

# Introduction to ADAS and Autonomous Driving

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# Introduction to ADAS and Autonomous Driving

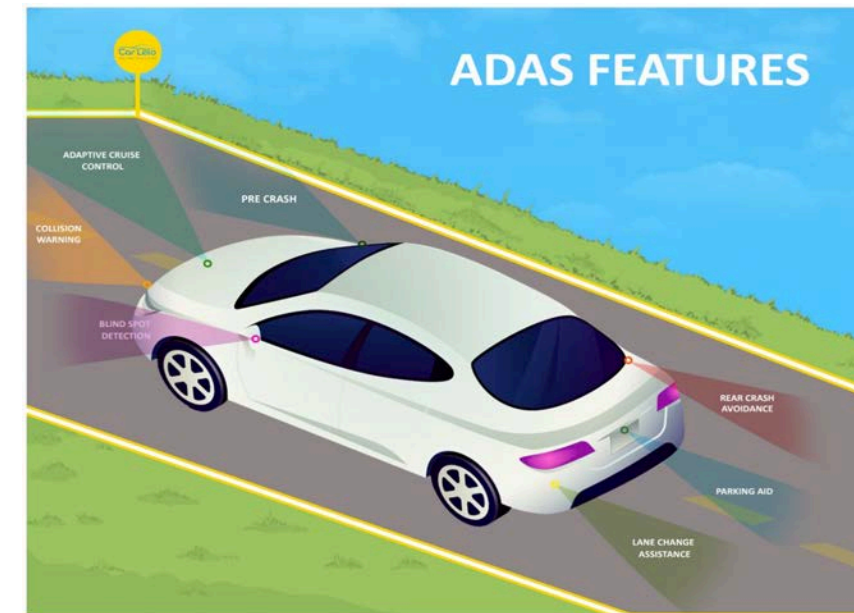
1. Introduction to ADAS and AD
2. Core Components of ADAS
3. Functions of ADAS
4. Computing power for ADAS
5. Evolution Towards Autonomous Vehicles
6. Impact on Road Safety and Transportation



