Xilinx Adapt: Automotive

Welcome

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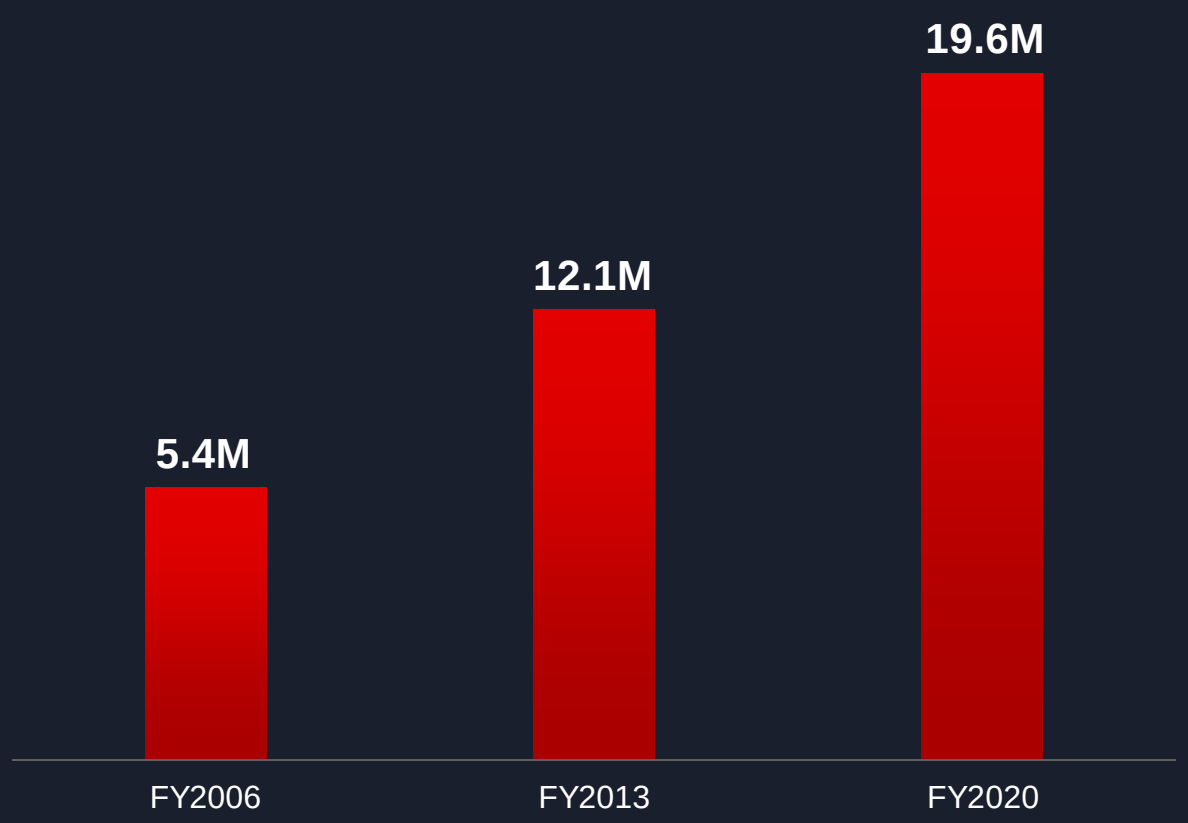
Xilinx Steady Growth in Automotive

Unit Shipments



Consistent Growth

- Double digit unit shipment growth over **15** years
- More than **190M** devices shipped
- More than **75M** devices shipped into ADAS

