



Technology with Vision

System Components and Integration for Sensors

DVN LiDAR Conference

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Christian Schmidt,

Frankfurt, NOV-20-2018



Sensor Integration

Level 5 Research Vehicles in 2018



Sensor Integration

Level 5 Urban Vehicles in 2018



Sensor Integration

Level 5 Concept Vehicles in 2018



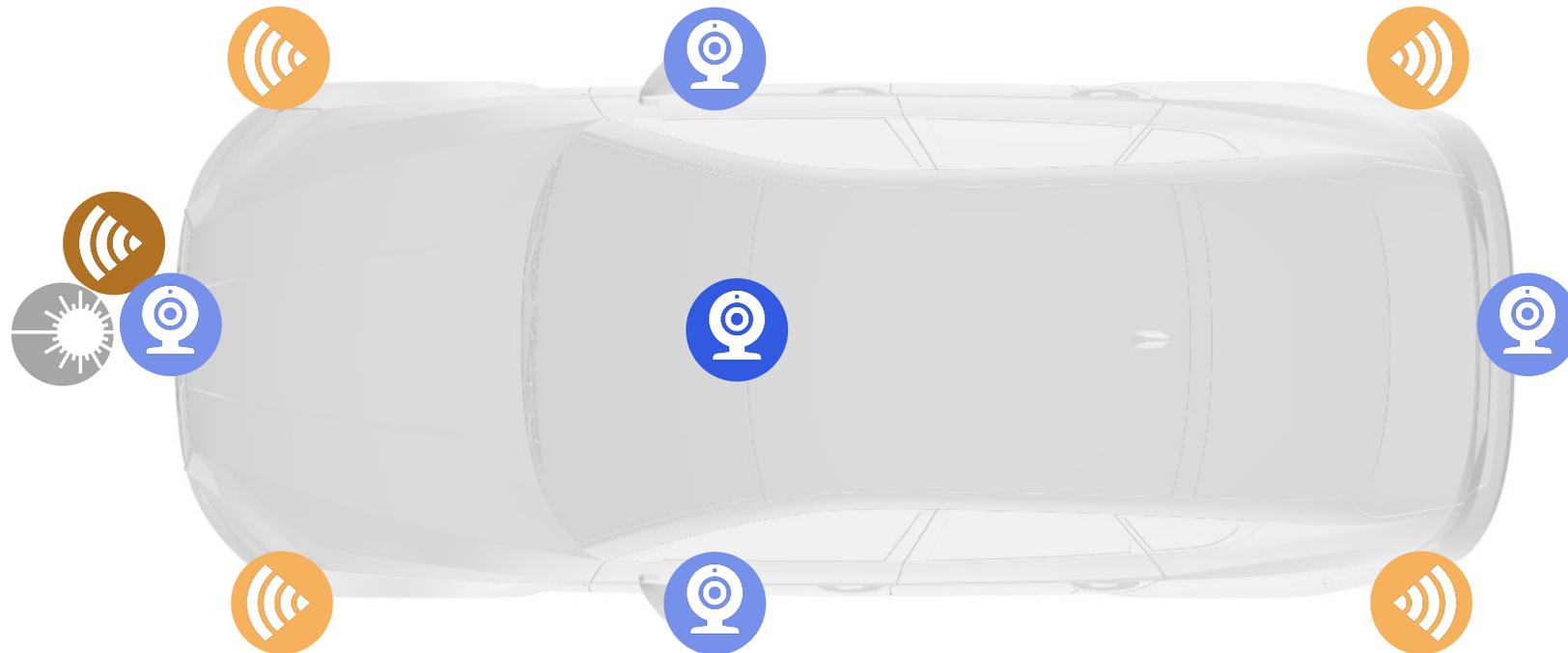
Sensor Integration

Level 3 Production Cars in 2018



Sensor Integration

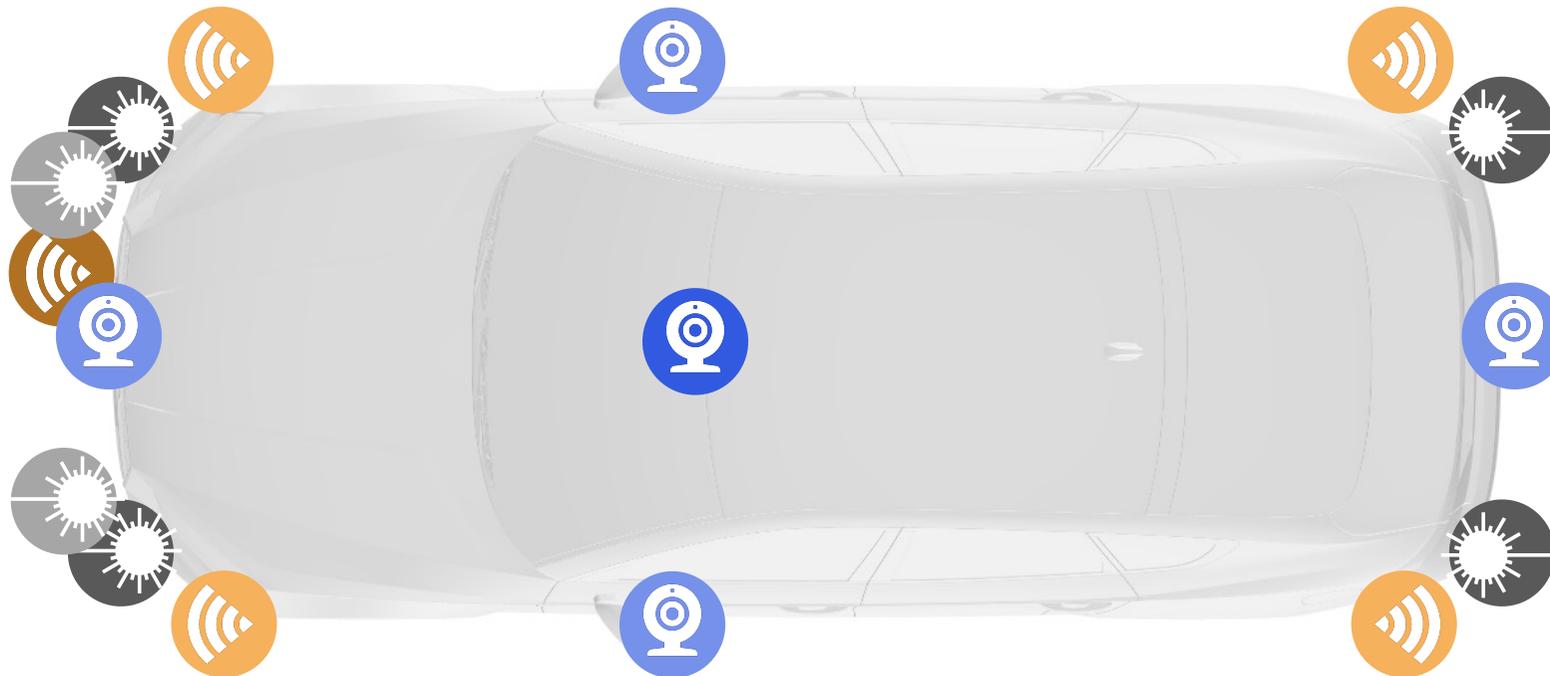
Overview sensors and installation areas LEVEL 3



-  LRR
-  SRR
-  Env. Camera
-  Front Camera
-  Long Range LiDAR
-  Wide Angle LiDAR

