



**Global and China Automotive Camera
ADAS Industry Report, 2016-2021**

May 2017

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 Automotive Camera ADAS Industry Report, 2016-2021 highlights the following:

- 1 Analysis and Forecast of Global and China Automotive Camera ADAS Market;
- 2 Analysis and Forecast of Global and China Automotive Camera ADAS Industry;
- 3 Status Quo and Trends of Automotive Camera ADAS Technology;
- 4 Study on Major Vendors

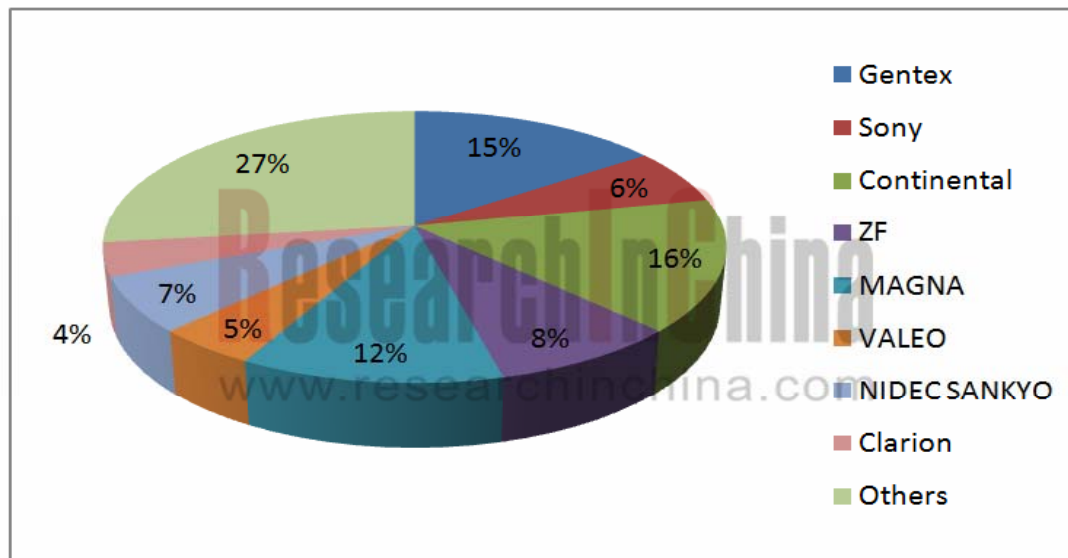
Broadly-defined camera ADAS includes 360-degree surround view system and park assist system. In 2016, broadly-defined camera ADAS shipments totaled roughly 40.1 million sets, of which, park assist (reversing camera) makes up the highest 34% or so, followed by 360-degree surround view system (about 20%) and FCW (about 13.7%). It is expected that by 2021 camera ADAS shipments will reach 71.4 million sets, of which park assist, 360-degree surround view system and AEB will capture 30.5%, 21.2% and 19.5%, separately. Narrowly-defined camera ADAS (excluding 360-degree surround view system and park assist system) shipments totaled approximately 15.2 million sets. By shipments, Continental Automotive, Gentex, Magna, ZF TRW, NIDEC SANKYO, Valeo, Sony and Clarion are successively ranked. In terms of camera ADAS processor, Mobileye, TI, Xilinx, Ambraella, Renesas, Toshiba, Hitachi, ADI and NXP are successively ranked by shipments.

The global camera ADAS market was worth USD2,667 million in 2016, an increase of 21.3%, and is expected to rise 24.4% to USD3,320 million in 2017. With the advent of L3/L4 self-driving in 2020, the deeply-learned embedded system will bring another marketing leap to an estimated USD7,760 million in 2021. Automotive camera module shipments totaled approximately 66.5 million sets in 2016 and are expected to rise 21.5% to 80.8 million sets in 2017 and then 117 million sets in 2021. In the unmanned era, Lidar will enter into rivalry with camera over the position of master sensor and is more likely to win out. Camera module won't see dramatic increase in shipments in the unmanned era.

Technologically, stereo camera's price has gone down and competitiveness has been boosted as shipments increase. Concerning luxury cars, main products of Benz, BMW, JLR and Lexus are likely to be configured with stereo camera in 2021. At the end of 2016, Denso launched small stereo camera, which would find wide application in Toyota compact cars. Besides, Honda and Hyundai are developing stereo camera system. It is predicted that by 2020 stereo camera will win one-third market share. Trifocal essentially as monocular camera poses no threat to stereo camera and has very limited market potential (only to be employed by Tesla and Volvo).

In China, local brand vendors with technical incompetence hope suppliers provide complete solutions containing millimeter-wave radar and actuator, and Bosch has monopolized the ESP market of local brands, therefore occupying the vast majority of local vendors' ADAS market. Local brand vendors are most interested in AEB, AHB and BSD, instead of alert and LKW applications.

Market Share of the World's Major Camera ADAS Vendors (by Shipments), 2016



Note: Reversing camera and 360-degree surround view system are excluded.

