

SOLUTIONS FOR ADAS AND AUTOMATED DRIVING

RENESAS ELECTRONICS, 28-MAY-2018

Renesas  autonomy™



WHO WE ARE

THE WORLD'S LEADING EMBEDDED SOLUTION PROVIDER

Renesas is a global semiconductor company built on a strong historical foundation of technological innovation originating from Hitachi, Mitsubishi, and NEC.

In 2017, Renesas acquired Intersil to become the world's leading embedded solution provider.

- A global leader in microcontrollers, SoC, analog and power semiconductors
- Focused on a broad range of Automotive, Industrial, Home Electronics, Office Automation and Information Communication Technology
- 780.3 billion yen in net sales in 2017
- Headquartered in Tokyo, Japan
- 20,000+ employees worldwide*1



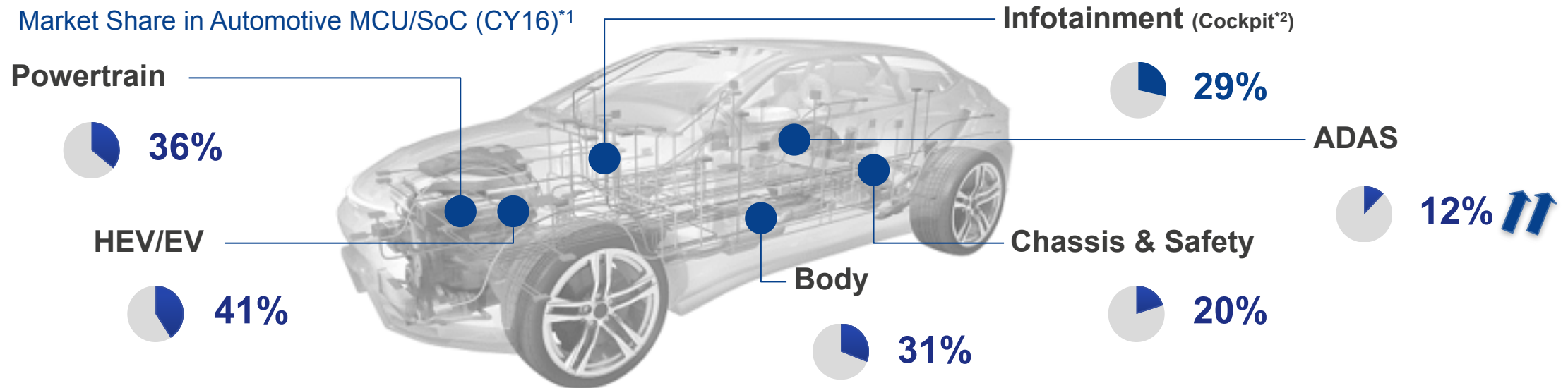
The European Headquarter in Düsseldorf-Rath