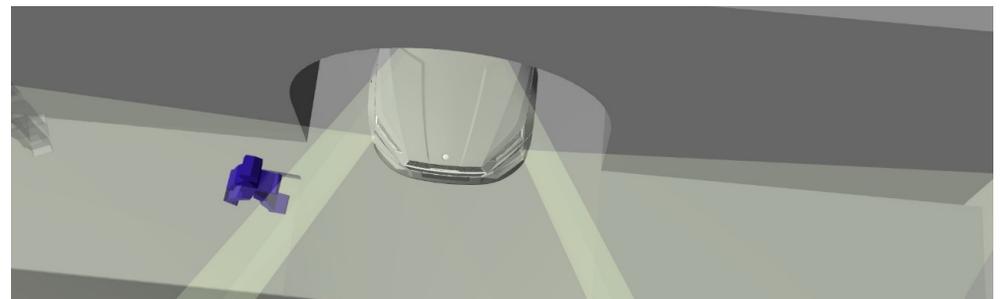
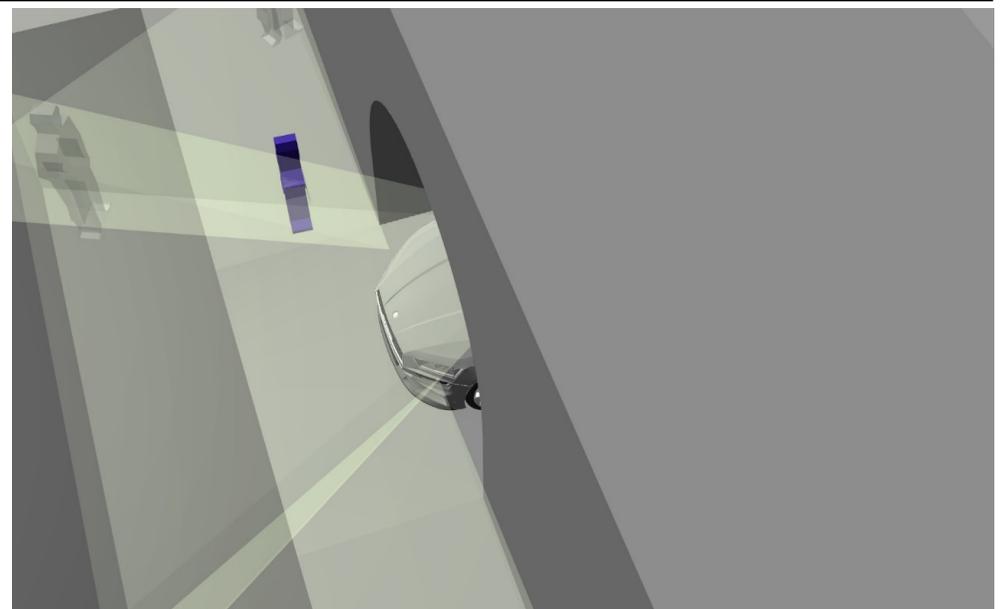
Sensor Integration

