

# Valeo Vision Systems

## Automotive Applications for Low Light Cameras

25/10/21



AUTOMATED &  
AFFORDABLE



# VALEO - A LEADER IN PARKING, SAFETY & DRIVING AUTOMATION

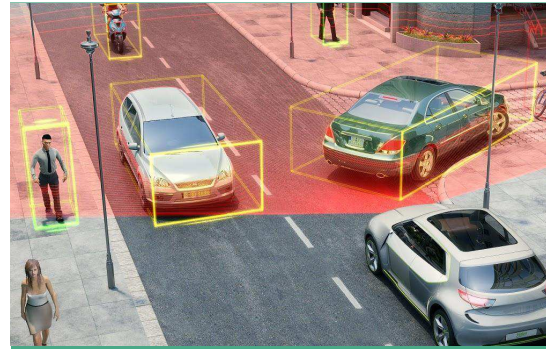
We ensure **safety, assistance and automation** with our best-in-class sensors and perception systems. We provide functions and modules for private and commercial mobility.



## PARKING

Market leader since 1991  
with 35% market share

- ✓ Ultrasonic Systems
- ✓ Rear & Surround View systems
- ✓ Automated Parking solutions



## ACTIVE SAFETY

Scalable platform from entry  
solutions to NCAP 5 stars

- ✓ 3-5 stars NCAP solutions
- ✓ ACC and Lane Centering
- ✓ Rear AEB



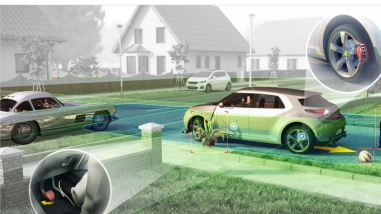
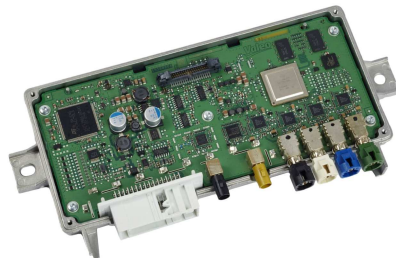
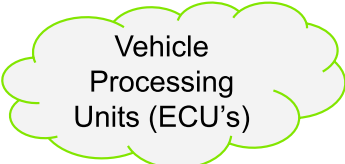
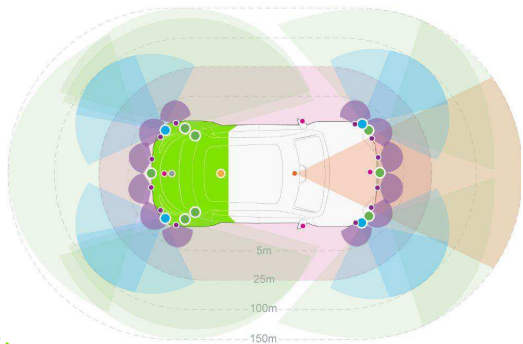
## AUTOMATION

Road testing in Europe,  
the USA and Japan since 2015

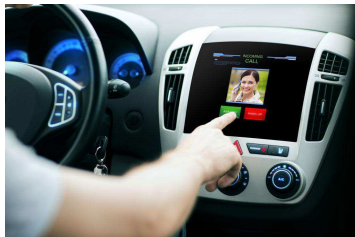
- ✓ 360° perception systems
- ✓ Localization & mapping
- ✓ High Definition Sensor (LiDAR, camera, radar)