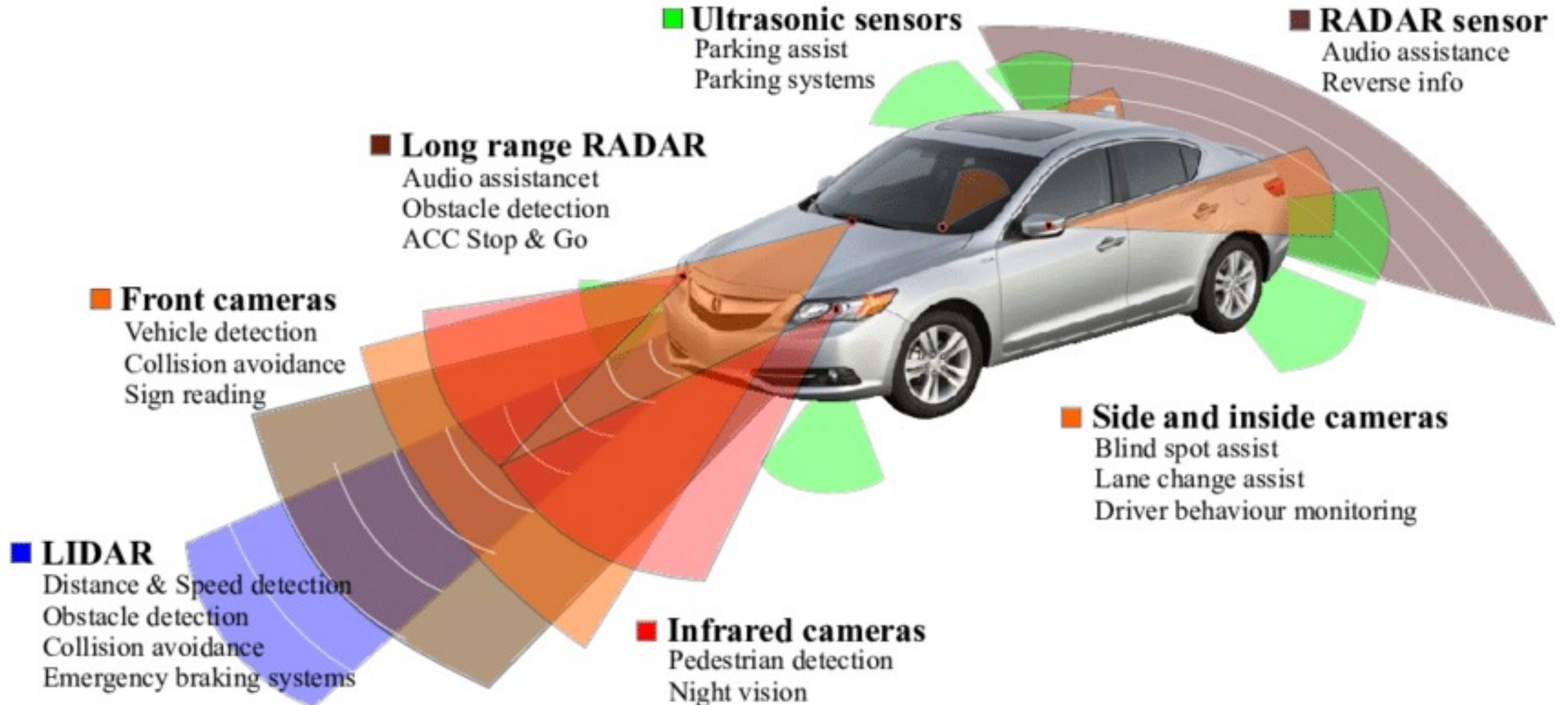
# Introduction to ADAS and AD

**Advanced Driver Assistance Systems (ADAS):** A suite of technologies designed to enhance vehicle safety and driving experience.

**Autonomous Driving (AD):** The next frontier, where vehicles navigate and operate without human input.



# Components of ADAS - HW





# Functions of ADAS

## Safety Package

Front Collision Warning  
Autonomous Emergency Braking  
Lane Departure Warning  
Lane Keeping Assist  
Door Open Warning  
Blind Spot Detection  
Front Cross Traffic Warning  
Rear Cross Traffic Warning  
Rear Collision Warning  
Emergency Lane Keeping Assist  
Evasive Maneuver Assist  
High Beam Control  
Traffic Sign Recognition  
Traffic Light Detection