Overview sensors and installation areas LEVEL 5

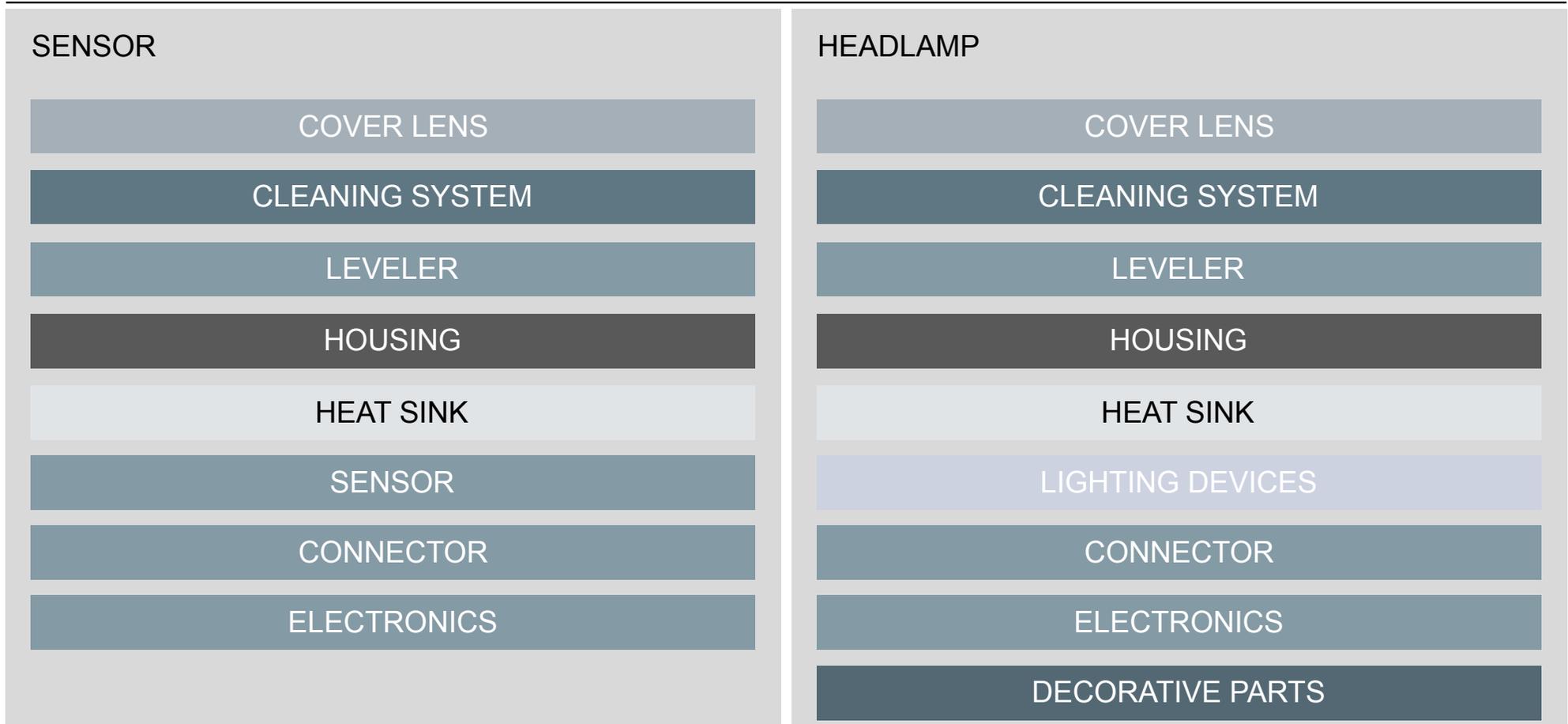


-  LRR
-  SRR
-  Env. Camera
-  Front Camera
-  Long Range LiDAR
-  Wide Angle LiDAR

