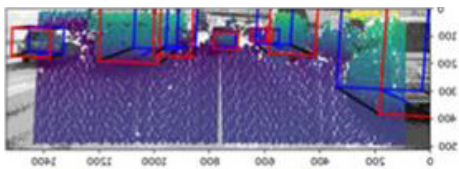
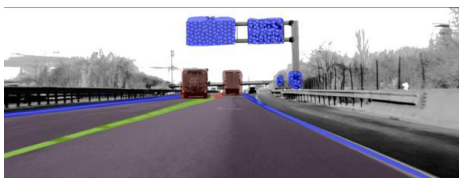


# SMART ME UP

## Classification software embedded into our LiDAR ECU



3D Boxing using LiDAR output



Point cloud segmentation, example

### Key features

- Artificial Intelligence SW developed by a dedicated team inside Marelli organization
- Combined deep learning (Neural Network) and optionally rules-based approach for redundancy (Safety)
- 3D objects detection and classification
- Road profile, free space and lane/barrier models recognition
- Scenario (construction,...) and sensor health information

### Object classification

#### Road users & Landmark

- Truck/Bus, Van, Car, Motorcycle, Bicycle, Pedestrian
- Uncategorized Objects (hazards), from big to small objects with low reflectivity (tire, tree branch,...)
- Horizontal structures (tunnel entry, bridges, sign gantry)
- Vertical structures (lamps post, tree stakes, house wall)
- Guard rails and concrete barriers
- Trees

This list can be extended to more classes.

### Contact

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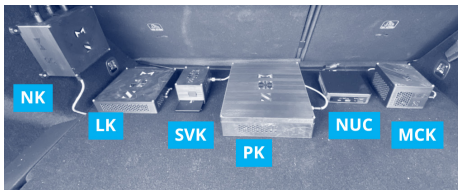
**Marelli Automotive Lighting Italia S.p.A.**

**Strada del Drosso, 29 int.15**

**10135 Torino (TO), Italy**

# DATA COLLECTION

## Our development platform with ADAS Plug&Play Kits



Sensor Validation Kit	(SVK)
Localization Kit	(LK)
Perception Kit	(PK)
Motion Control Kit	(MCK)
Networking Kit	(NK)

### Features

- Flexible Platform to support product development (Perception Software)
- Synchronized start up with vehicle key on
- Marelli Power Module for power supply management and safety
- STM32 ARM® Cortex™-M3 embedded MCU
- Mixed networking WIFI/Bt/ETH
- 4G/5G communication
- OTA (over-the-air) for remote update, upgrade or bug correction
- Controllable by Android App



### Data collection for neural network training

- Data acquisition from vehicle to cloud (4G/5G) for annotation
  - Camera Images
  - Pointclouds
  - Processed Data
  - Positioning Data
- Vehicle in the loop test
  - HMI display output of Perception Software
- Live monitoring from remote
  - Analytic server for KPI evaluation
- Localization platform with GNSS RTK
- Odometer
- IMU and data from Lidar/Camera fused to reach centimeter accuracy



Classification output

### HMI display output

#### Sensor (Lidar and Camera) Processing Output :

- 3D Objects (Classification)
- Objects Distance
- Objects Tracking
- Lines

#### Enabling ADAS/AD features at system level

- Trajectory planning
- Lane change
- Lane keeping
- Autonomous emergency brake
- etc.