear that ubiquitous perception facilities should be pervasive enough in the transportation industry; the Guide for Layout of Internet of Vehicles (IoV) Roadside Facilities, an association standard concerning roadside facilities published in August 2020, specifies layout of IoV roadside facilities in the C-V2X-based IoV traffic circumstance, and further promotion of roadside and cloud equipment to be unified.

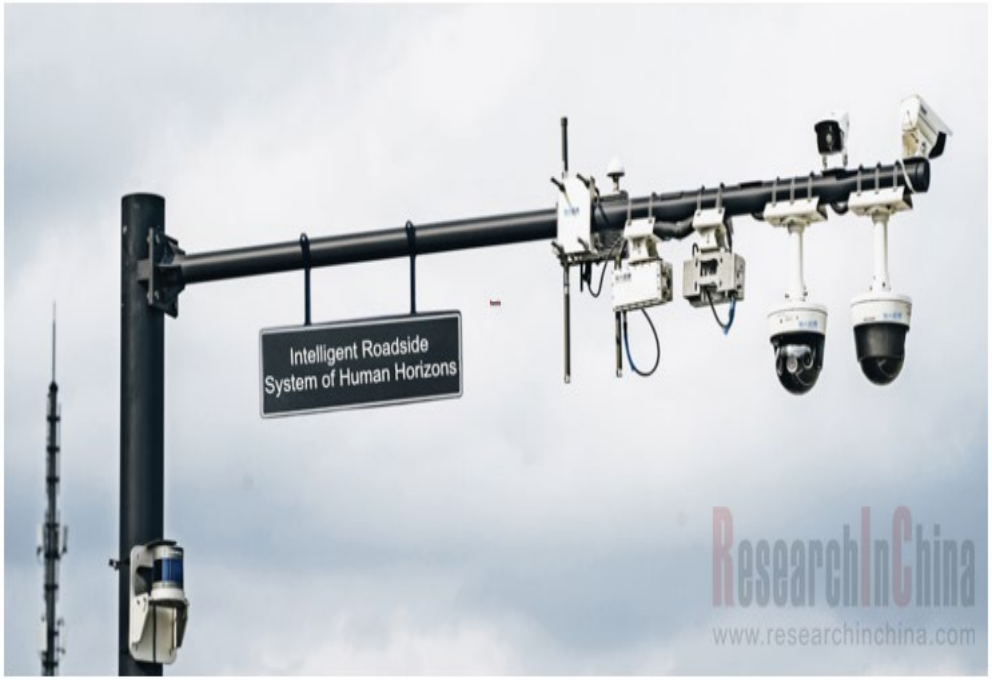
With policy support, China's intelligent roadside perception market (including radar, camera, etc.) is proliferating fast and is expected to be worth RMB40 billion by 2025. In the market, LiDAR costs the most in deployment, with a single set even priced up to tens of thousands of yuan. Yet LiDAR performs much better in roadside scenarios, notably complex intersections, for it could recognize target attributes precisely and offer far more accurate, reliable data combining with cameras. LiDAR is still at the start of application in roadside end and has yet to be used massively. If deployed on a large scale, the price of LiDAR will take a nosedive.

Intelligent roadside facilities: enormous social benefits fascinate government to invest