Tier-1s

Continental, MAGNA, veoneer, ZF, HITACHI, Neusoft REACH

OEMs

BYD, SUBARU, DAIMLER, WELTMEISTER 威马汽车

Startups

Baidu 百度 | apollo, pony.ai, OUSTER, robosense 速腾聚创, MINIEYE

Note: Only showing publicly-announced customer collaborations

Production deployments with our 28nm and 16nm families to fuel continued growth

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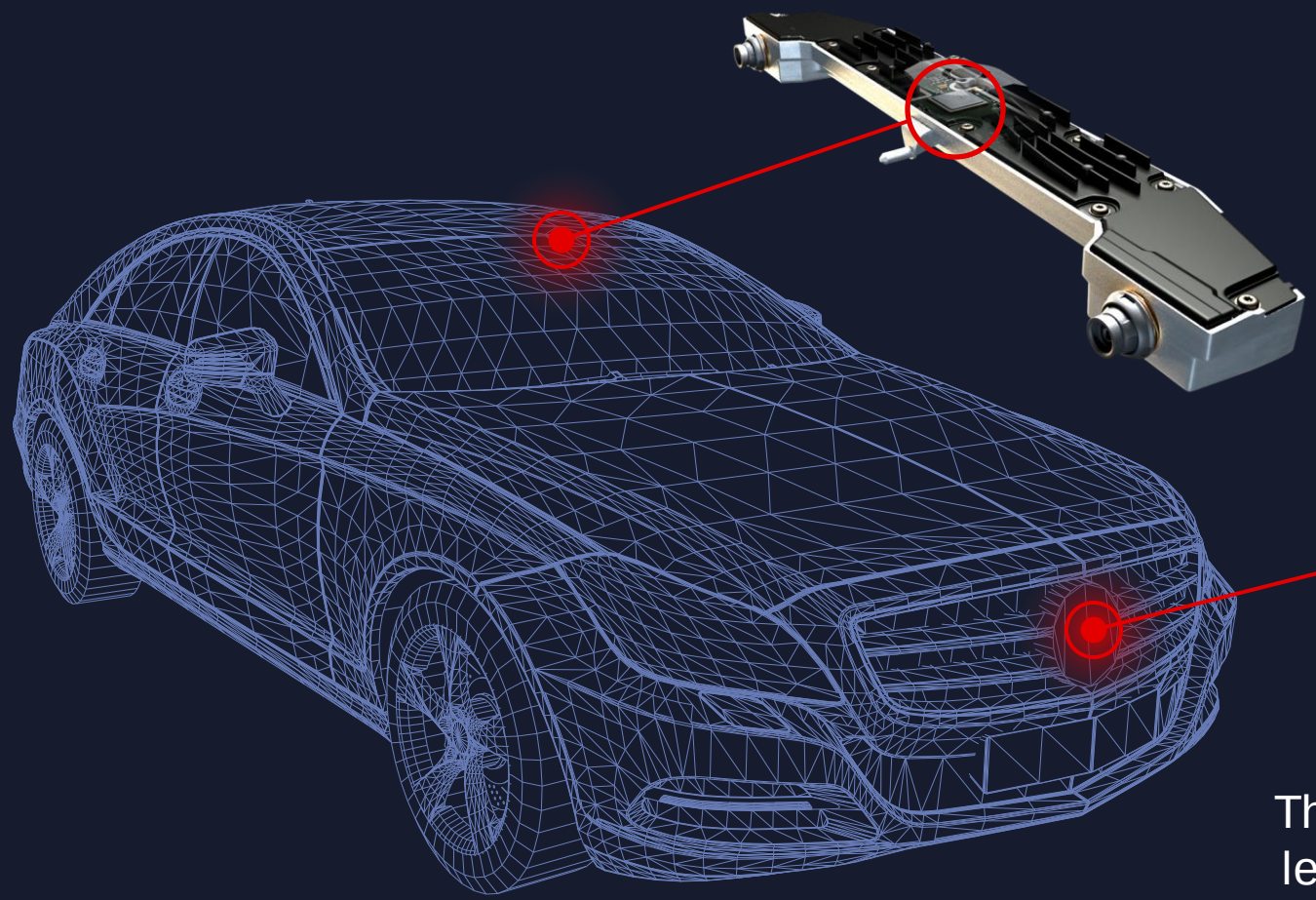
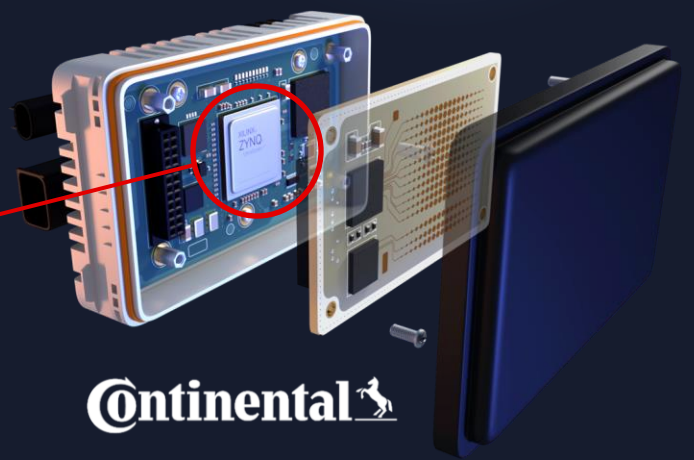
SUBARU

The New Generation EyeSight
In production starting with Subaru Levorg





Continental

The ARS540 has been selected by
leading European and U.S. OEMs

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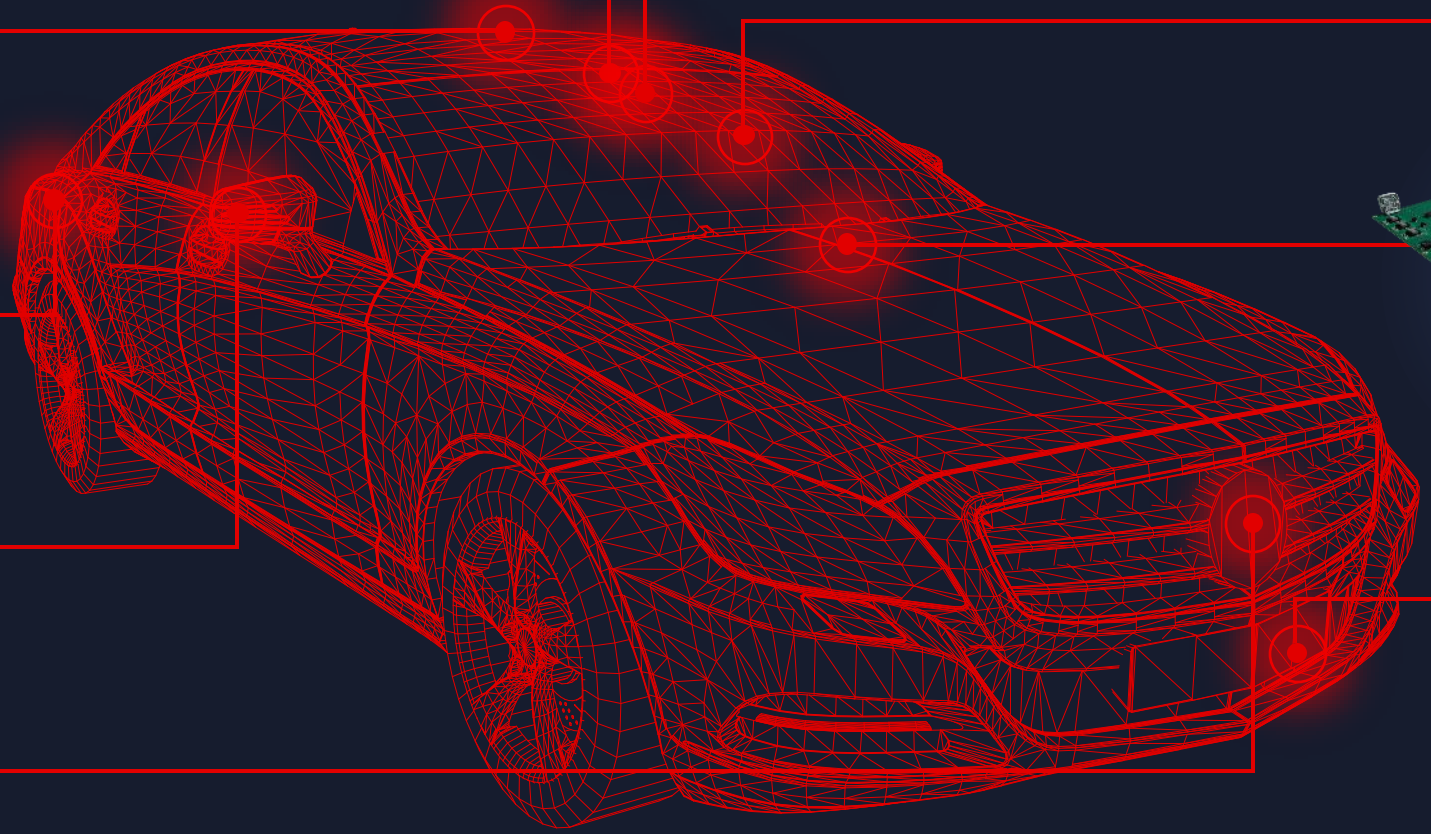
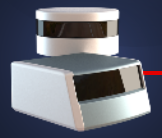
Xilinx Automotive ADAS & AD Focus Areas



