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A location independent LiDAR-based real-time approach for validation of lane keeping assistance and lane departure warning system

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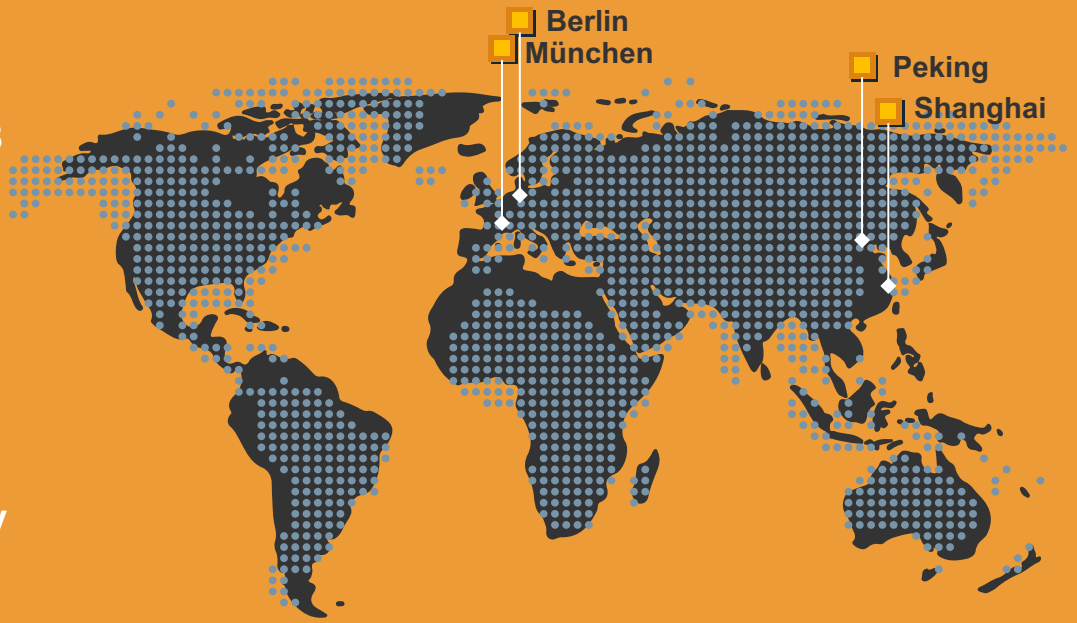
ABOUT LiangDao

- Sino-German technology Company since 2018
- Expertise in product development
- In-depth know-how in the area of LiDAR technology



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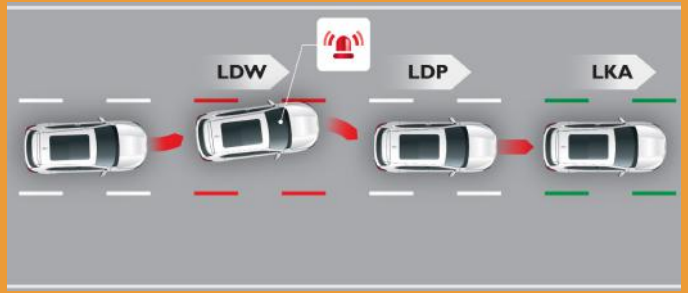
LKA and LDW

- LKS: Lane Keeping Assistant
- LDW: Lane Departure Warning



source

Source: Mercedes-Benz

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Conventional approaches

01

Visual observation and record

- labor-intensive; rough

02

HD map

- not always updated and prior knowledge is needed

03

GNSS and RTK

- expensive; limited by the testing field ; too much preliminary work

An example:
Testing and validation of LKA and LDW using GNSS and RTK

Tools:
RTK (x2),
Several Radio Pairs,
DGNSS Base Station RTK,
CAN Hub,
Tripod for GPS Antenna,
Survey Trolley

1. Rent a testing field with road markings
2. Set up RTK base station
3. Make points with a small trolly
4. Generate a map
5. Drive the car and make rounds until the precision is achieved
6. Test and record, KPI report