Why Headlamp Position



Why Headlamp Components



What Sensors Need

Environmental Impacts on Headlamps and Lidar Sensors



ICE AND SNOW



RAIN



MOISTURE



DUST



INSECTS



VIBRATION



TEMPERATURE



SCRATCHES



MATERIAL



STONE IMPACT



ROAD CONDITION



RADIATION

What Sensors Need Cleaning



High Pressure Cleaning



Wiper



Coating



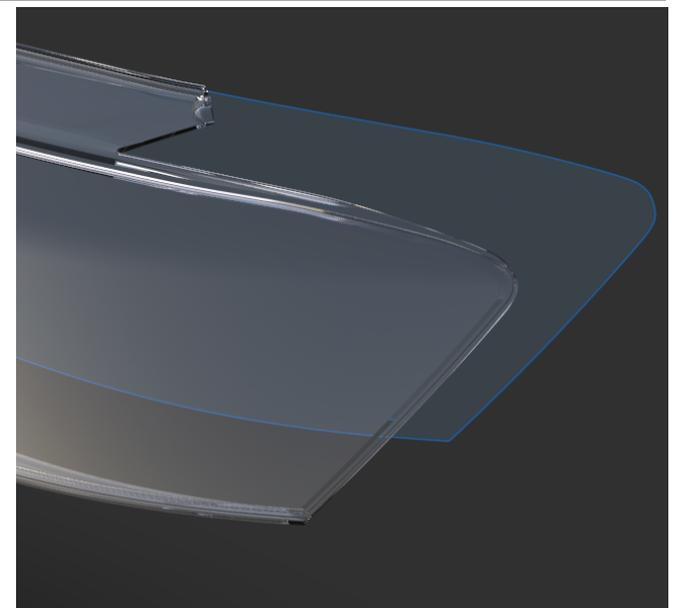
What Sensors Need De-Icing / Defrosting



Wire Heated Lens



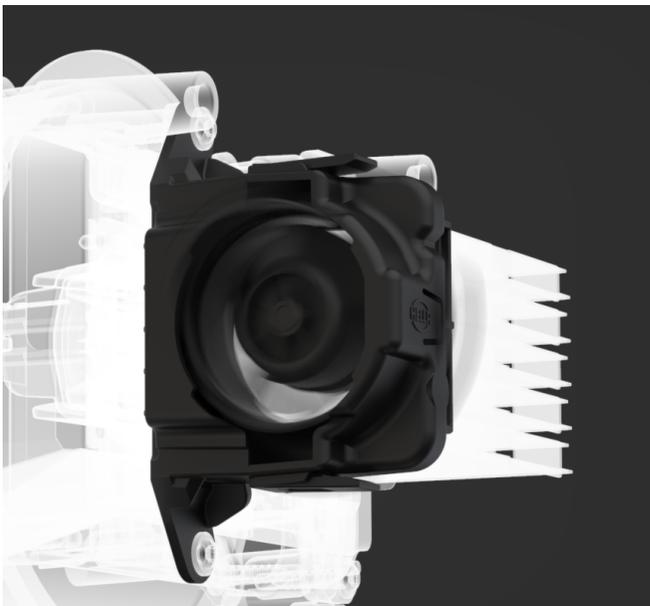
Infra Red Heated



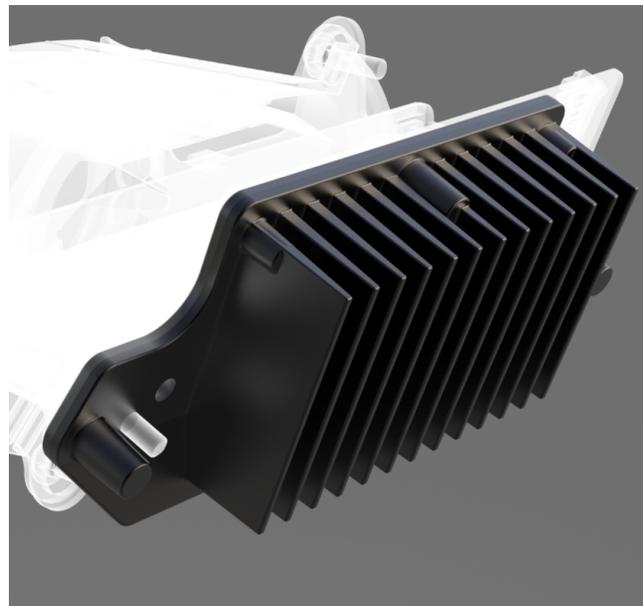
Anti Fog Coating



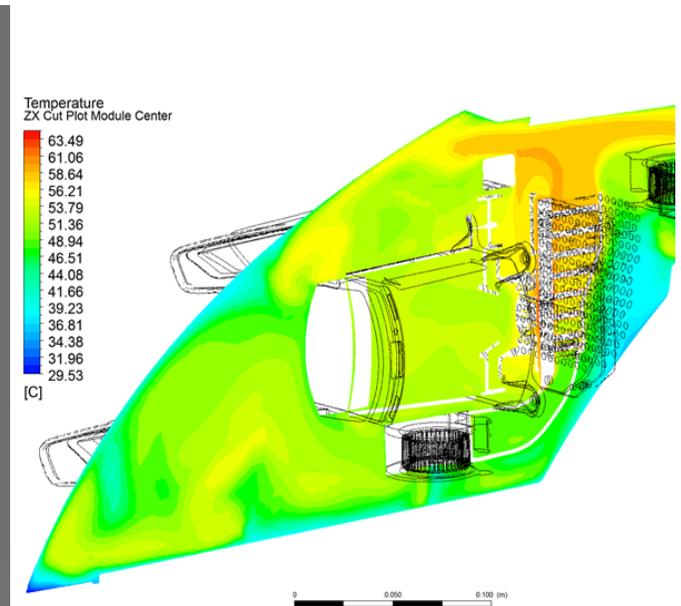
What Sensors Need Thermal Management



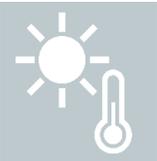
Active Ventilation