Full Display Mirror

Forward Camera

LiDAR



In-Cabin Monitoring Camera

Surround View Camera

> Rear

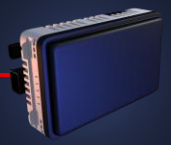
> Side

> Front

Domain Controller

> Gateway
> Compute Acceleration
> Data Aggregation, Pre-processing, and Distribution (DAPD)

RADAR



Note: Not representing actual vehicle architecture; Sensors are for illustrative purposes

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Xilinx® Adapt

Acceleration from Cloud to Edge

Fireside Chat

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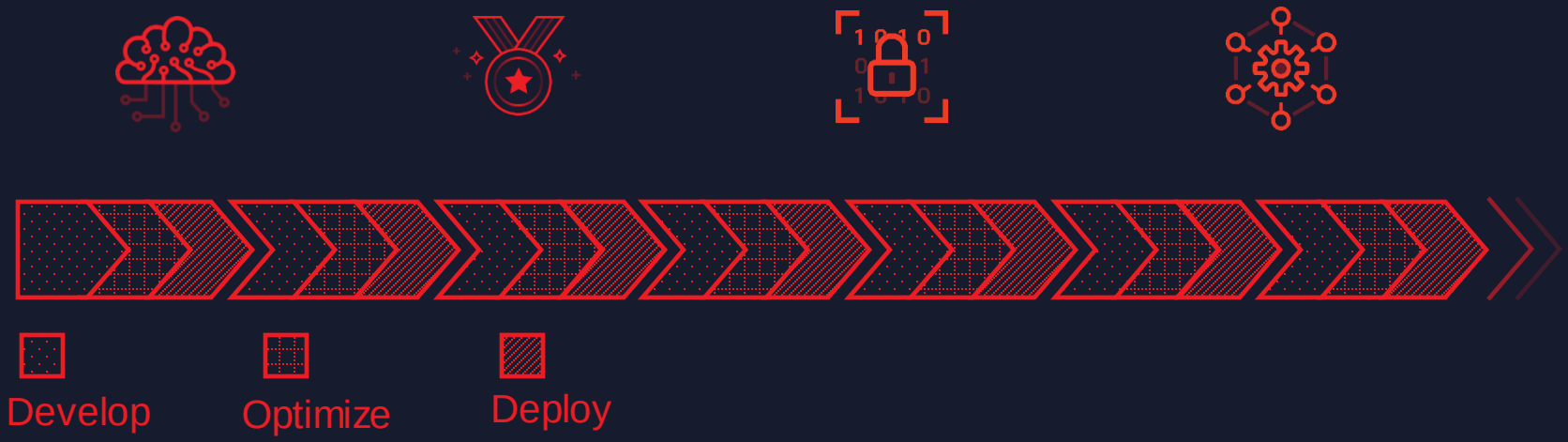
Innovation Cycles Outpacing Silicon Design Cycles

