



DVN GLOBAL MARKET STUDY ON AUTOMOTIVE LIDAR

DVN study will be ready for publication
in November 2019. Price: 8 000 Euros

For ordering or more information

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Driven by the enormous push for future driving automation, automotive LiDAR is a very important emerging technology.

At the same time, many uncertainties exist around the LiDAR technology:

- What will be the winning technologies?
- How will the LiDAR market and adoption rate develop?
- What are the OEM customer and application demands?
- What are the new business opportunities for the Lighting Industry, such as: integration in exterior lighting, sensor cleaning, optics, etc.?

DVN sensed that an extensive study on the Automotive LiDAR opportunity, is of benefit both for companies active in the development of LiDAR sensors & components as well for OEM's and companies active in the Automotive Lighting industry.

The Study is titled:

AUTOMOTIVE LIDAR: HYPE OR MUST HAVE? **VISION ON SYSTEMS, APPLICATIONS, TECHNOLOGIES, AND COMPONENTS**

DVN study on Automotive LiDAR will be made available in October 2019 and will help you in decision making and to identify new business opportunities in the currently embryonic automotive LiDAR market. DVN used following resources to complete this study:

- 27 interviews have been conducted with experts / industry leaders from LiDAR companies and the automotive lighting industry
- Interviews with 4 leading research institutes
- Literature and web research
- This study has been conducted under the umbrella of DVN experts and with experienced automotive consultants.



CONTENT OF DVN GLOBAL MARKET STUDY ON AUTOMOTIVE LIDAR

> ACKNOWLEDGEMENT

> PREFACE

> INTRODUCTION AND TARGET OF REPORT

> MANAGEMENT

> BEST BETS

> WHY AUTOMOTIVE LIDAR?

- Automated driving leads sensor developments
- Sensor fusion
- Experts opinions on why LiDAR
- Summary

> LIDAR SYSTEM & COMPONENT TECHNOLOGY

- Main Principles of Distance Measurements by Time of Flight (ToF)
- Pulsed Laser Technology for LiDAR sensors
- Imaging
- LiDAR systems for Imaging
 - LiDAR Sensors with fixed illumination
 - Single emitter Flash LiDAR
 - Multi-Beam Flash LiDAR
 - LiDAR Sensors with Varying illumination
 - Macro-Mechanical LiDAR Sensors
 - Solid State scanning LiDAR Sensors-MEMS-OPA
 - Mixed approaches
 - Wavelength Range
- LiDAR key Components

- LiDAR Emitters-EEL-VCSEL
- Photo Detectors-PIN-APDs-SPADs & MPPCs
- Optics

- Other Aspects
- Summary

> AUTOMOTIVE LIDAR APPLICATIONS

- Examples of LiDAR Use Cases
 - Motorways and main roads with two separate traffics
 - Traffic Jam
 - Highway Pilots
 - Valet Parking Pilot: Home Zone, Dedicated and Standard parking areas
- Analysis of LiDAR Application for Automated Driving
 - Main LiDAR categories and specification
 - Short/Mid Range LiDAR (SMR)
 - Long Range LiDAR (LR)
 - Vehicle application of LiDAR Sensors
- Environmental Aspects
 - Sunlight
 - Reflectivity of Surfaces in Dry and Wet Conditions
 - Absorption by Water
 - Influence of scattering Atmosphere
- Sensor Cleaning
 - Micro Nozzles
 - Mini Wipers
 - Coatings
 - Rotating-Vibrating Outer Lens Windows
 - Cleaning Intervals
- Summary



CONTENT

OF DVN GLOBAL MARKET STUDY ON AUTOMOTIVE LIDAR

> INTEGRATION OF AUTOMOTIVE LIDAR AND LIGHTING

- Concepts
- Advantages-Disadvantages of LiDAR Integration in Lamps
 - Application Synergies between Lighting and LiDAR
 - OEM Benefits Through Integration
 - System Cost Advantages through Integration
 - Styling aspects
 - Concerns about integration and alternative LiDAR positions
 - Enablers for Lamp Integration
- Summary

> STANDARDISATION, REGULATION, TESTING & RELEASE

- Standardization
- Regulation
- Testing & Release
 - Safety of the Intended Functionality (SOTIF)
 - ISO 26262 and Automotive Safety Integrity Level (ASIL) Norm
- Summary

> AUTOMOTIVE LIDAR MARKET DEVELOPMENT AND NEW BUSINESS OPPORTUNITIES

- Automotive LiDAR ecosystems and market segmentation

- Some market scenari on driving automation
- Automotive LiDAR market projection
- Spin off and new business opportunities for the Lighting eco-system
- Automotive LiDAR: Hype or Must Have?
- Summary

> SCIENTIFIC CONTRIBUTIONS

- LiDAR For Automated Driving by Adrian Slocki, FKA GmbH, Germany
 - # TBD IMS Fraunhofer / W Brockherde
 - # TBD LETI / F. Simoens (future or OPA)
 - # TBD Vedecom / G. Le Calvez (lidar roadtests)
 - # TBD IPT Fraunhofer / T Mueller (optics)

Appendix 1 List of contributing companies and institutions

Appendix 2 Author biographies

Glossary

**WE THANK THE FOLLOWING COMPANIES AND INSTITUTES
FOR THEIR SUPPORT AND SHARING THEIR INSIGHTS IN
INTERVIEWS TO CREATE THIS STUDY**

