



# **Global and China Vision ADAS Industry Report, 2015-2020**

**Feb. 2016**

## **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 and China Vision ADAS Industry Report, 2015-2020 focuses on the followings:

1. Global vision ADAS system market and industry
2. Lane detection
3. Emergency braking (Anti-collision)
4. Night vision and adaptive high beam system
5. Parking Assist
6. Vision ADAS Companies

Camera-based vision ADAS systems can be divided into several categories of applications: 1) Lane Detection, i.e., LDW/LKA/LCA (Lane Centering Assist) to prevent the car from deviating in the working state of either ACC or TJA (Traffic Jam Assist); 2) Obstacles Detection and Recognition, i.e., FCW (Forward Collision Warning)/AEB (Autonomous Emergency Braking); 3) Surroundings Display, i.e., Parking Assist, including Rear View and 360° Surround View. 4) BSD (Blind Spot Detection); 5) HBA (High Beam Assist) and Night Vision.

In application field, warning-only ADASs will gradually exit market, while the ADASs with actuator represent the mainstream in the future. For example, it is hard for drivers to take prompt countermeasures, as the warning time of FCW is no more than 3 seconds. Moreover, AEB (Autonomous Emergency Braking) may become the most important ADAS application. AEB will be a mandatory safety function across the world during 2021-2025.

Future orientation of development will be stereo camera rather than mono camera, especially in AEB field. As AEB concerns human life, there must be as much performance redundancy as possible, thus ensuring the safety of drivers to the utmost extent. Stereo camera has an overwhelming advantage over mono camera in the aspect of pedestrians recognition. However, the majority of companies (OEMs & Tier 1 suppliers) still adopt mono camera, as AEB is largely an optional component rather than a standard one, and the costs of stereo camera are much higher, resulting in higher price and low popularity.

Pedestrians Recognition will be a must of next-generation AEB, meaning that stereo camera has to be employed. Mercedes-Benz, Subrao, Jaguar, and Suzuki have adopted stereo camera from the very beginning, while VW, Toyota, Honda, and Nissan all employ stereo camera in their experimental models.

As to Tier 1, Hitachi Automotive System has used stereo camera at the very start, while Continental, Bosch, Denso, and Fujitsu Ten see stereo camera as the priority of development. These companies are iconic ones in automobile industry and their moves represent the direction of automobile industry as a whole.

Global automotive camera module shipments approximated 50.3 million pieces in 2015 and are expected to reach 62.1 million pieces in 2016, 141 million pieces in 2020, and 246 million pieces in 2025. There are three cameras on each light vehicle on average, respectively for LKA, AEB, and Parking. Unlike mobile phone camera modules, automotive camera modules are highly demanding on reliability and range of operating temperature. Major vendors are Panasonic, Sony, Valeo, Fujitsu Ten, MCNEX, Magna, Gentex, Continental, and Hitachi. Panasonic ranks first globally in terms of market share and is far ahead of the second place.

Global automotive vision system market size was worth about USD3.1 billion in 2015 and is expected to hit USD6.1 billion in 2020. Magna, TRW (ZF), Hitachi Automotive System, and Continental are in the first camp, with Magna being the world's largest, and Autoliv, Valeo, Denso, Fujitsu-ten, and Bosch are in the second camp. As the demand from carmakers varies greatly, the market concentration has been lower and this will continue for a considerable time.

### 1. Global Vision ADAS System Market and Industry

Global Automotive Camera Module Shipments, 2009-2020E  
 Front Camera Shipments, 2014-2020E  
 Global Rear View and Surround View System Shipments, 2014-2020E  
 Parking Assist System Shipment in the United States by Technology, 2015&2020E  
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 Market Share of Global Rear View Suppliers, 2015  
 Market Share of Global Automotive CMOS Image Sensor Suppliers, 2015  
 Market Share of Global Automotive Camera Module Suppliers (by Turnover), 2015  
 Market Share of Global ADAS Vision System Suppliers, 2015  
 Number of Auto Models Equipped with ADASs Available in Chinese Market, 2015  
 Penetration of Main ADASs in Chinese Market, Jan-Dec 2015  
 Pre-installation of LDW in Domestic Passenger Car Brands, Jan-Dec 2015  
 Pre-installation of LKA in Domestic Passenger Car Brands, Jan-Dec 2015  
 Pre-installation of SV (Surround View) in Domestic Passenger Car Brands, Jan-Dec 2015  
 Pre-installation of AEB in Domestic Passenger Car Brands, Jan-Dec 2015  
 Pre-installation of FCW in Domestic Passenger Car Brands Jan-Dec 2015

### 2. Lane Detection

Overview of LDW  
 Trend of Lane Assist  
 Difference of LDW/LKA/LCA

Principle of LDW  
 Block Diagram of LDW&ACC&TJA  
 Control Structure Diagram of Lane Keep Assist/Lane Centering Assist System  
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 Control Structure Diagram of Electric Power Steering System  
 Control Structure Diagram of Steer-by-Wire System  
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 Hough Transform  
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### 3. Emergency Braking (Collision Avoidance)

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 Automotive Brand AEB Performance  
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 Sensor Fusion of AEB  
 Sensor Matching and Merging of AEB  
 Forward Crash Avoidance and Mitigation (FCAM) and AEB  
 Collision Mitigation: An Extended AEB  
 Emergency Steer Assist (ESA) of TRW  
 Nissan's Autonomous Emergency Steering System  
 Continental SRL 111  
 Low-cost Fixed-beam Infrared Lidar

Unique Design of Three-beam Light

#### 4. Night Vision and High Beam Assist

Overview of Night Vision

Night Vision Static

BMW's Night Vision

Trend of Night Vision

Overview of HBA (High Beam Assist)/Smart Beam

LED Headlamp: A Must for HBA (High Beam Assist)

HBA (High Beam Assist) Image Sensor

Overview of Gentex's Smart Beam

HW-Architecture of SmartBeam

#### 5. Vision for Parking Assist

Comparison of Various Sensors

Overview of Rear Assist

Composition of Rear View Camera System at VW Touran

Different Colors for Different Distances

VW's Rear Assist-CAN Network

Dense Stereo for Parking Assist

Motion-stereo Parking Assistant at BMW

79GHz UWB: A Likely Future Star

Daimler's 360° Surround View

Delphi's 360° Surround View Image Processing

Adjusting Scope of Surround View

Delphi's Semi-automatic Parking-Parallel Parking Process

Delphi's Semi-automatic Parking-Vertical Parking Process

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6.1 Mobileye

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Customers of Mobileye, 2012-2015

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Map Database of Mobileye

Roadmap of Mobileye

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6.4 Sunny Optical

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Block Diagram of Eyesight Ver3.0

Principle of Stereo Camera

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Application of Magna Gen 2.5	Fujitsu 360° Wrap-Around Video Imaging
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