Evolving Algorithms & AI Models

Changing Industry Standards

Increasing Safety & Security Requirements

Growing Number of Sensors & Interfaces



The World Needs Adaptive Compute …

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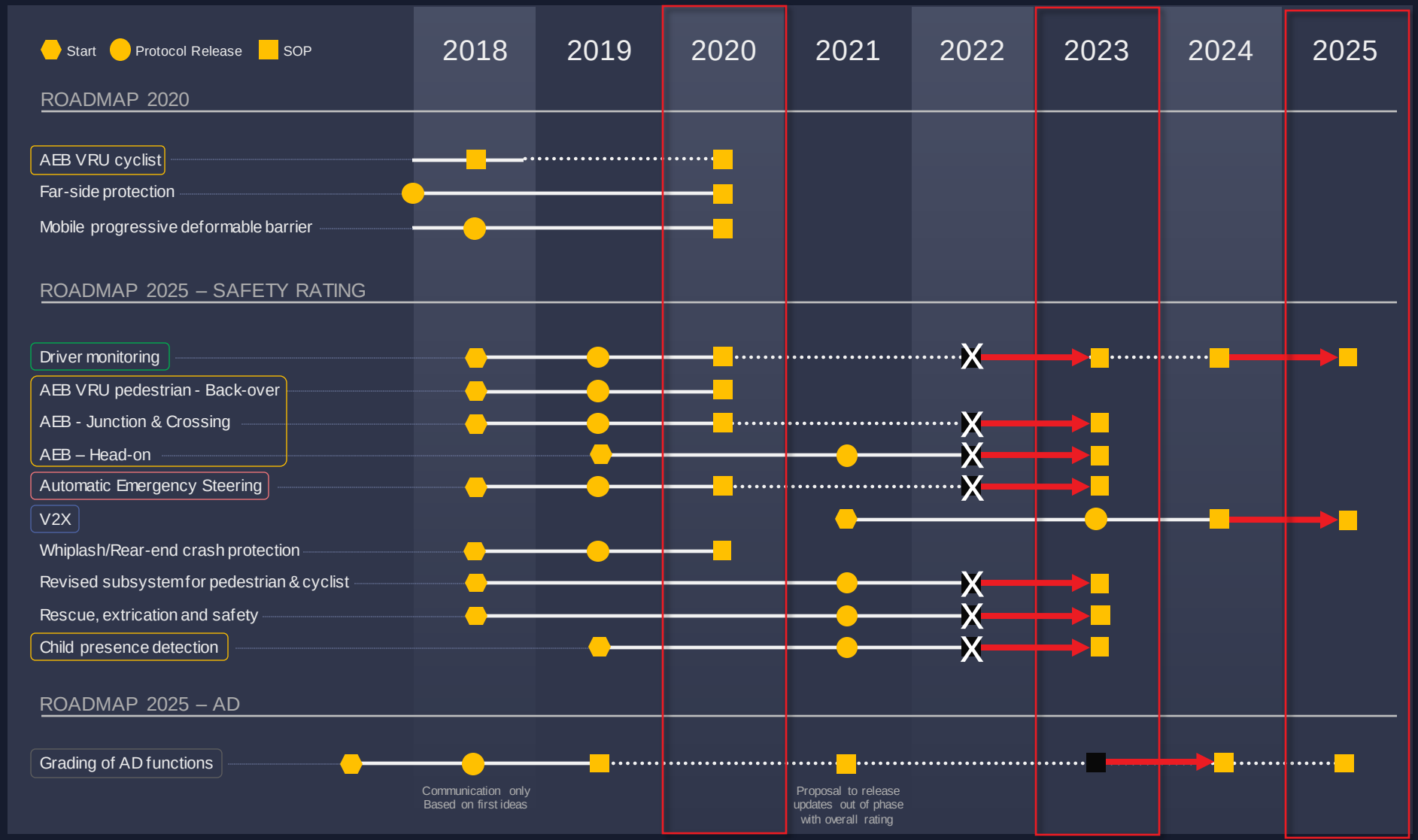
Euro NCAP Roadmap 2020 – 2025

(Covid-19 Impact) - 2022 Requirements Delayed to 2023 and 2024 to 2025



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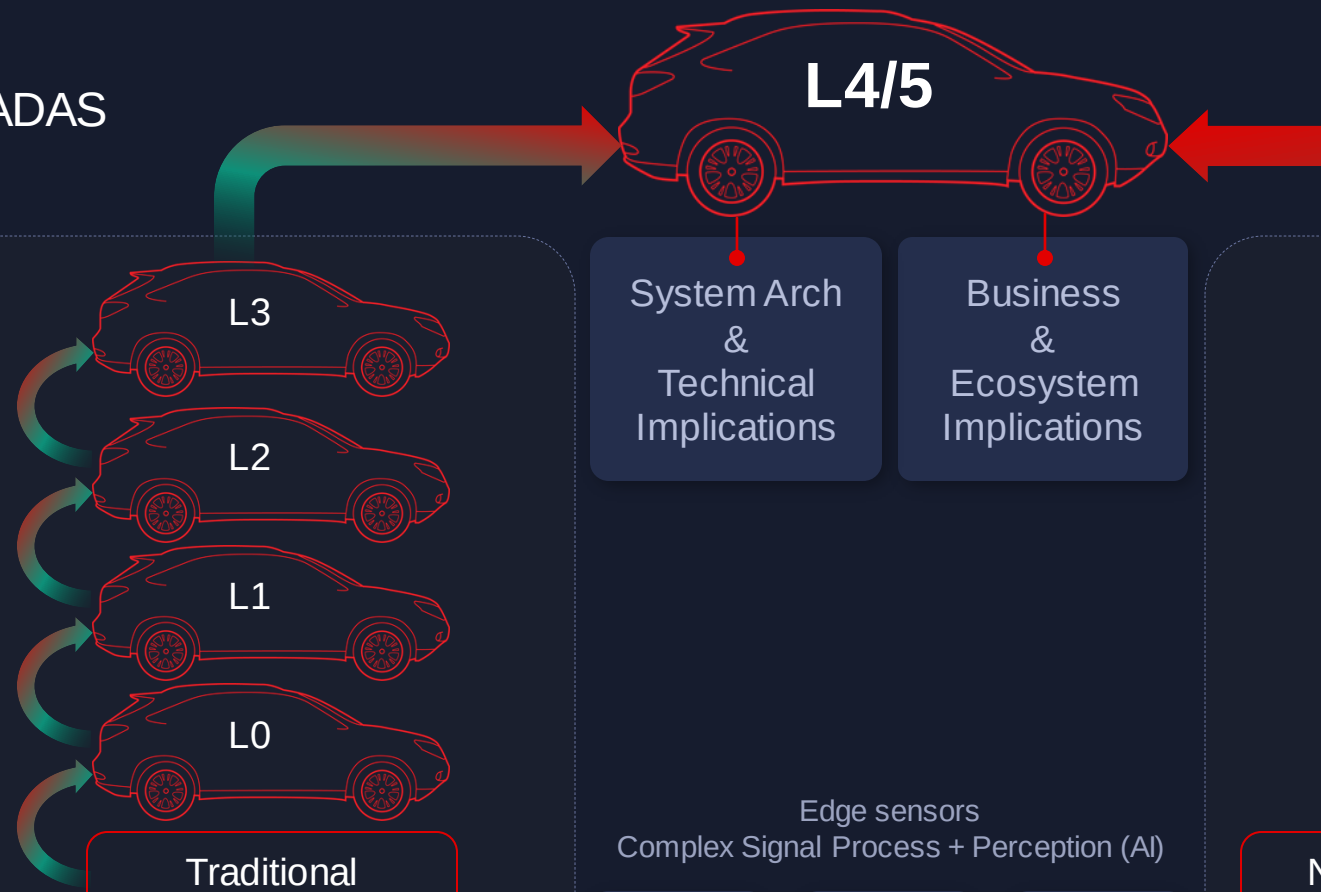
The Road to Autonomous Driving

