



**Global and China In-vehicle LiDAR Industry  
Report, 2017-2022**

**June 2018**

## **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

Global automotive LiDAR sensor market was USD300 million in 2017, and is expected to reach USD1.4 billion in 2022 and soar to USD4.4 billion in 2027 in the wake of large-scale deployment of L4/5 private autonomous cars.

Being subject to autonomous driving technologies as well as laws and regulations, the autonomous driving companies has limited demand for LiDAR as yet. Mature LiDAR firms are mostly foreign ones, such as Valeo and Quanergy. Major companies that have placed LiDARs on prototype autonomous driving test cars are Velodyne, Ibeo, Luminar, Valeo and SICK. There are four firms that have already brought or plan to bring products to the market, specifically;

**Continental SRL1:** State-of-the-art LiDAR for Advanced Driver Assistance Systems, single-beam solid-state LiDAR, installed on Volvo XC60 and S60L;

**Valeo SCALA** Gen.1, mechanical 4-beam LiDAR, installed on Audi A8/A7/A6;

**InnovizOne** (MEMS solid-state LiDAR), will be installed on L3 autonomous car to be launched by BMW in 2021;

**Quanergy S3** (OPA LiDAR), will be installed on new luxury electric model- Emotion built by Fisker.

Chinese LiDAR companies lag behind key foreign peers in terms of time of establishment and technology. LiDARs are primarily applied to autonomous logistic vehicles (JD and Cainiao) and self-driving test cars (driverless vehicles of Beijing Union University and Moovita). Baidu launched Pandora (co-developed with Hesai Technologies), the sensor integrating LiDAR and camera, in its Apollo 2.5 hardware solution.

LiDAR will become smaller, solid-state and more cost-effective in the future. Solid-state LiDAR needs no rotating parts and hence is smaller and easily integrated in car body. Moreover, the reliability is improved and the costs can be reduced in great measure. So, the solid state of LiDAR will be an inevitable trend.

Most mainstream LiDAR vendors plan to launch solid-state radar around 2020, following technological routes of MEMS, OPA and Flash.

## Major Chinese LiDAR Companies

Company	Established	First Launch of LiDAR	Major LiDAR Products	Market Application
SureStar	2005	Launched R-FANS 16-beam in 2015	①R-Fans (16-beam and 32-beam) ②C-Fans128	JD autonomous delivery vehicle Moovita's driverless car
Hesai Technologies	2013	32-beam LiDAR in Oct 2016	①Pandora40 ②Pandar GT	Baidu APOllo2.5 solution
RoboSense	2014	RS-LiDAR-16 in Oct 2016	①RS-LiDAR-16 ②RS-LiDAR-32 ③RS-LiDAR-M1	JD's autonomous delivery vehicle; Cainiao's ET Lab driverless car; BUU's autonomous car; provide LiDAR coupling solution
LeiShen Intelligent System	2015	Trigonometry series in Nov 2016	①LS01 series ②LS02 series ③LS03 series ④N301 ⑤N1 series TOF2D ⑥WXX0X ⑦CX series ⑧C1 series M006	
Quanergy	2012	First M8-1 in Sept 2014	①M8 8-beam ②Phased array LiDAR S3 ③ Miniature solid-state LiDAR sensor S3-Qi	Daimler AG, Renault Nissan, Hyundai, Delphi, Sensata. EMotion, a kind of new luxury electric model built by Fisker will carry Quanergy's S3 solid-state LiDAR
Velodyne	1983	HDL-64E (64-beam) in 2010	①HDL-64E (64-beam) ②HDL-32E (32-beam) ③VLP-16 (16-beam) ④VLP-32C ⑤VLS-128 ⑥Velarray	Velodyne's LiDARs are used by well-known autonomous technology representatives like Google, Baidu, Uber, Ford, GM and Mercedes Benz. HD map companies like NavInfo, Microsoft Bing, Here, AMAP and TomTom, and the projects including smart towns in Singapore and Taiwan.
Innoviz	2016	Innoviz Pro™ on May 1, 2017	①InnovizPro™ ②InnovizOne	BMW decides to use InnovizOne on Level 3 autonomous car to be launched in 2021.
Ibeo	1998	2014 LUX series	① 4-beam LiDAR ScaLa; ② another LUX series (4-beam, 8-beam)	Cooperative companies include BMW, Volkswagen, Audi, GM and Toyota. The LiDAR system (360° full monitoring) based on 6 sets of LUX sensors has been adopted by over nine famous carmakers for autonomous driving scientific research projects

## Product Planning and Mass-production Technology of Major LiDAR Vendors

Company	Technology	Radar Model	Mass Production Plan
Quanergy	Phased array	S3, S3-Qi	Mass production in 2019
Valeo	MEMS	SCALA Gen.3	2020+
Ibeo	MEMS/Phased array		Car-grade mass production in 2021
Innoviz	MEMS	InnovizOne	2019Q1
Velodyne	MEMS	Velarray	Mass production in 2021
SureStar	MEMS		Launch solid-state LiDAR in mid-2018
Hesai Technologies	ZOLO (Zoomable Light Oscillator)	Pandar GT	Launch in Dec 2017
RoboSense	MEMS	RS-LiDAR-M1	
Continental	Plane array	HFL	Mass production in 2020 (1064nm)
Aeye	MEMS	iDAR	Launch on Dec 1, 2017
LeiShen Intelligent System	MEMS/phased array/area array		Prototype in June 2018

Source: Zuosi Consulting

According to ADAS and autonomous driving plans of major OEMs, most of them will roll out SAE L3 models around 2020. Overseas OEMs: PAS SAE L3 (2020), Honda SAE L3 (2020), GM SAE L4 (2021+), Mercedes Benz SAE L3 (Mercedes Benz new-generation S in 2021), BMW SAE L3 (2021). Domestic OEMs: SAIC SAE L3 (2018-2020), FAW SAE L3 (2020), Changan SAE L3 (2020), Great Wall SAE L3 (2020), Geely SAE L3 (2020), and GAC SAE L3 (2020). The L3-and-above models with LiDAR are expected to share 10% of ADAS models in China in 2022. The figure will hit 50% in 2030.

Global and China In-vehicle LiDAR Industry Report, 2017-2022 focuses on the followings:

- ◆ In-vehicle LiDAR market (status quo of application, market size forecast);
- ◆ Leading in-vehicle LiDAR companies at home and abroad (development course, profile, financing, LiDAR products, product planning & technical direction, partners, etc.);
- ◆ Trends of LiDAR Technologies and Costs.

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