Expensive, time consuming and only in limited testing areas

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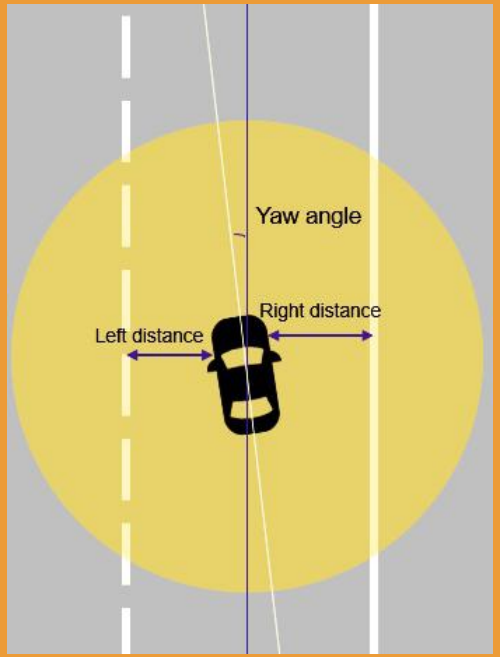
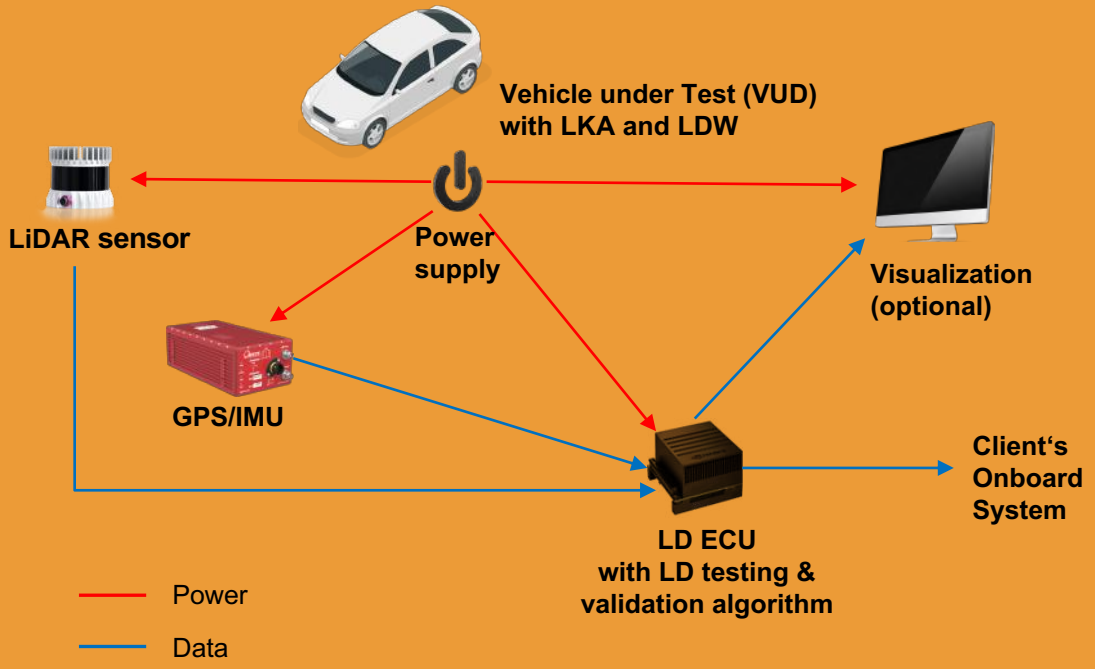
LiDAR based method: flexible, open road and cost efficient



Technical Parameters detected by LiDAR sensor in real-time



System Components

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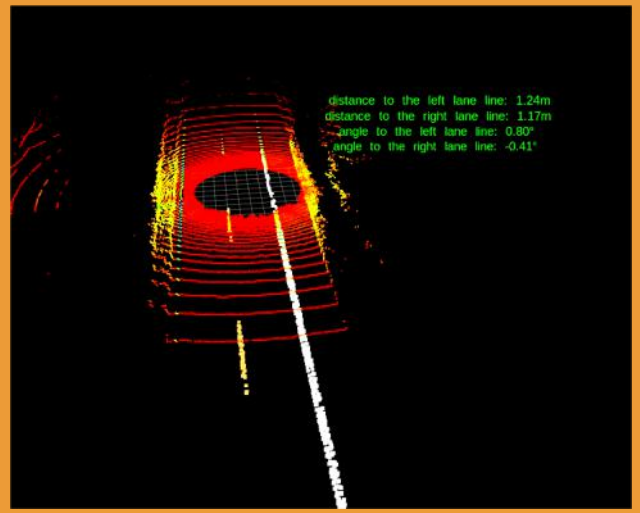
LiDAR data processing workflow