2 types of Xilinx Customer: Evolutionary vs. Revolutionary

Sensors & ADAS



Transportation as a Service (e.g. “Robotaxi”)

ADAS Domain Controllers

In-Cabin

Surround View

Traditional Vendors

System Arch & Technical Implications

Business & Ecosystem Implications

Edge sensors
Complex Signal Process + Perception (AI)

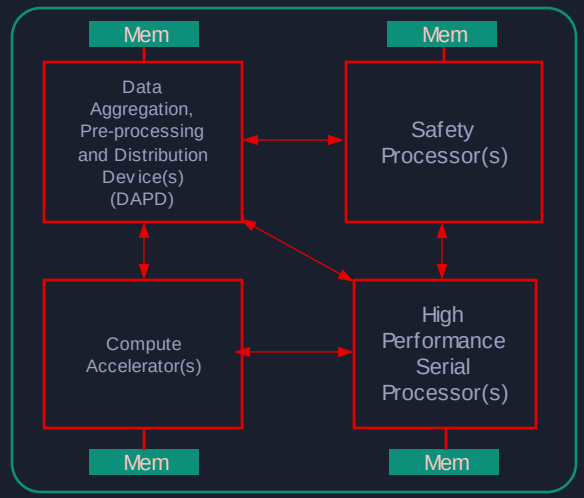
Camera

4D Imaging RADAR

LiDAR

Non-traditional Vendors

Centralized Processing Module(s)



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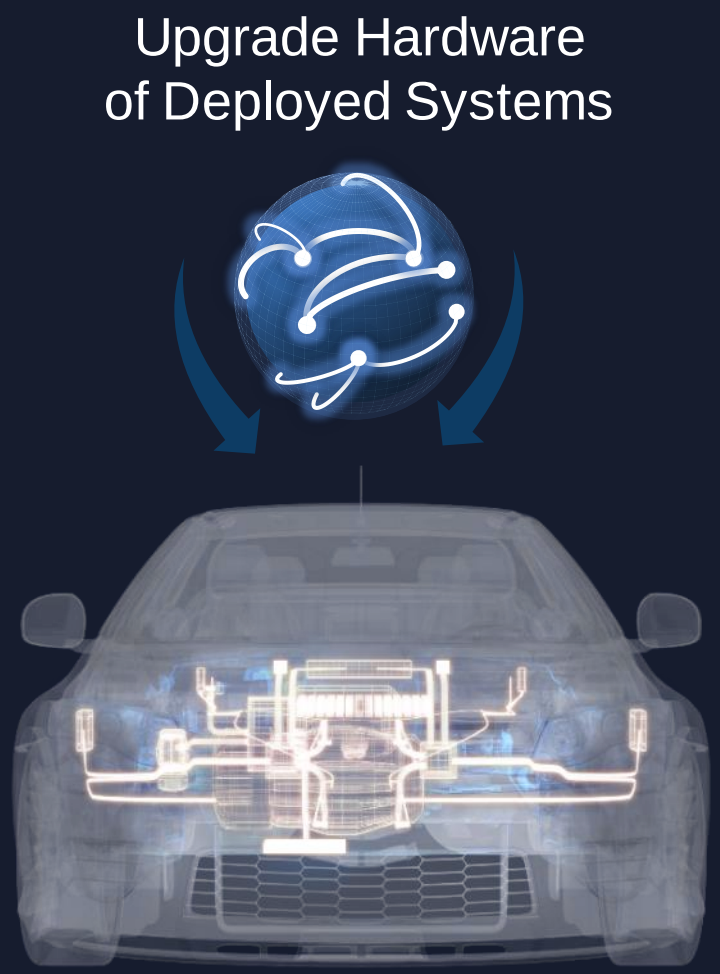
Over-the-Air Silicon Updates (OTA)

- Future proof for emerging security threats
- Update safety algorithms
- Evolve neural network implementations over time
- Perform remediation or corrective action



Dynamic Function eXchange (DFX)

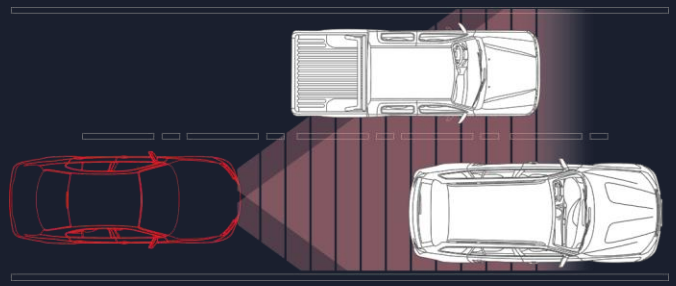
Dynamically Reconfigure Device to Reduce System-Wide Power and Cost