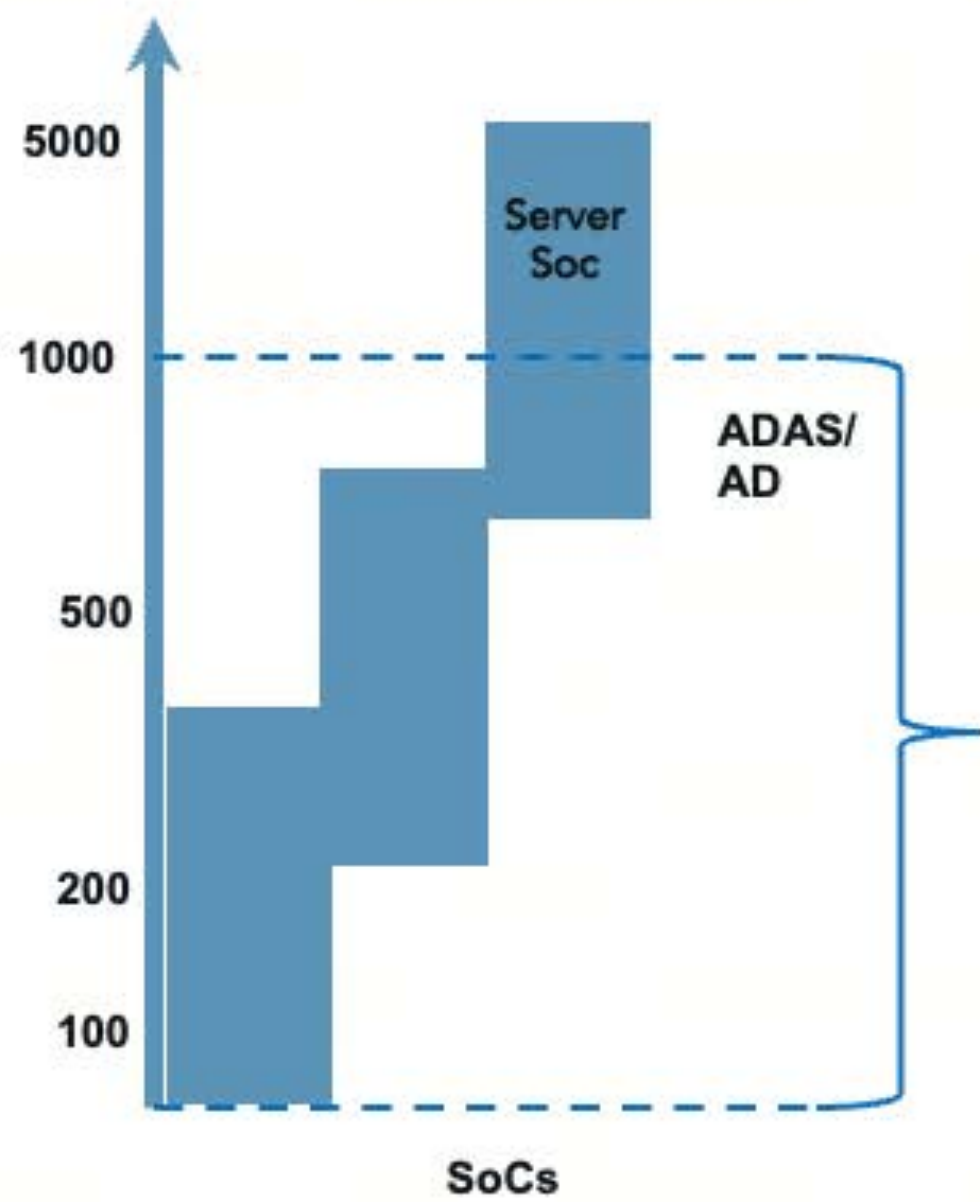
## Comfort Package

Adaptive Cruise Control  
Speed Limit Control  
Curve Speed Assist  
Overtaking Assist  
Traffic Jam Assist  
Highway Assist  
Dynamic Offset (Truck/Roadedge)  
Crossing Intersection  
Manual Lane Change  
Highway Navigation Pilot  
Taking over slow vehicle  
Ramp-in/-off  
Lane merge / Lane split  
Navigated Lane Change