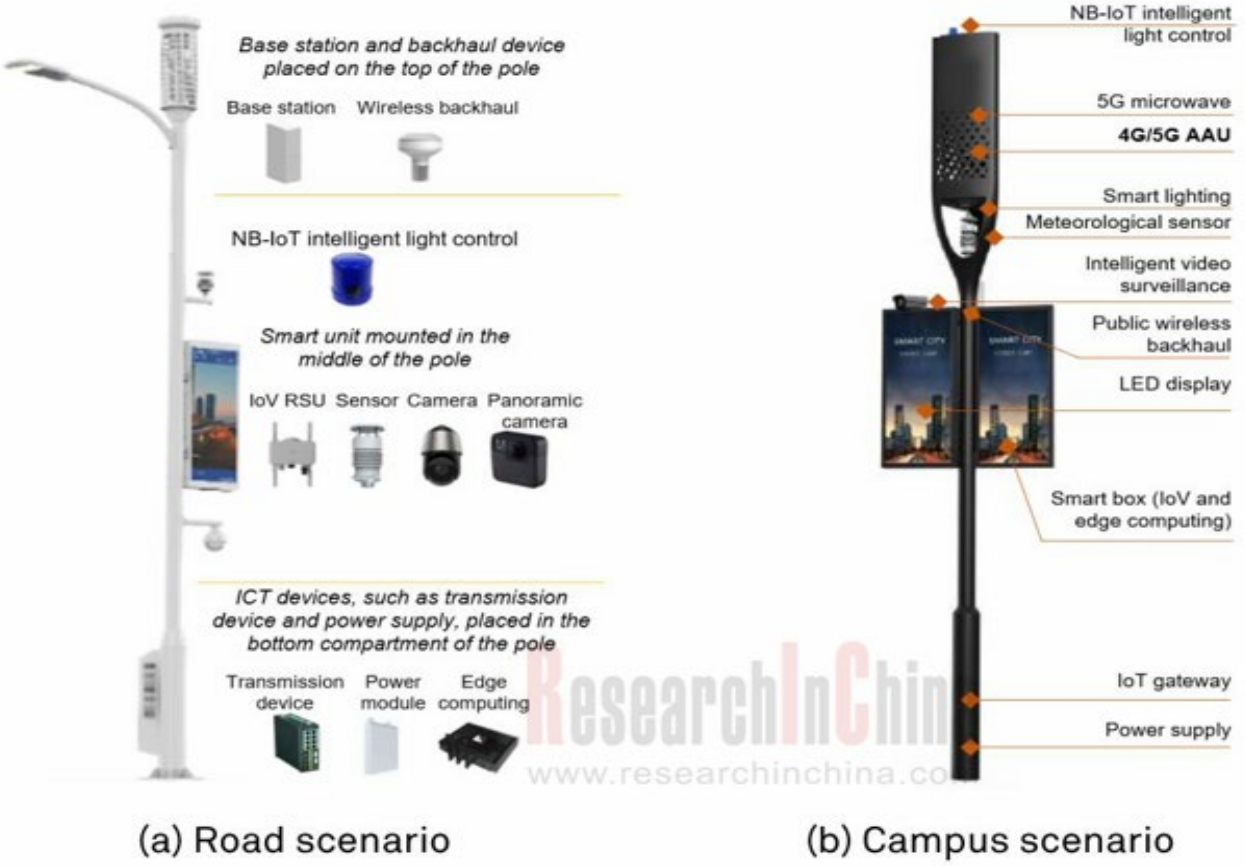
Core sensors of an autonomous vehicle that offer limited detection range, is far from meeting the needs for non-line-of-sight perception of surroundings, e.g., ultra long distance, intersections and blind spots. Intelligent roadside perception is thus needed to broaden the detection range around a vehicle and make autonomous driving safer and more reliable.

In current stage, roadside perception devices are led by camera, LiDAR and radar. Players like VanJee Technology Co., Ltd., China TransInfo Technology Co., Ltd. and Changsha Intelligent Driving Institute Ltd. have made sound deployments in roadside perception system, with product lines covering three systems (perception, transmission and computing). During the layout, roadside perception devices can be directly mounted on traffic light poles, intelligent poles and other facilities.

Intelligent Perception System of Human Horizons



Structure of Huawei's Smart Pole



(a) Road scenario (b) Campus scenario

For single perception devices have some limitations, Chinese vendors are vigorously developing multi-sensor fusion solutions which perceive richer road environment information more accurately around the clock. Examples include VanJee Technology Co., Ltd. who already begins to work on data fusion between roadside 3D LiDARs and cameras to cover the drawbacks of LiDAR for greater ability to perceive.

Layout of Intelligent Roadside Perception Product Lines of Major Suppliers in China

Supplier	Perception System			Transmission System	Computing System
	LiDAR	Radar (Wide-area Radar)	Camera	RSU	Edge Computing
VanJee Technology	√	√	√	√	√
Shenzhen Genvict Technologies				√	
China TransInfo Technology	√	√	√	√	√
Beijing Nebula Link Technology		√		√	
iSmartWays Technology		√	√	√	√
Changsha Intelligent Driving Institute	√		√	√	√
Nanjing Hurys Intelligence Technology		√			
Beijing E-Hualu Information Technology			√		√
LeiShen Intelligent System	√		√		

Through the lens of commercial use, pilot roadside infrastructures constructed for demonstration nationwide have generated a mass of data, which is a solution to some technological problems. For example, the First Section (radars and cameras deployed every 250 meters) of Shanghai-Hangzhou-Ningbo Intelligent Expressway has made its pilot run for half a year, bringing about 8% faster average speed, a 20% increase in traffic capacity, a 10% reduction in congestion time, 90% accuracy in travel time forecast, a 10% fall in driving accidents, and a 10% cut in rescue time. It follows that intelligent roadside equipment could produce so obvious social benefits that government is more willing to construct for commercial use on large scale.