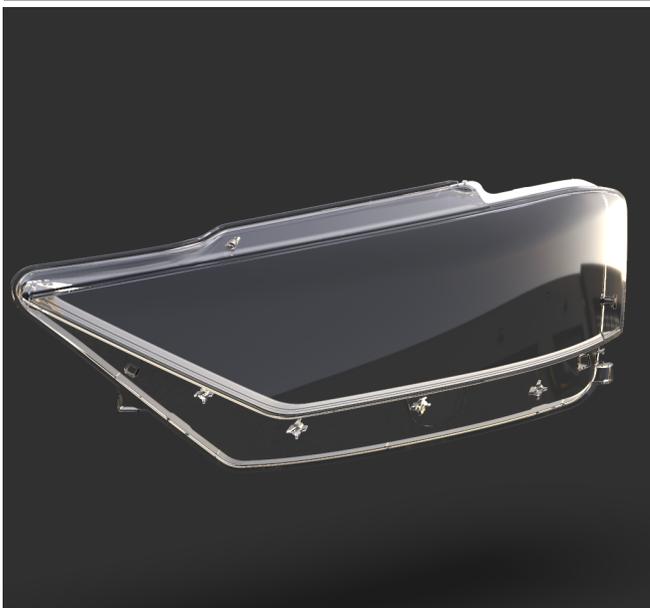
Heat Sink



Simulation Experience



What Sensors Need Housing



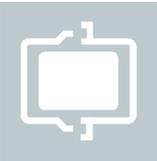
Cover Lens



Gluing



Pressure Equalization



What Sensors Need Aiming



Leveling Actuator



Adjustment



Leveling Sensor



What Sensors Need Validation



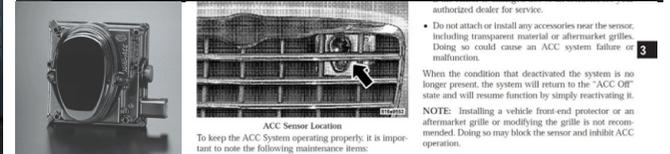
Vibration Testing



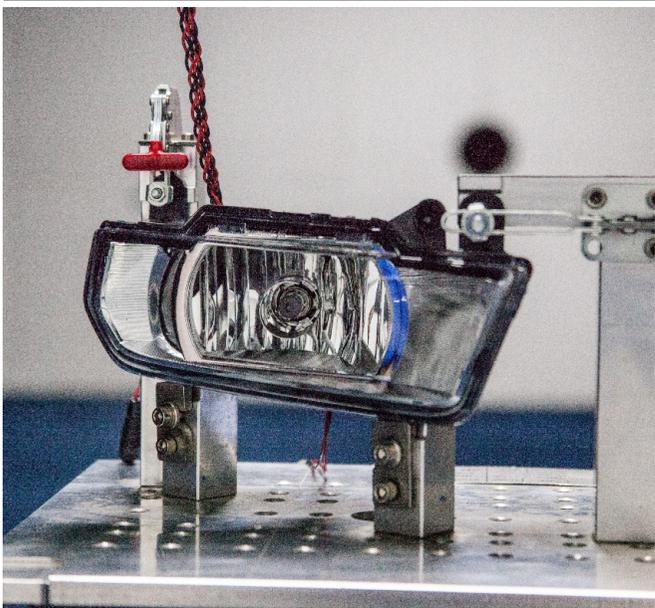
Climate Testing



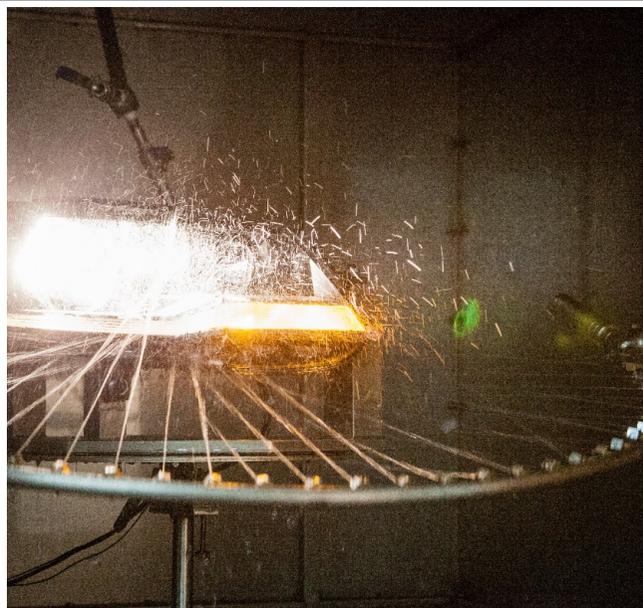
Development Experience



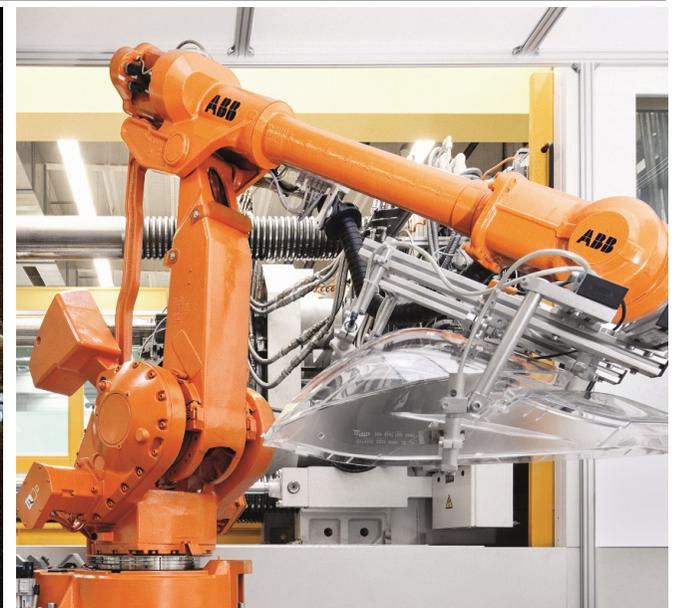
What HELLA stands for Qualification and Industrialization



C-Sample



Leakage Test



Industrialization



Resumé

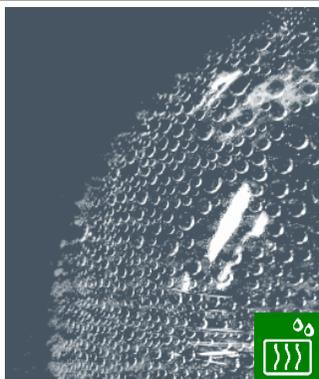