# Vehicle Architectures for Automated Driving



Vehicle Control



Vehicle Display

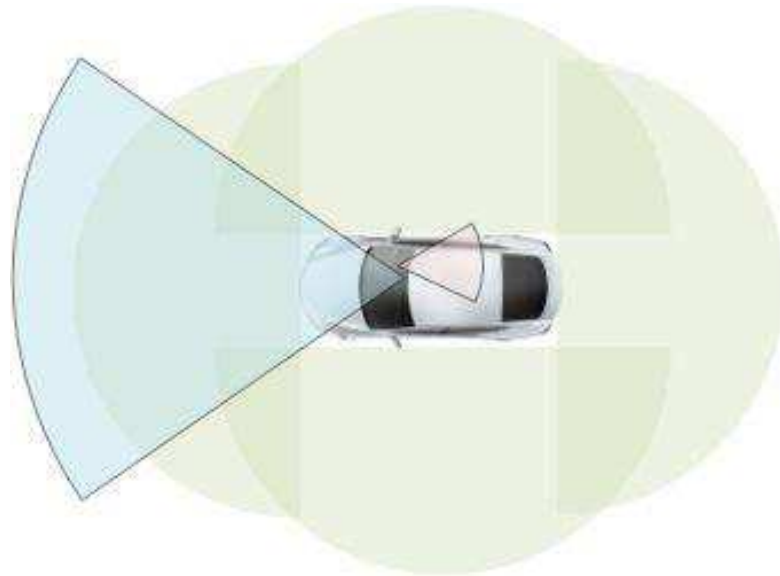


Off-Vehicle Features

# Example Automotive Vision Configuration



Front Camera

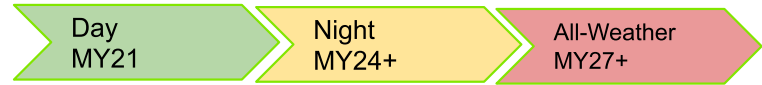


360° /Rear Cameras

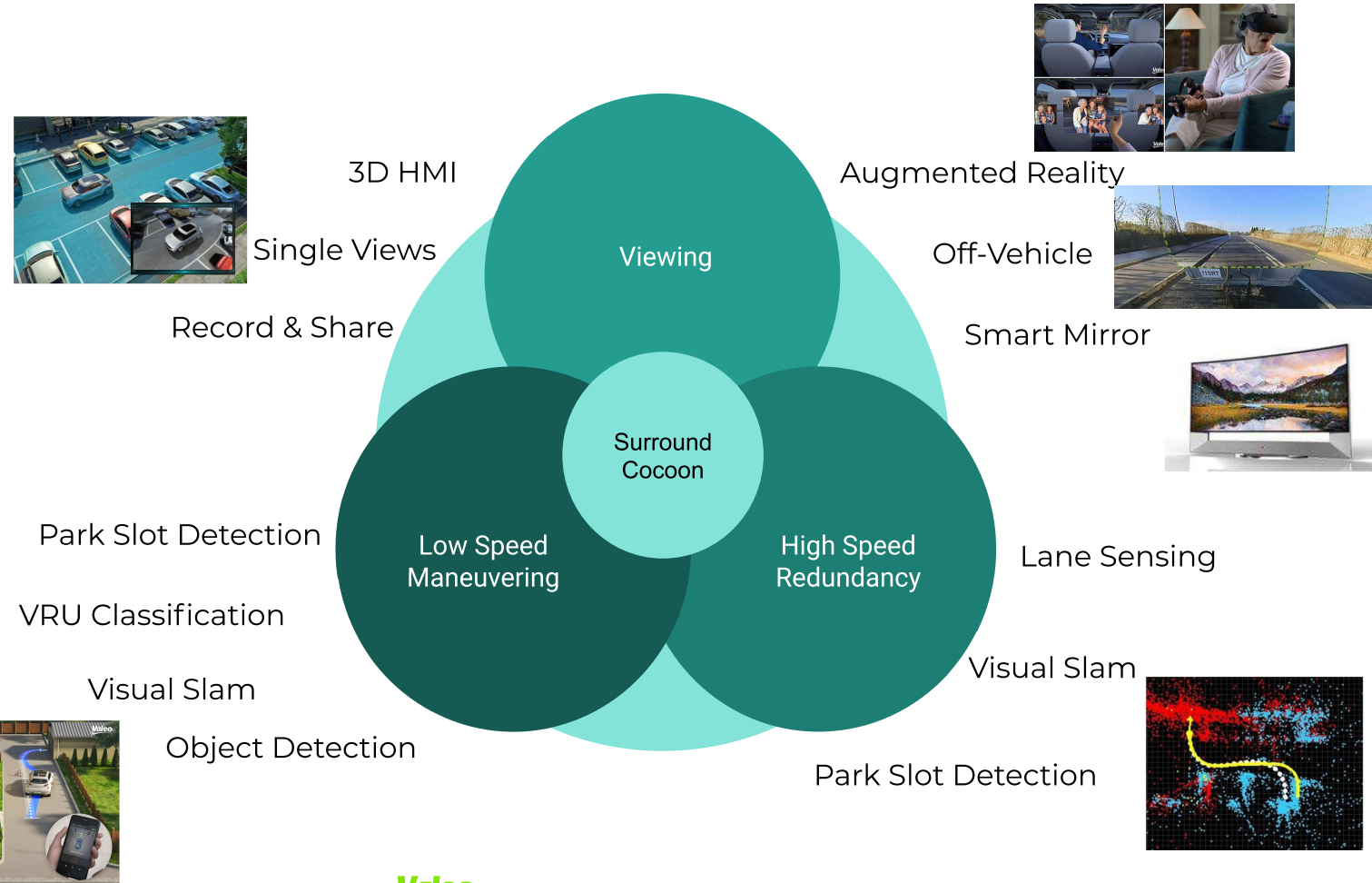


Driver Monitoring Camera

# Surround View System Use Cases



- Considerations**
- Screen Size/Resolution
  - Video Consumers (On/Off Vehicle)
  - Camera Locations
  - Algorithm Target KPIs
  - Pixel Low Light Performance
  - Video Link Bandwidth
  - Processing Bandwidth
  - Cost



## Lane Sensing - Sample Video Low Light video



Major detection performance challenge for fisheye cameras in low light

VALEO RESERVED



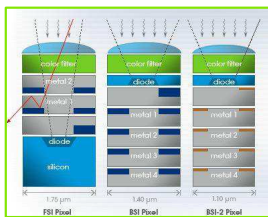
# Automotive Pixel Technology Evolution

VGA, 6µm pixel  
Non-HDR, 60-70dB

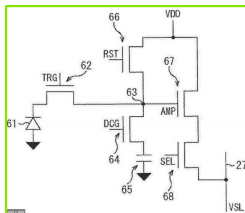
1mpx, 4.2µm pixel  
HDR, 90-110dB

2+mpx, 4.2µm pixel  
HDR, 120dB+

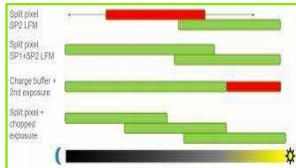
8+mpx, 2.1µm pixel  
HDR, LFM, 60fps



BSI



Dual Conversion Gain

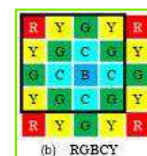
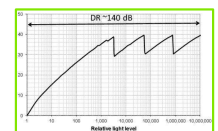
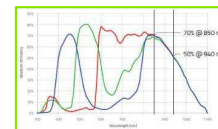


LFM



CFA binning

<2.1µm pixel pitch



Process, manufacturing, design improvements

2010  
VALEO RESERVED

2012

2014

2016

Valeo

2018

2020