*1: Consolidated, as of December 31, 2017 / SoC: System-on-a-chip

TRUST AND EXPERIENCE REQUIRED FOR VOLUME PRODUCTION

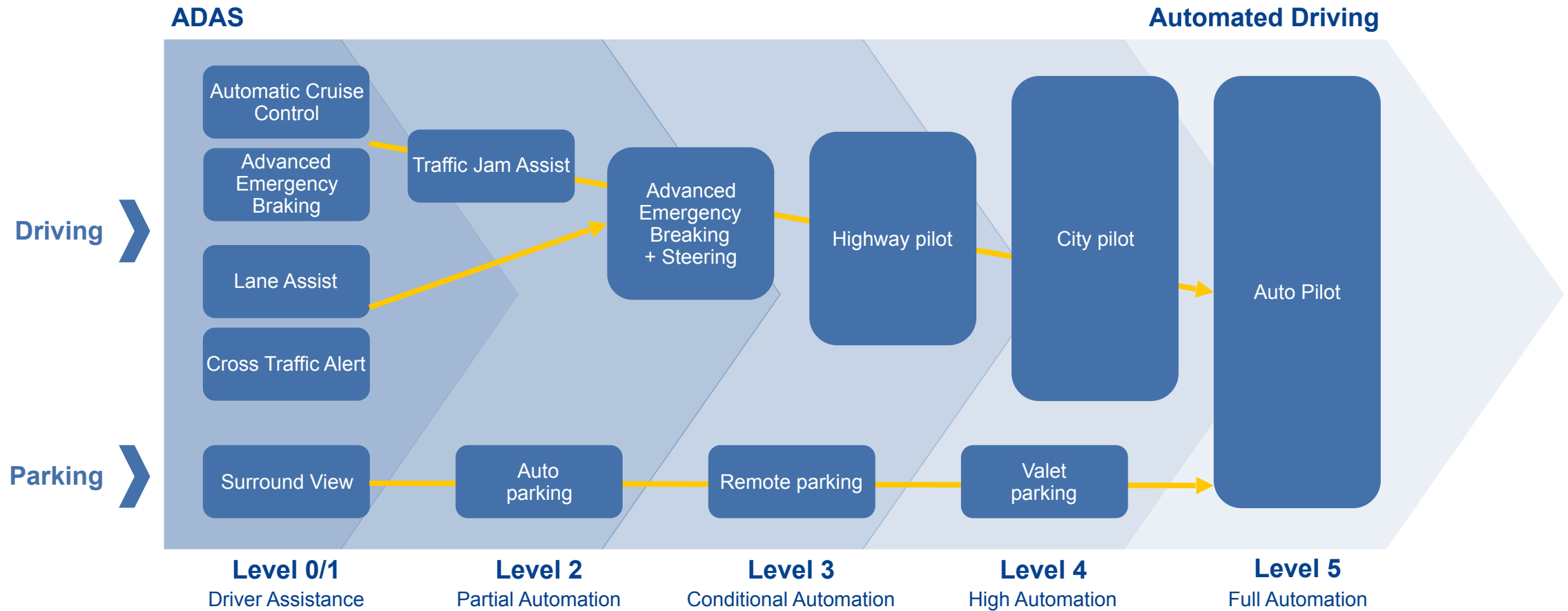
- Renesas is the leading MCU/SoC supplier for Automotive – W/W shipments reached aprox.1B units in 2016
- Best in quality – Extremely low failure rate at 0.1ppm
- Advanced process – 16nm finFET for SoC, 40nm to 28nm cutting edge process for MCU