Protection Against Environmental Impacts



ICE AND SNOW



RAIN



MOISTURE



DUST



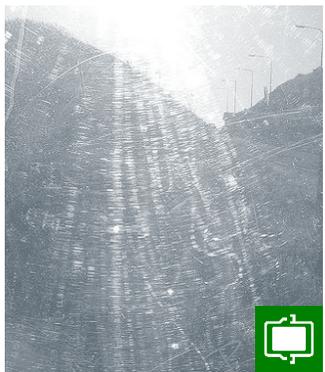
INSECTS



VIBRATION



TEMPERATURE



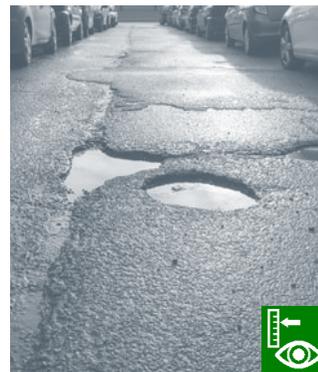
SCRATCHES



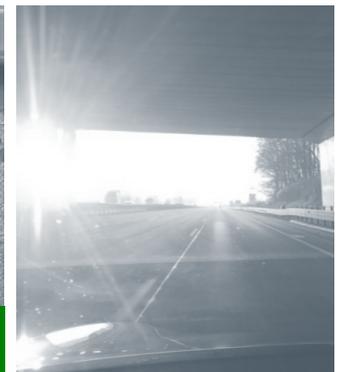
MATERIAL



STONE IMPACT



ROAD CONDITION



RADIATION

Resumé

Graceful and robust integration of sensors into autonomous vehicles is a discerning task

Headlamp integration is offering various synergies in terms of part reduction and protection against environmental impacts

HELLA is investigating towards the integration of sensors in headlamps





Technology with Vision

Dr. Michael Kleinkes
Lighting Development

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