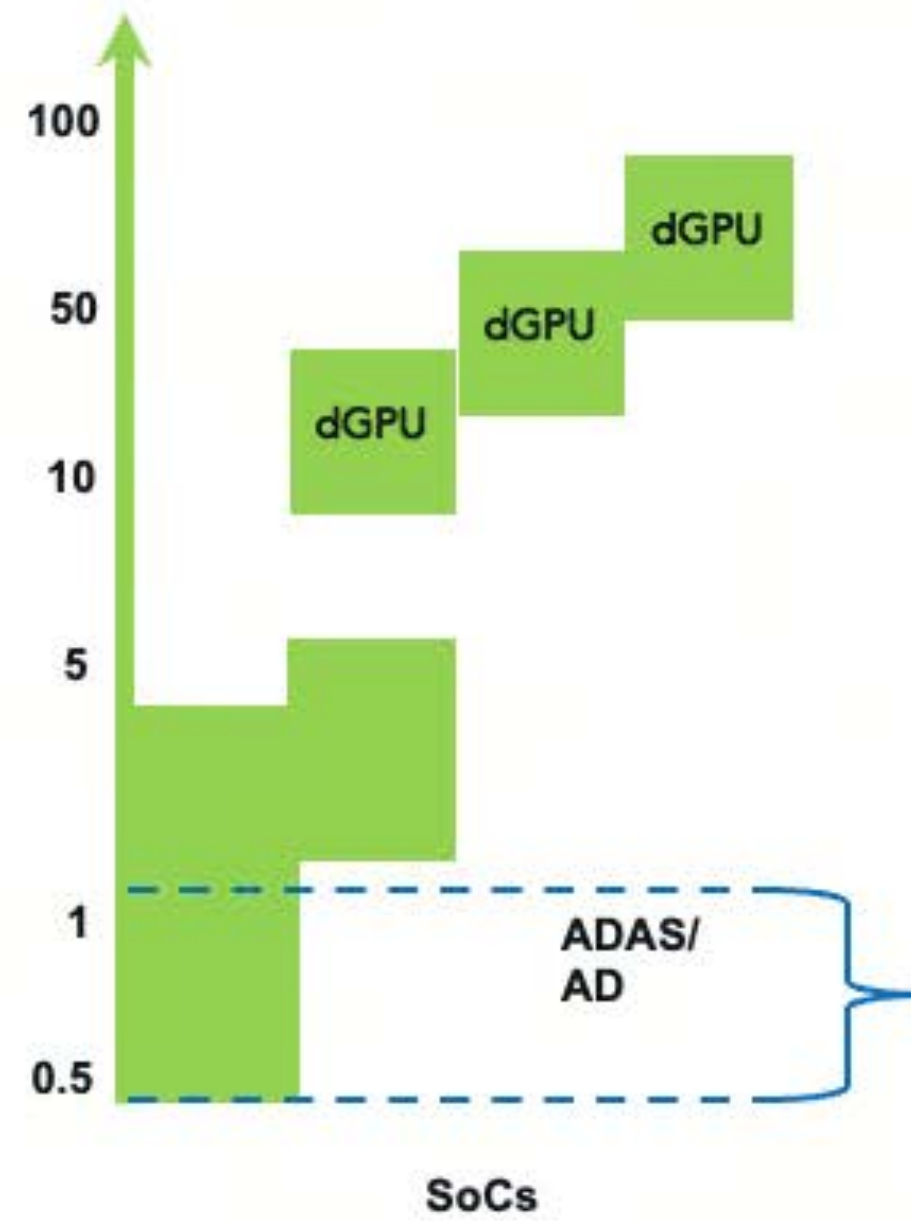
## Parking Package

360 Around View Monitor  
Parking Distance Control  
Parking Emergency Brake  