raw point cloud

imu_gps_can

LD_Calibrator

LD_Interpretor

calibrated point cloud

LD_can

LD_Synchronizer

LD_Data

Point cloud

Ground Removal

Ground points

Intensity_Filter

Road markings

Distance to lanes
Angle to Lanes

Ego lane recognition

can

Odometry_Generator

Odometry

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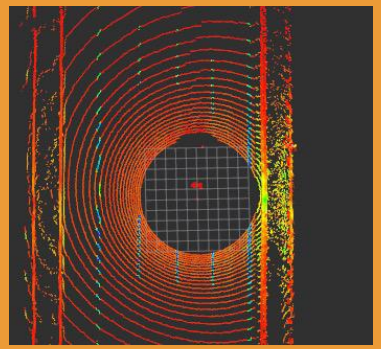
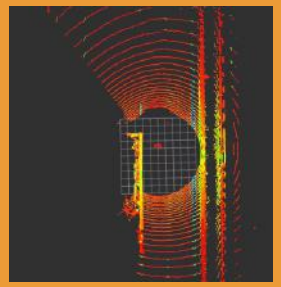
How to deal with different road conditions? Confidence level concept

Best case:

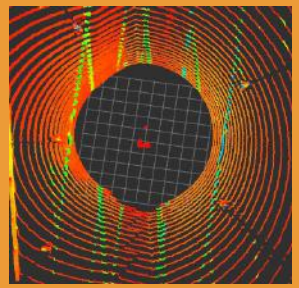


Straight road with clear road markings

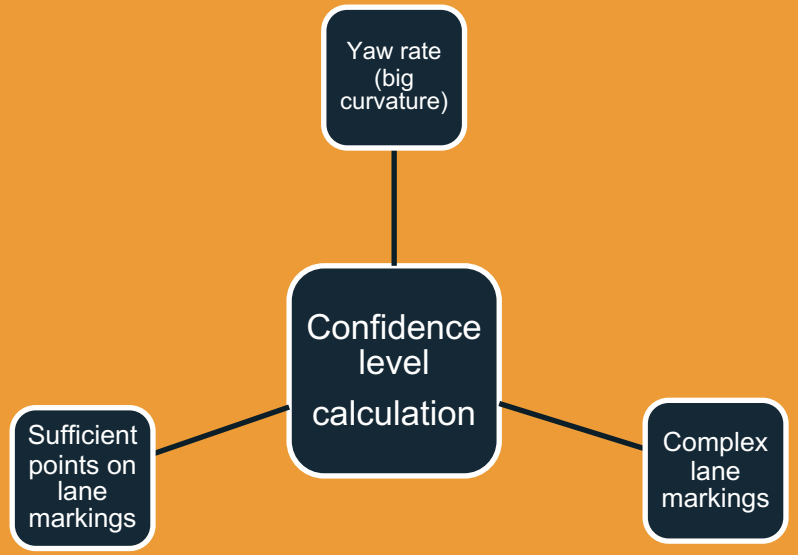
Worst case:



Long-time blockage



Complex or unclear lane markings



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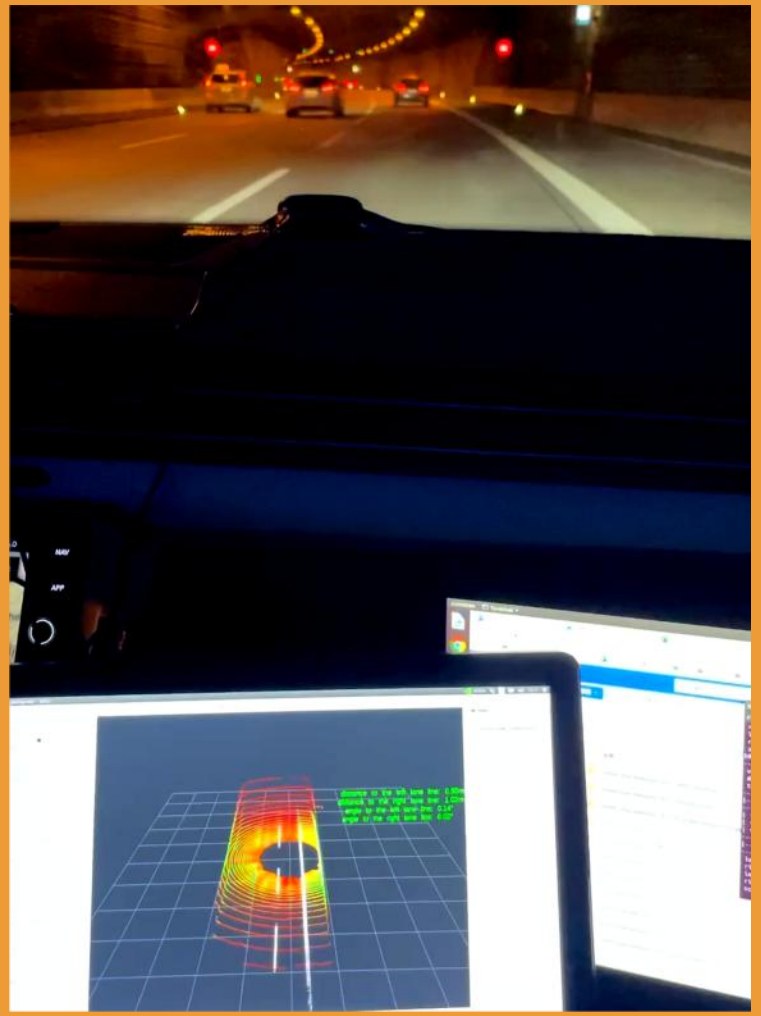
Self-Testing On LiangDao Reference Vehicle on open road

The result can be acquired in real-time with visualization tool.

With our LiDAR-based system, the testing can be done on any public road with road markings day and night.



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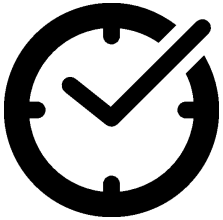

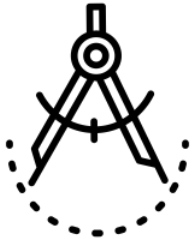

Advantages

1. Flexible application for open road
2. Easy-to-use system design
3. Accurate result with confident level
4. Real time testing result
5. Cost efficient

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Reference Project: Magna Steyr

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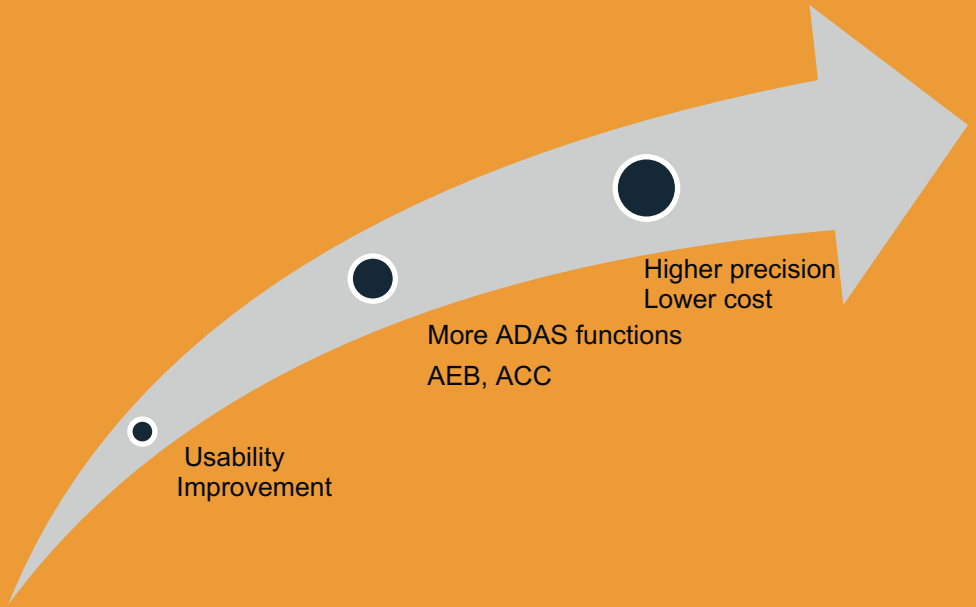
Future work


Higher precision
Lower cost
More ADAS functions
AEB, ACC
Usability
Improvement

THANK YOU!

Do you have any questions?
Visit our booth outside

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