Swap Functionality in Milliseconds

Pre-Drive Security

Low-Speed Driving

High-Speed Driving



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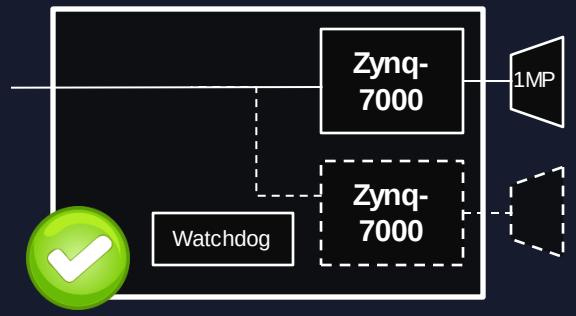
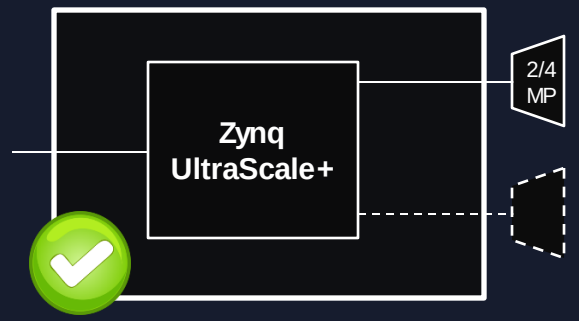
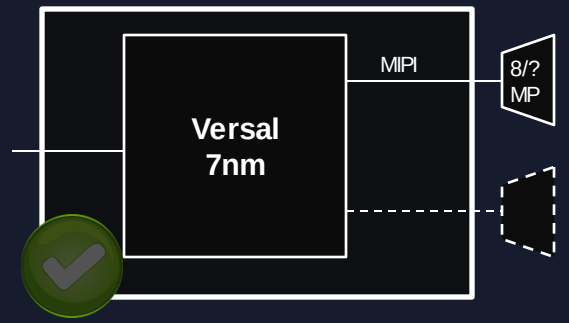
Xilinx Automotive Role in Forward Camera Evolution

Xilinx Deployed in Production Systems for first 3 Generations and targets NCAP2022 with Next Generation of Devices

2008 2010 2012 2014 2016 2018 2020 2022







GEN1: Spartan 6

- Camera: VGA/WVGA
- Warning Only, e.g. Lane Departure Warning
- Xilinx Value
  - Imager Interfacing
  - Image Conditioning and Feature Extraction

GEN2: Zynq 7000

- Camera: Up to 2 Mpixel
- Lane Departure Warning, Speed Alert, Collision Mitigation (AEB)
- Xilinx Value
  - Optimal HW/SW Partitioning
  - Scalability
  - Differentiation