Market Share in Automotive MCU/SoC (CY16)*1

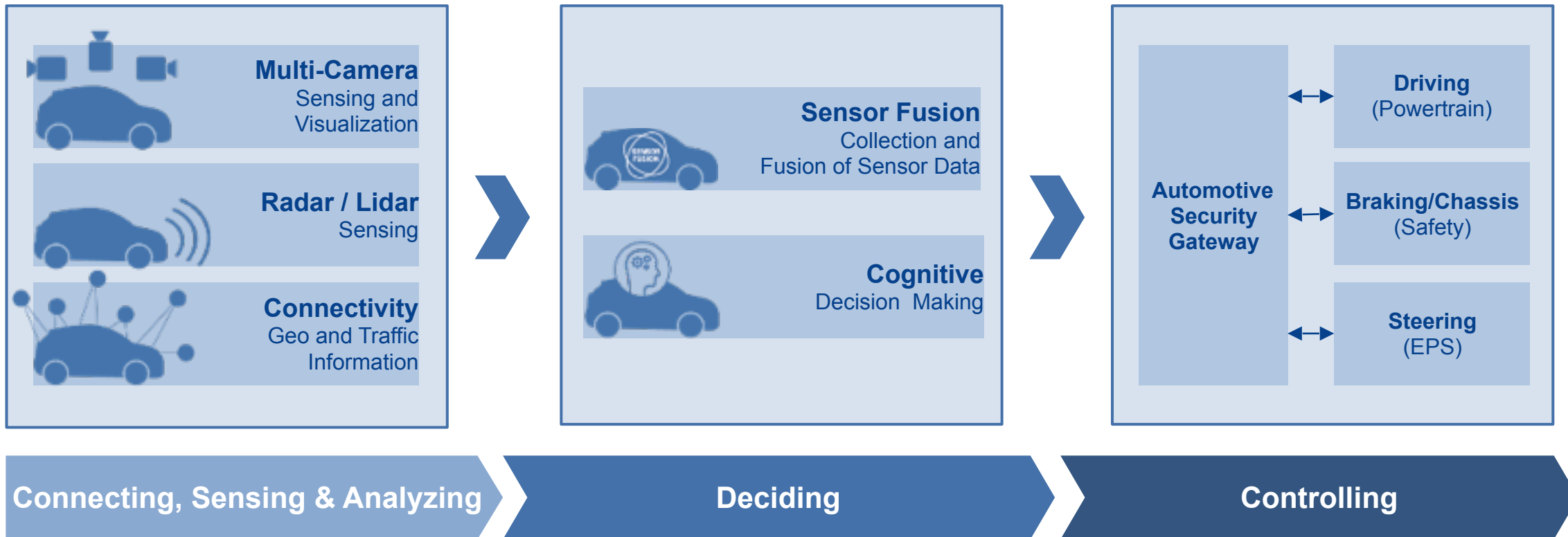


*1: Renesas' revenue estimate in each segment is based on the market analyses by Strategy Analytics 2016. / *2: SoC share in all of cockpit related systems. / MCU: Microcontrollers / SoC: System-on-a-chip

FROM ADAS TOWARDS AD



END-TO-END PLATFORM FOR ADAS AND AUTOMATED DRIVING



“SYSTEM-ON-CHIP” SOLUTIONS FOR FRONT CAMERAS



► Solutions for Level 2 (“NCAP”) to Level 3+4 Vehicles

NCAP SETTING THE PACE FOR FRONT CAMERAS

- NCAP (New Car Assessment Programme) rates safety level of cars
- Highest safety ratings (★★★★★) require a minimum set of assistance systems:



► Renesas and partners enabling NCAP cameras

AUTOMATED DRIVING PUSHING THE LIMITS

Highway Pilot



Traffic Jam Pilot



Unconditional
Emergency Braking



Remote
Parking



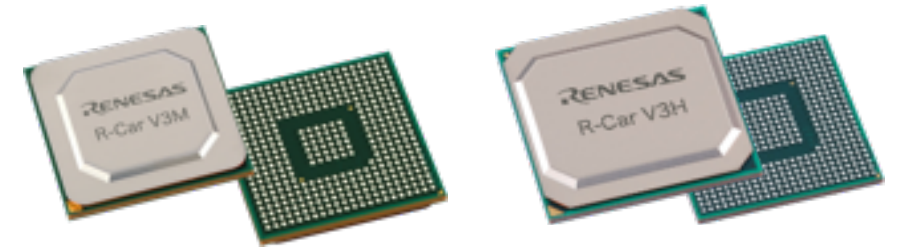
Going from Mono- to Stereo Cameras

Need for high precision

Requires 360 degree detection

► Requires new system solutions based on R-Car V3H

INNOVATION ENGINEERED IN EUROPE



5x increasing computer vision performance

Performance (MMAC)

10000

R-CAR V3H

4x CA53
IMP-X5+, HWA

>4 TOPS

1000

R-CAR V3M

2x CA53
IMP-X5+

0,8 TOPS

100

R-CAR V2H

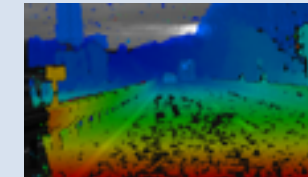
2x CA15 1.0GHz
IMP-X4

Highly efficient accelerator for Artificial Intelligence

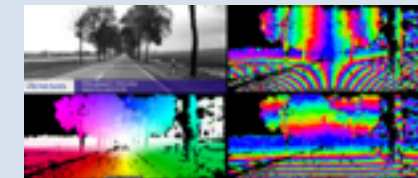


CNN IP
providing > 400 GMAC
at less than 300mW

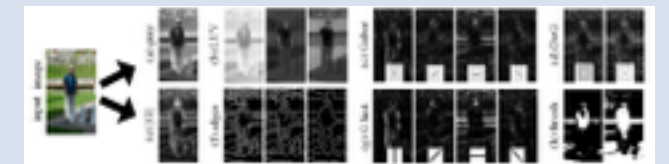
Highly efficient accelerator for traditional computer vision