Auto Parking Assist  
Remote Parking Assist  
Home Parking Assist

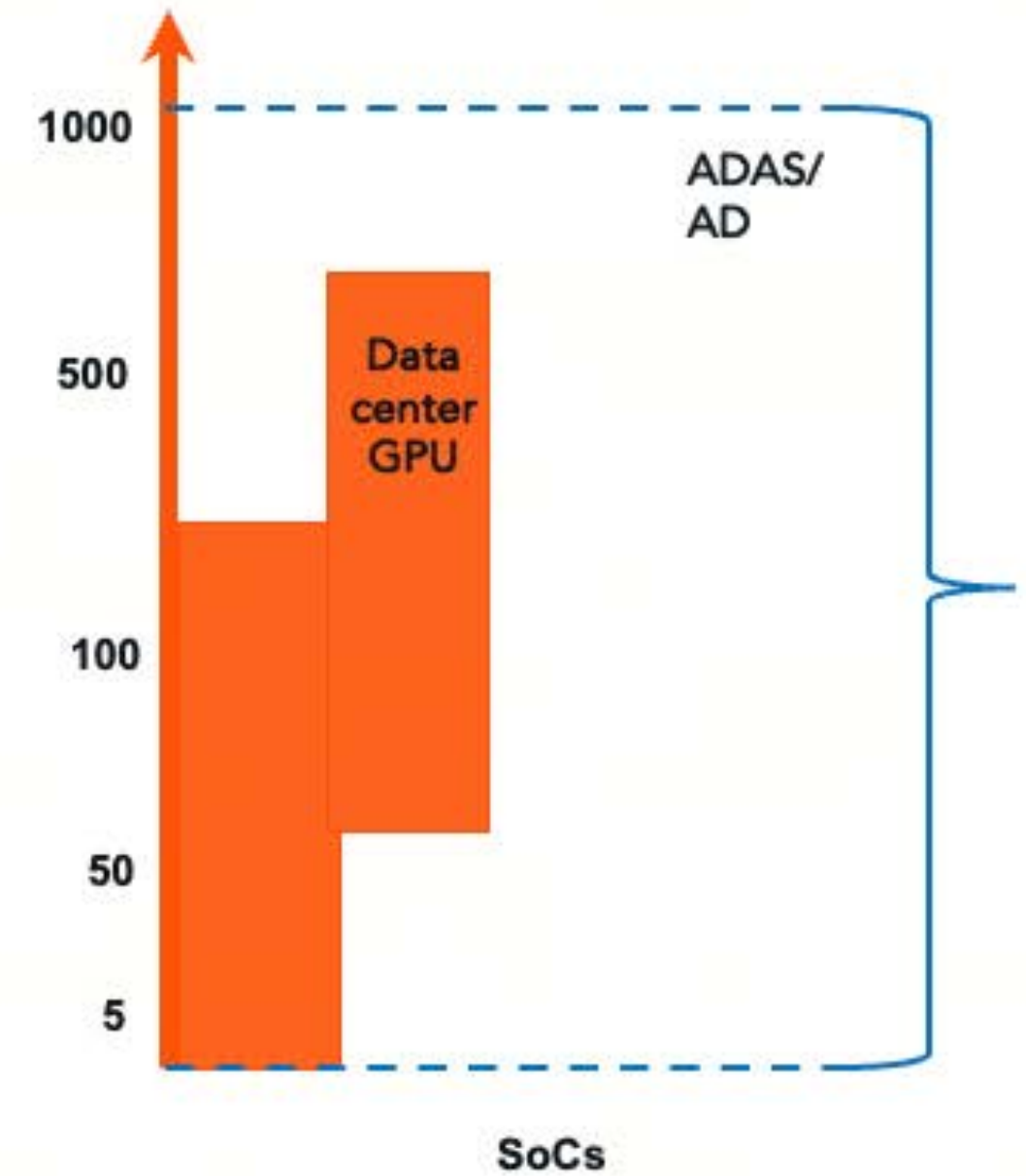
# Compute Power required for ADAS/AD systems