1 Global Vision ADAS System Market and Industry

Camera ADAS Market Size, 2015-2021E

Camera ADAS Shipments by Technology, 2016-2021E

Camera ADAS Market by Technology, 2016-2021E

Global Automotive Camera Module Shipments, 2015-2021E

Park Assist System Shipments by Technology in the United States, 2015/2020E

EU Park Assist System Shipments by Technology in EU, 2015/2020E

Park Assist System Shipments by Technology in Asia-Pacific Region, 2015/2020E

Park Assist System Shipments, by Technology in China, 2015/2020E

Supporting Relationship between Japanese Vendors and ADAS Sensor Suppliers (Who Supply Whom)

Supporting Relationship between American/Korean/Chinese Vendors and ADAS Sensor Suppliers (Who Supply Whom)

Supporting Relationship between European Vendors and ADAS Sensor Suppliers (Who Supply Whom)

Market Share of World's Major Camera ADAS Vendors by Shipments, 2016

Market Share of World's Surround View Suppliers, 2015

Market Share of World's Rear View Suppliers, 2015

Market Share of World's Automotive CMOS Image Sensor Suppliers, 2016

Market Share of World's Automotive Camera Module Suppliers by Turnover, 2015

Market Share of Camera ADAS Processor Vendors, 2016

ADAS Shipments by Technology in China, Jan. 2017

ADAS New Car Carrying Rate in China, 2016

ADAS Cumulative Carrying Rate in China, 2016

ADAS and Brand Correspondence in China, 2017

2 Lane Detection

LDW Overview

Lane Assist Trend

Difference of LDW/LKA/LCA

Lateral Control ("Lane Centering")

LDW Principle
LDW&ACC&TJA Block Diagram
Control Structure Diagram for a Lane Keep Assist/Lane
Centering Assist System
Control Structure Diagram for a Conventional Hydraulic Brake System with Electronic Stability Control
Control Structure Diagram for an Electric Power Steering System
Control Structure Diagram for a Steer-by-Wire
System
LKW Algorithm
Hough Transform
Lane Detection Camera

3 Emergency Braking (Collision Avoidance)

AEB Will Become Mandatory Standard Configuration Sooner or Later
Proportion of Models with Front Crash Prevention IIHS, 2000-2015
Automotive Brand AEB Performance
Introduction to AEB (Advanced/Autonomous Emergency Brake)
AEB Sensor Fusion
AEB Sensor Matching and Merging
Forward Crash Avoidance and Mitigation (FCAM) and AEB
Collision Mitigation is Extended AEB
TRW Emergency Steer Assist (ESA)
Nisan Autonomous Emergency Steering
Continental SRL 111
Cheap Fixed Beam Infrared Lidar
Unique Design of Three Beam Light

4 Night Vision and High Beam Assist

Night Vision Overview

Night Vision Static

BMW Night Vision

Night Vision Trend

HBA (High Beam Assist)/Smart Beam Overview

HBA (High Beam Assist) Needs LED Headlamp

HBA (High Beam Assist) Image Sensor

Overview of Gentex Smart Beam

HW-Architecture of SmartBeam

5 Vision for Parking Assist

Comparison of Sensors by Type

Introduction to Rear View Camera System

Reversing Camera System Composition of VW Touran

VW Rear View Camera System CAN Network

Dense Stereo for Parking Assist

Motion-stereo Parking Assistant at BMW

Future Star might be 79GHz UWB

Daimler 360 Degrees Surround View

Delphi 360 Degrees Surround View Image Processing

Delphi 360 Degrees Surround View Image Processing

Adjusting Scope of Surround View

6 Vision ADAS Vendors

6.1 Mobileye

Revenue and Gross Profit of Mobileye, 2011-2017

Revenue of Mobileye by Business for 12 Consecutive Quarters

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- Product Roadmap of Mobileye
- Revenue of Mobileye by Customer 2013-2017
- Block Diagram of Mobileye EyeQ3
- Block Diagram of Mobileye EyeQ4
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- Quarterly Revenue of ON Semiconductor by Business, Q1 2014 - Q4 2016
- Quarterly Revenue of ON Semiconductor Image Sensor Group, Q3 2014-Q4 2016
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- Eyesight Ver3.0 Function
- Eyesight Roadmap
- Next Generation Eyesight
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- Magna Gen 1.0 Applications
- Magna Gen 2.5 Applications
- Magna's Roadmap

Magna's Strategy

6.7 Autoliv

Autoliv Customers by Region, 2015-2016

Autoliv Revenue by Product, 2014-2016

Autoliv Shipments by Product, 2009-2016

Autoliv Technology Distribution

6.8 Valeo CDA Division Overview

Valeo's Position in Automotive ADAS

Valeo's Partners

Valeo's Park4U

Park4U ECU

6.9 Continental Automotive ADAS

Continental Automotive ADAS Revenue by Region

Continental Automotive 360 View Component

Continental Automotive 360 View for Commercial Vehicles Examples

Continental Automotive 360 View Next-Remote Control Parking

Continental Camera Overview

Continental MFC2 Data

6.10 Bosch

Bosch Stereo Camera Overview

Bosch MPC2 Overview

6.11 Clarion

Clarion Revenue by Region, FY2009-FY2017

Clarion Around View Next -Automated Parking

Clarion's Surroundeye for Commercial Vehicles

6.12 FUJITSU TEN

Fujitsu 360 Wrap Around Video Imaging

Fujitsu 360 Wrap Around Video Imaging Component

- Fujitsu 360 Wrap Around Video Software
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- 2014 TRW Revenue by Customer
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- Denso ADAS Product Roadmap
- Denso ADAS Roadmap

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