Continental ARS540 Powered by Xilinx
The Xilinx Automotive Grade (XA) Zynq® UltraScale+™ multi-processor system-on-chip (MPSoC) is powering Continental’s new Advanced Radar Sensor (ARS) 540.

Xilinx 16 nanometer technology provides the performance power to do the complex signal processing need to create a point cloud that includes data on range, azimuth, elevation and relative speed.

Continental’s ARS540 is the industry’s first production ready 4D image radar that can support vehicles from SAE L2 to L5.
ADAS & AD Sensor Innovation

ADAS Market is in a constant state of change

- Sensors targeting 300 meter range
- LiDAR technology evolving rapidly with multiple approaches
- Camera resolution and field of view increasing for AI/ML
- RADAR innovation to 4D Imaging RADAR

Note: Not representing actual vehicle architecture; Sensors are for illustrative purposes
Long Range 77GHz – RADAR Sensor

**DESCRIPTION**

› ARS540 is a high performance premium long range radar sensor which enables highly automated driving in combination with other technologies. It provides best radar performance in a state-of-the-art sensor size.

**BENEFITS & FEATURES**

› Direct and independent measurement of four dimensions (range, doppler, azimuth, elevation)
› 300 meter range
› Multi-hypothesis tracking for better prediction of high complexity scenarios
› Cyber Security
› Real height measurement
› Classification of traffic participants & infrastructure
› Radar-only VRU detection by means of micro-doppler technology
› Auto alignment
› Highest availability of all ADAS technologies
Radar for Automated Driving

Next Generation

- High detection sensitivity
- Elevation
- High resolution
- Radar Image Processing & Fusion
- System Availability

Complex traffic scenarios

Non overridable ground obstacles
Source: ADAC

Adverse weather conditions

Underrideable elevated objects
Source: Swiss Park

Stationary targets / early & comfortable System reaction

Road boundaries / Land marks

Continental

BU ADAS
Public

22 September 2020
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4D-Radar
Elevation Measurement Capability

Output of elevation-high-resolution-tracker shows bridge of 6.5m height
# What's New?

## Radio Frequency (RF) Performance

- First time **real elevation measurements**
- New antenna arrays which offer digital beam forming in elevation as well → **4D-Radar**
- **Increased number of antenna channels:** up to $12 \times TX + 16 \times RX = 28$ (1.75 x ARS430)
- **Virtual antenna channels:** $12 \times TX \times 16 \times RX = 192$ channels (8 x ARS430)
- Stepped Frequency Modulation for **improved range resolution** in all FoV
- **New RF/Antenna** interconnect

## Low Frequency (LF) Performance

- New processing platform → **Xilinx**
- Increase of processing power for Raw Data Processing by factor 20
- Increase of processing power for Object Tracking by factor 10
- High scalability (flexible size of RAM and Flash modules), modularity
The ARS540 has been selected by leading European and U.S. OEMs
Xilinx Automotive ADAS & AD Focus Areas

- Full Display Mirror
- LiDAR
- Surround View Camera
  - Rear
  - Side
  - Front
- Forward Camera
- In-Cabin Monitoring Camera
- Domain Controller
  - Gateway
  - Compute Acceleration
  - Data Aggregation, Pre-processing, and Distribution (DAPD)
- RADAR

Note: Not representing actual vehicle architecture; Sensors are for illustrative purposes
Xilinx Steady Growth in Automotive

Unit Shipments

<table>
<thead>
<tr>
<th>Year</th>
<th>FY2006</th>
<th>FY2013</th>
<th>FY2020</th>
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<tbody>
<tr>
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<td>5.4M</td>
<td>12.1M</td>
<td>19.6M</td>
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Consistent Growth

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

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

Tier-1s
- Continental
- MAGNA
- Veoneer
- ZF
- Hitachi
- REACH

OEMs
- BYD
- Subaru
- Daimler
- WELTMEISTER

Startups
- Baidu
- Apollo
- Pony
- Ouster
- MINIEYE

Note: Only showing publicly-announced customer collaborations
Xilinx Automotive SoC Devices

- Automated Driving DAPD
- Domain Controller DAPD/Accel
- Domain Controller DAPD
- Surround View/Central ADAS Module
- Forward Camera
- ICMS
- Sensors (Radar/Lidar)
- DMS

Xilinx Devices:
- ZU11
- ZU7
- ZU5
- ZU4
- ZU3
- ZU2
- Z7030
- Z7020
- Z7010

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Zynq UltraScale+ MPSoC
Heterogeneous Multi-Processing at the Heart of the System

- Full Power Domain (FPD)
- Low Power Domain (LPD)
- Programmable Logic (PL)