**CPU kDMIPS**

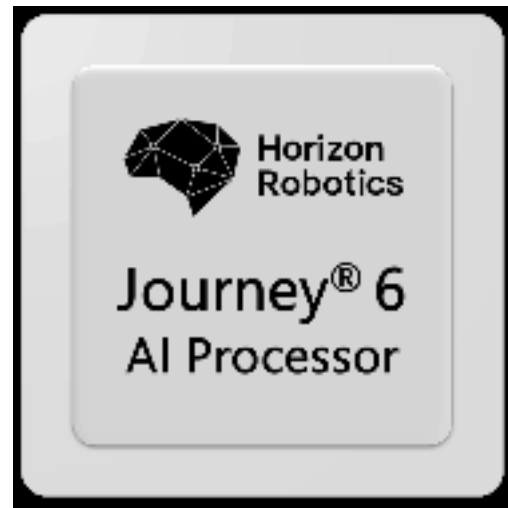


**GPU TFLOPS**

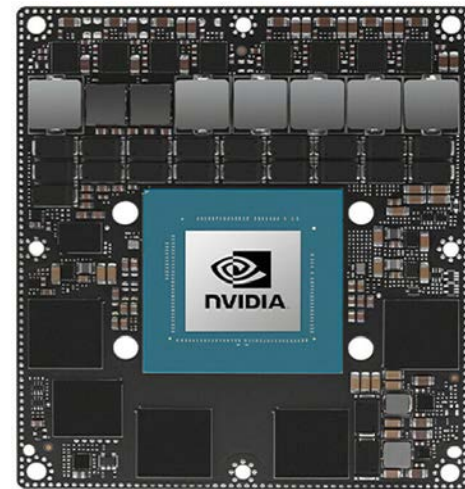


**NPU TOPS**

# Chips for ADAS/AD systems



Horizon Robotics J6: 560 TOPS



NVIDIA Orin: 254 TOPS

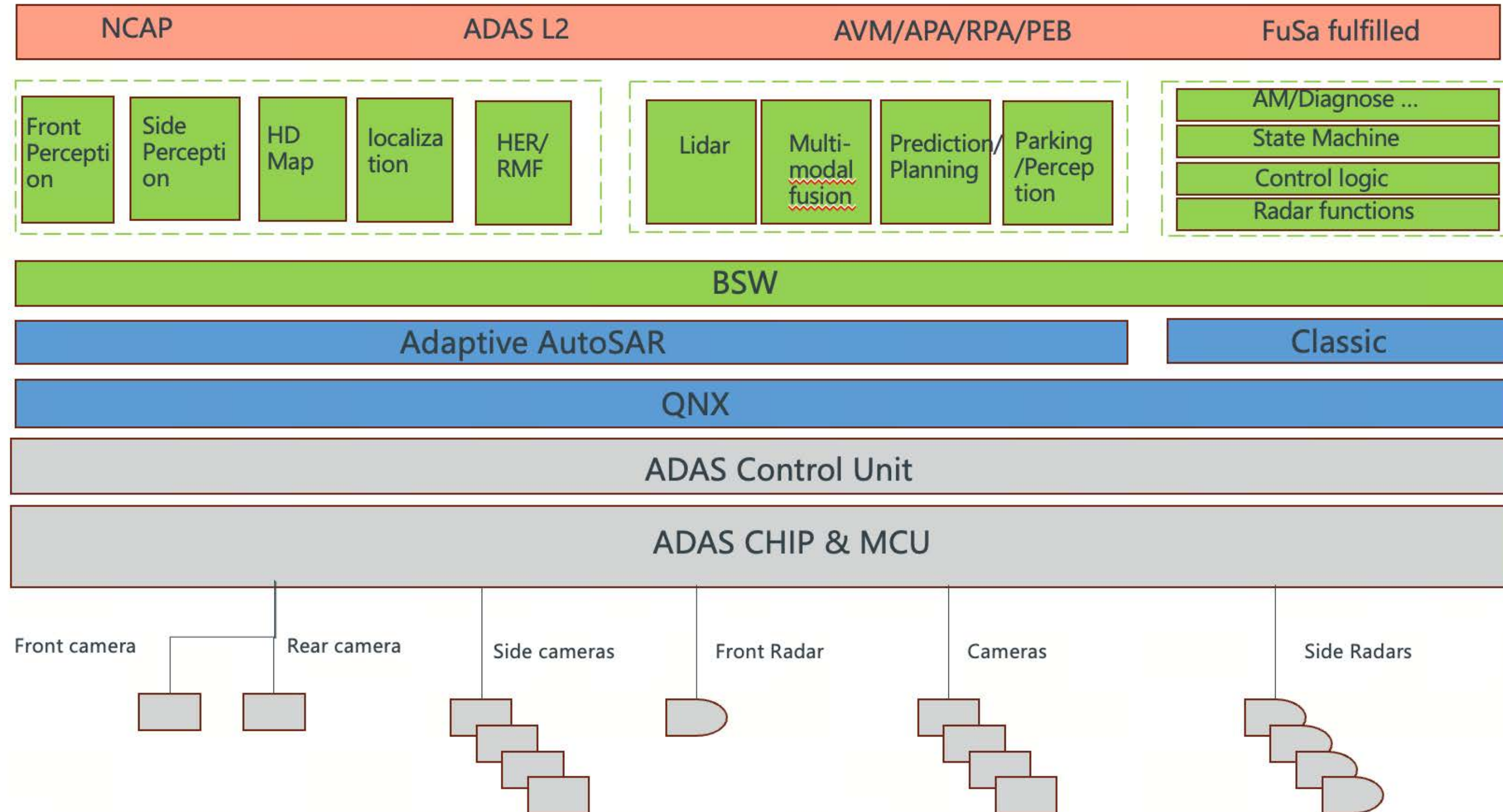


TI TDA4 VH: 32 TOPS



Mobileye EyeQ Ultra : 176 TOPS

# Components of ADAS - SW











# Autonomous Driving: Level 0-5

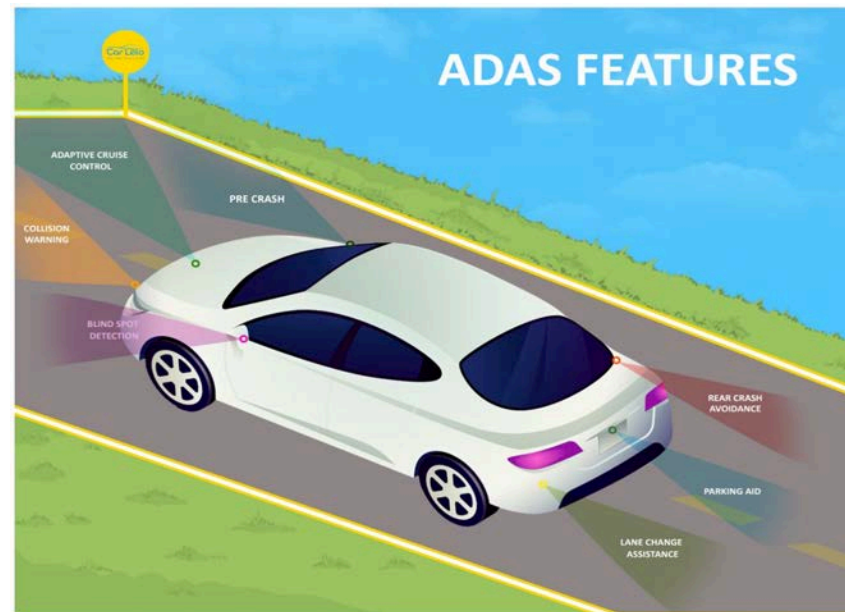
SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation

 <b>0</b> <b>No Autonomy</b>	 <b>1</b> <b>Driver Assistance</b>	 <b>2</b> <b>Partial Autonomy</b>	 <b>3</b> <b>Conditional Automation</b>	 <b>4</b> <b>High Automation</b>	 <b>5</b> <b>Full Automation</b>