Dense Optical Flow

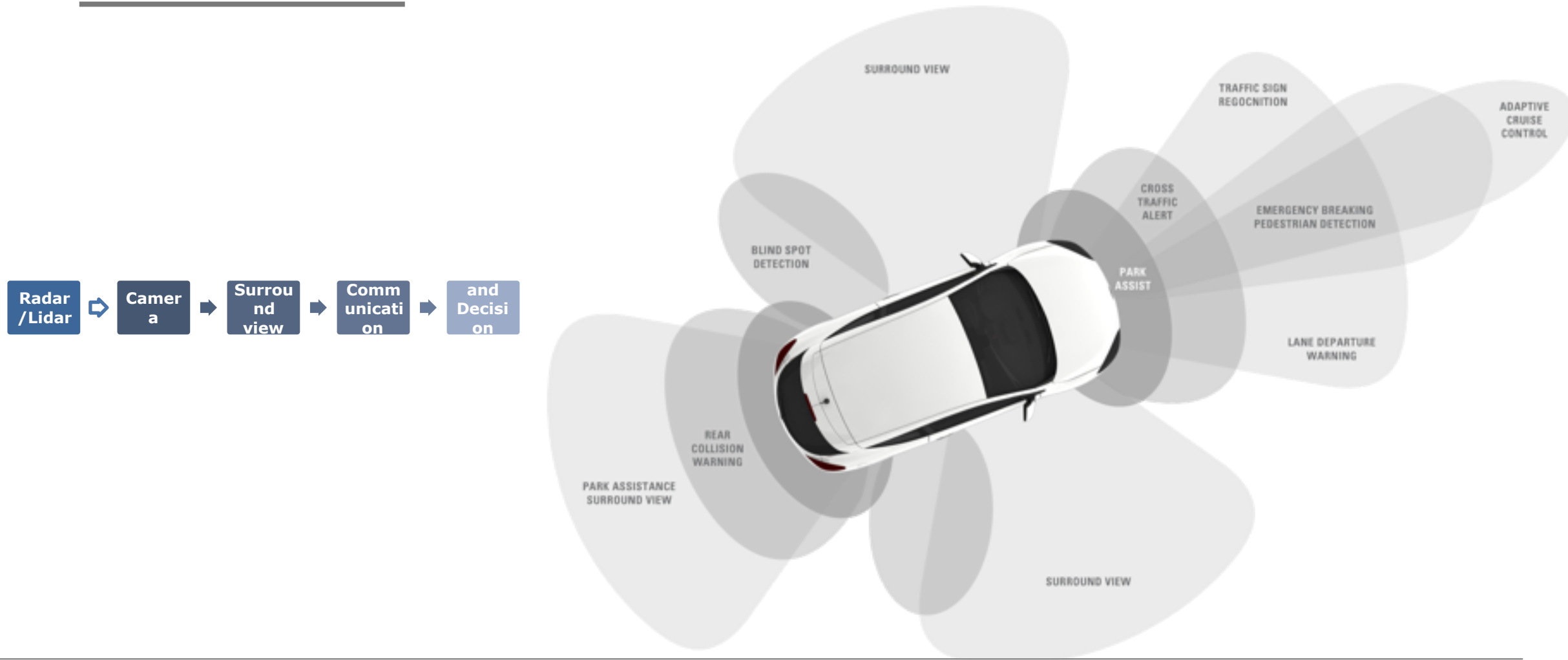


Stereo Disparity



Object Classification

AUTOMATED DRIVING NEEDS MORE THAN A CAMERA



PREPARING THE ROAD FOR AUTOMATED DRIVING

Software Platform



Control Unit



▶ This moment engineers would die for

SUMMARY

Renesas autonomy, “the open, innovative and trusted platform for assisted and automated driving” provides the required answers >

We deliver solutions for high volume ADAS today >

We are developing solutions for Automated Driving for tomorrow >

Renesas  **autonomy™**