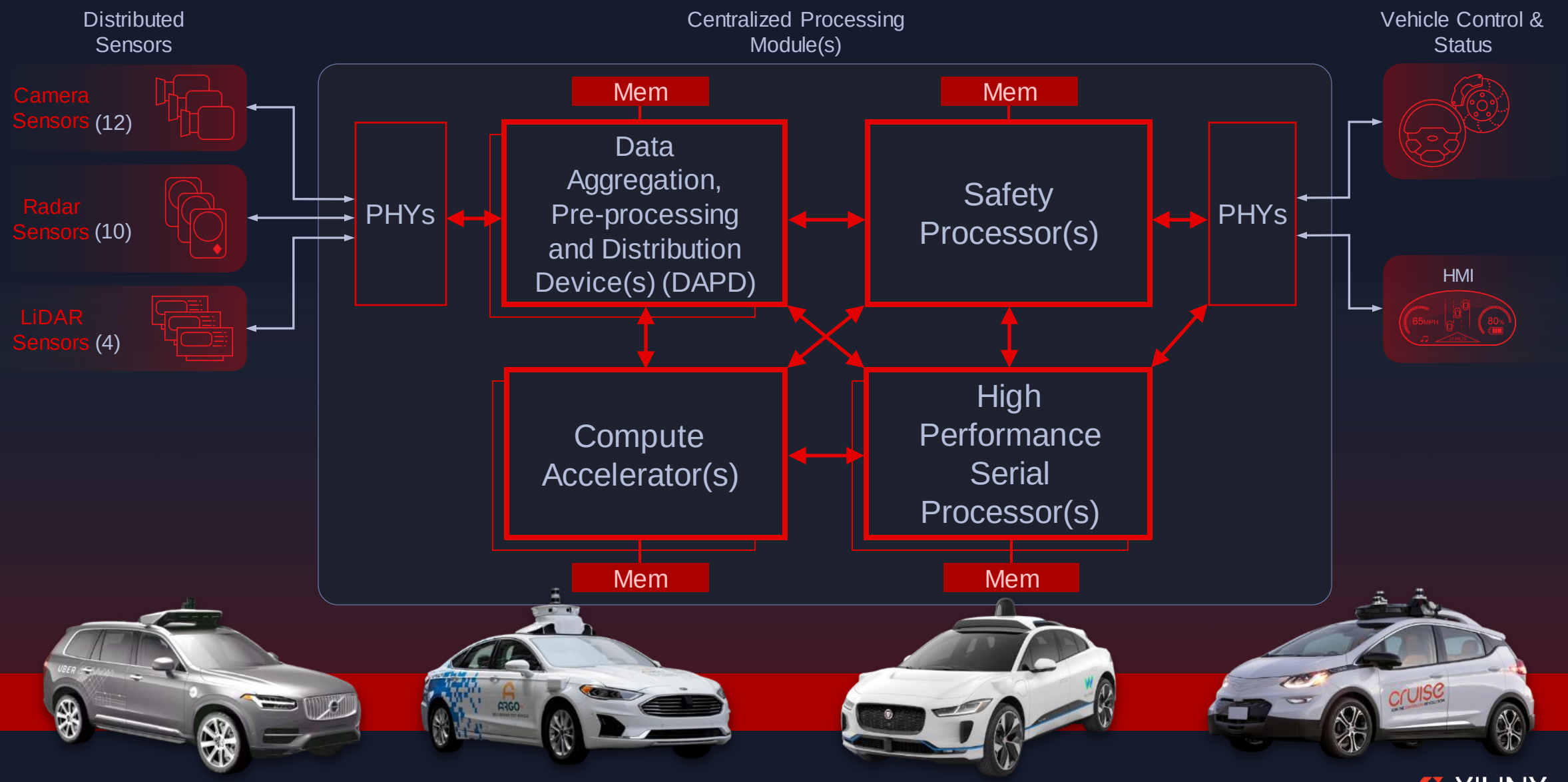
GEN 3: Zynq MPSoC

- Camera: Up to 4/8 Mpixel
- Broader Protection (e.g. Pedestrian/Cyclist Protection)
- Vehicle Convenience Control (e.g. Traffic Jam Assist)
- Xilinx Value
  - Heterogeneous processors
  - Tightly coupled Application SW and custom HW accelerators
  - Safety Island for FuSa

Future: ACAP

- Camera: Up to 8/12 Mpixel
- System Features:
- Level 2/3 Automation
- Urban and Highway Scenarios
- Xilinx Value
  - Higher Data Bandwidth Channels
  - High Performance / Low Power CNN Processing for environment Cognition
  - Advancing FuSa

Adaptability and Scalability



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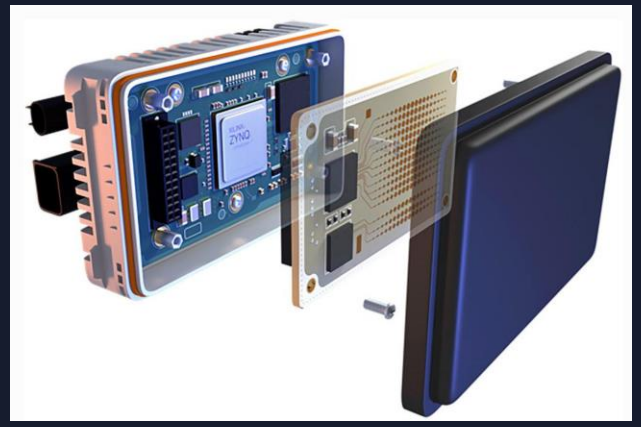
Xilinx Automotive in Radar & Lidar



> Automotive Radar Module

ML Processing on Lidar Data Demo

> Model: Pointpillars
> Framework: Pytorch
> Dataset: Kitti, 64-channel, 1~2Mpoints/sec
> 25fps (40ms latency)

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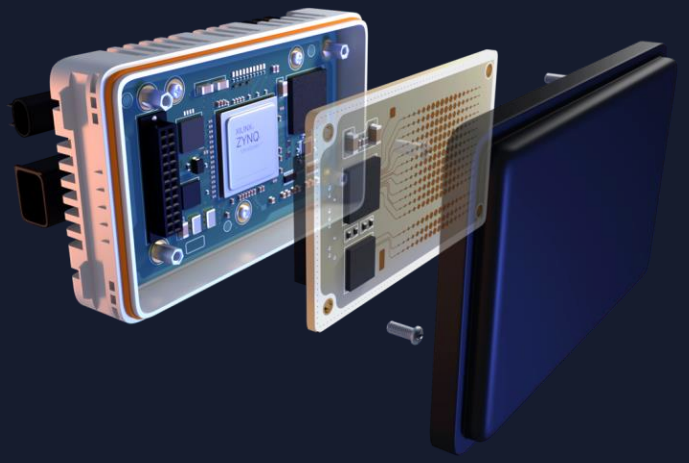
Xilinx Automotive in Radar & Lidar