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.



# Impact on road safety and transportation



## Enhanced Safety Through ADAS

ADAS technologies significantly contribute to road safety by acting as vigilant co-pilots for drivers.



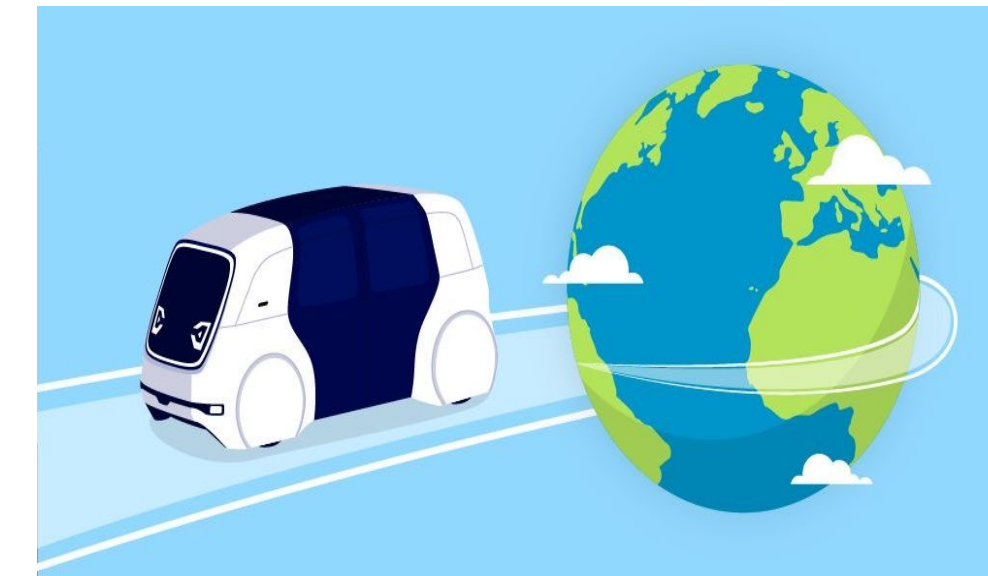
## AD Revolutionary impact

AD takes safety to a new level – reduced accidents, improved traffic, efficient transportation



## Accessibility and inclusivity

Enhanced accessibility for individuals with disabilities or limitations, accommodates diverse needs & demographics



## Environmental benefits

Efficient traffic patterns reducing fuel consumption and emissions. Optimized routes and smoother traffic flow





Thank you