Business model: Application in specific scenarios will go first

After exploration, it is found that application in scenarios is an efficient model to develop intelligent roadside perception equipment. In the long-cycle market, pilot application first in specific commercial scenarios remains more efficient. Demonstration products such as intelligent perception and integrated smart traffic poles on intelligent highways and at city crossroads have been introduced successively.

In July 2020, Ezhou Airport Expressway, Hubei's first intelligent highway invested and constructed by Hubei Provincial Communications Investment Group Co., Ltd., started construction, with a video detector installed every 150 meters on both sides of the road.

In July 2020, China's first 5G multifunctional demonstration highway pole (Pole No.: K72+455) was installed on the Shenzhen Section of Guangshen Expressway. Every pole can carry such intelligent hardware as 5G base station, intelligent light, video surveillance system, emergency broadcaster and meteorological monitor.

Construction of 5G Intelligent Highways in China

Region	Constructor(s)	Constructed Road Section	Construction Contents
Hubei	China Mobile Hubei Branch		According to the plan, initial selection of sites to install 5G base stations on highways in the province is under way and intelligent toll tests are conducted at the same time. Moreover, 5G autonomous driving on the intelligent highways are in the phase of application for testing.
Jiangsu	Hubei Provincial Bureau of Construction of Communications Projects	Road Junction of Wufengshan Cross-river Pathway	The project of Wufengshan Cross-river Pathway and Road Junction of Southern and Northern Roads is to be planned, designed, constructed and accepted, with implementation of transportation and public communication infrastructures taken into account. As it is completed and open to traffic, the project will enable full coverage of 5G public networks.
Anhui	Hubei Branch of China Tower Corporation Limited	Hefei Xinqiao International Airport Expressway	Parameters, e.g., optimal roofing and best azimuth are to be determined according to distribution of current sites, on-site construction resources, and survey of features of 5G coverage, so as to enable fine planning of 5G sites along the highway.
Beijing	China Mobile Hefei Branch	Beijing-Chongli Expressway	The Beijing section of the highway is 75km long. The large proportion of bridges and tunnels on the highway leads to over 50% coverage of 5G signals in tunnels. It is predicted that the highway will be 100% covered by 5G in the second half of 2020.
Guangdong	China Telecom Meizhou Branch		China Telecom's strengths in cloud-network-terminal fusion of 5G, 4G, optical fiber network, internet of things, cloud computing, big data, AI, etc. should be brought into full play to provide quality connection services for intelligent road ecosystem.

IT giants race to enter

Evolvement of cooperative vehicle infrastructure system (CVIS) is decided by use of roadside equipment. Amid the rising penetration of intelligent roadside perception systems, the intelligent transportation network will be built up to further improve operational efficiency of cities and roads with technologies from edge computing to cloud control. Intelligent roadside perception system is a foundation for development of intelligent transportation.

Additionally, widespread layout of intelligent roadside equipment will drag down installation cost of vehicle V2X devices and push up their penetration. Only sound development of CVIS may make L4/L5 automated driving a reality.

IT tycoons like Huawei and BAT (Baidu, Alibaba and Tencent) who are bullish about the prospect of intelligent roadside equipment, scramble to march into the market.

Baidu focuses on research and development of roadside perception capabilities that meet needs of autonomous driving scenarios and fuse with V2X roadside perception information offered by the vehicle autonomous driving system. In the first half of 2020, Baidu has won the biddings for intelligent transportation projects in Nanjing, Hefei, Yangquan, Chongqing, to name a few.

Alibaba remains superior in infrastructure end, with Cainiao Alliance and ET City Brain. The giant will develop vehicle-infrastructure cooperation using technologies such as Alibaba Cloud Control Platform, AliOS and intelligent roadside facilities.

Tencent has a plan to expedite edge computing equipment installations and to build an open source platform for edge computing together with several partners.

Huawei makes concurrent efforts on vehicle and infrastructure ends, having rolled out products like roadside unit, EI-based Traffic Intelligent Twins, and OceanConnect intelligent transportation platform.

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