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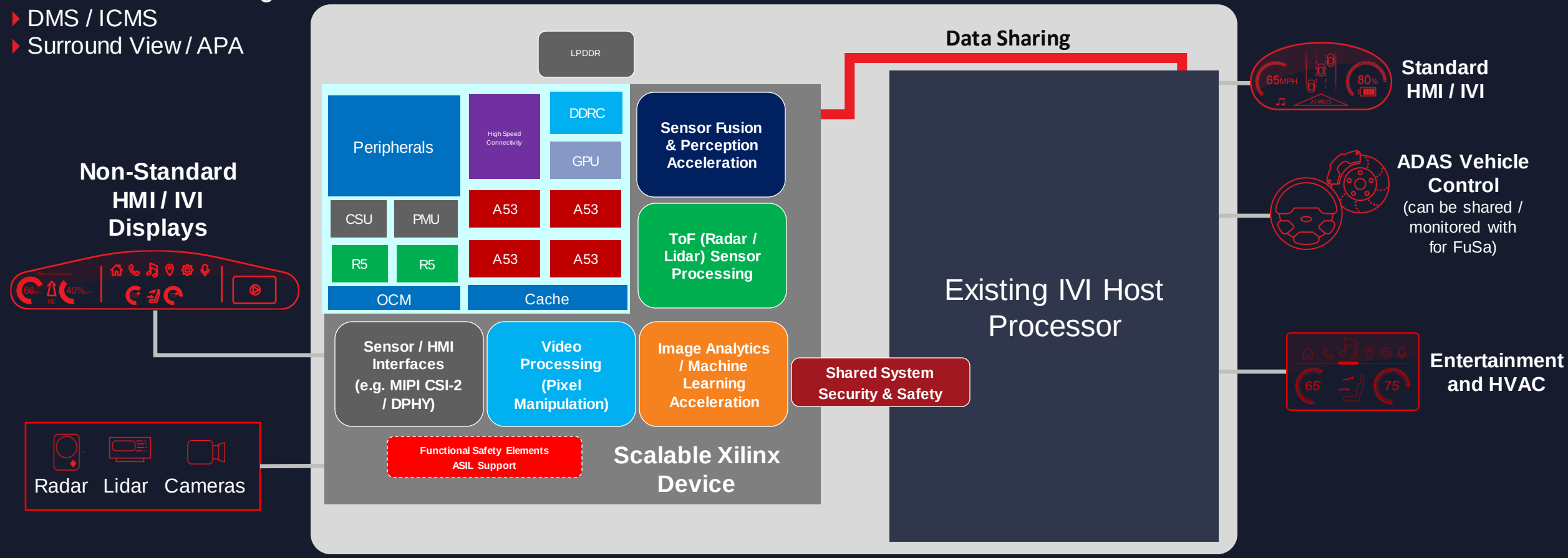
IVI Architectures with Xilinx Adaptable Extension

South Bridge Connectivity
- ADAS Sensor Expansion
- Specialized Display Drive

Feature Acceleration e.g.:
- DMS / ICMS
- Surround View / APA



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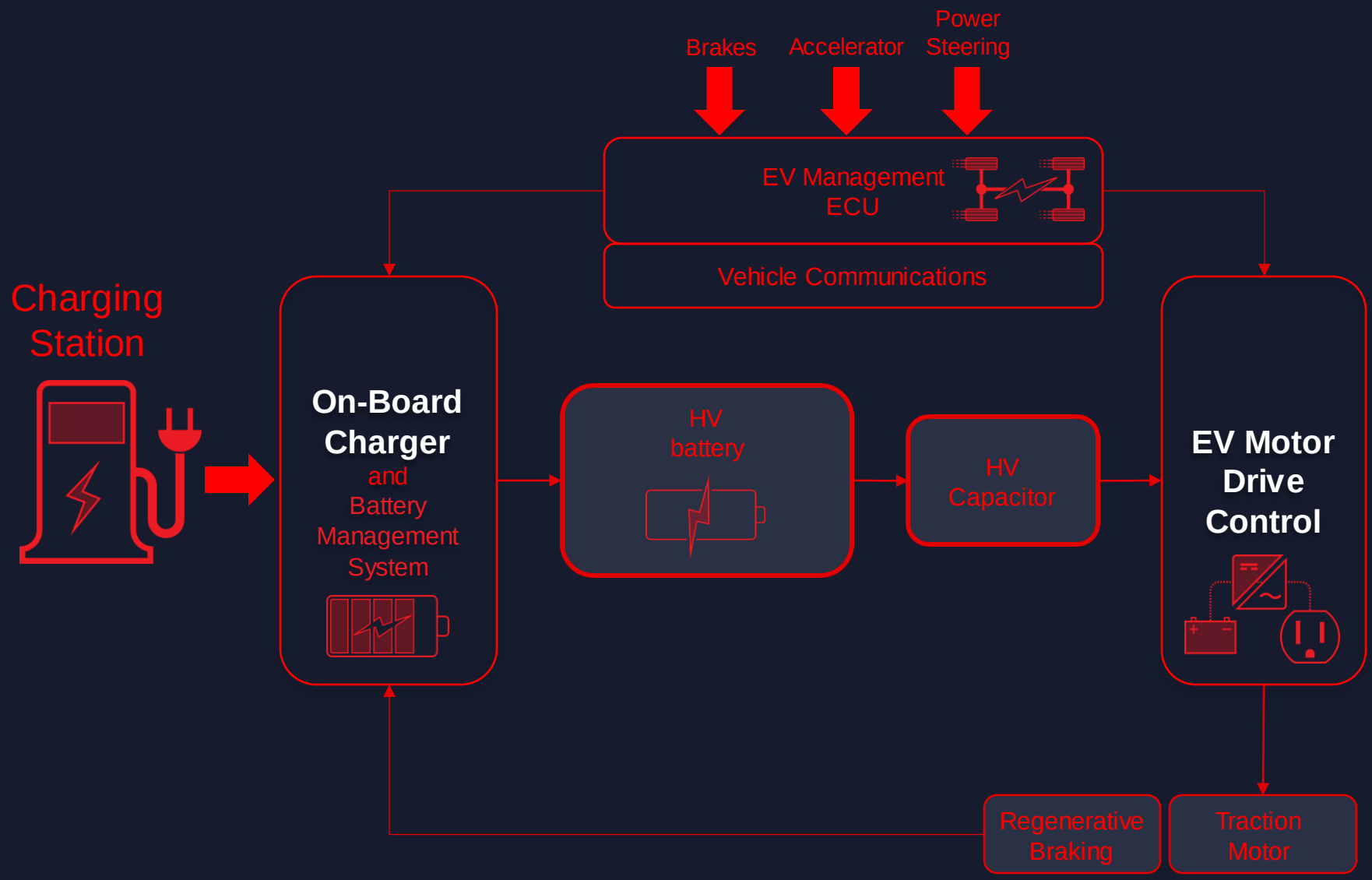
Xilinx Automotive in Vehicle Electrification



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