Forward Looking Mobility
for Relaxed and Enjoyable Driving

Advanced Driver Assistance Systems
## Strong Divisions and Business Units

### Continental Corporation

### Automotive Group

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### Rubber Group

- Two-Wheel Tires
- Original Equipment
- Replacement Business Europe & Africa
- Replacement Business The Americas
- Replacement Business Asia
- Two-Wheel Tires
- Truck Tires Europe
- Truck Tires The Americas
- Truck Tires Replacement Business Asia
- Industrial Tires
- Air Spring Systems
- Benecke-Kaliko Group
- Conveyor Belt Group
- Elastomer Coatings
- Fluid Technology
- Power Transmission Group
- Vibration Control
- Other Operations
As a division of Continental, we are setting the ground for an intelligent mobility protecting lives and preventing injuries.

Vehicle dynamics for cars that are safe and a pleasure to drive are an integral part of our mindset.

Merging superior automotive components and profound systems know-how into our integrated safety concept, ContiGuard®, conveys our core competence.

We value our people. Our drive and passion for innovation, quality and full customer satisfaction make us a leading-edge global automotive supplier.
Chassis & Safety Division – Business Units

**Electronic Brake Systems**
- Electronic brake systems, e.g. ABS and ESC
- Electric-hydraulic combi brake (EHC)
- Control units for motorcycle brakes
- ABS for motorcycles
- Regenerative brake systems
- Software for extended brake control functions and assistance systems
- Hydraulic valves

**Hydraulic Brake Systems**
- Brake disks
- Drum brakes
- Brake calipers
- Parking brakes
- Electric parking brakes
- Brake boosters
- Tandem master cylinders
- Mechanical, electronic and hydraulic brake assist devices
- Brake actuation modules
- Brake pressure regulators
- Brake hoses
- Duo-servo parking brake systems

**Sensorics**
- Inertial sensors for stability and ESC applications
- Sensors for active chassis control
- Steering angle and torque sensors
- Speed sensors for wheels, engines and transmission
- Sensors and switches for seat belt locks and seat position

**Passive Safety & ADAS**
- Passive safety
- Driver assistance systems
- Occupant classification
- Product integration and validation

**Chassis Components**
- Steering systems
- Air suspension systems
- Chassis electronics
- Electronic components
- Windshield and headlamp cleaning systems
Passive Safety & ADAS / Chassis & Safety

Business Unit: Passive Safety & ADAS
Business Segments

Passive Safety

Functions:
- Front & rear crash sensing
- Side crash sensing
- Roll over sensing
- Pedestrian protection

Products:
- Airbag control unit, SPEED platform
- Acceleration satellites
- Pressure satellites clipSat
- Crash impact sound sensing (CISS)

Advanced Driver Assistance Systems

Functions:
- Adaptive cruise control
- Emergency brake assist
- Blind spot detection
- Lane departure warning
- Speed limit monitoring

Functions e.g.:
- Adaptive cruise control
- Emergency brake assist
- Blind spot detection
- Lane departure warning
- Speed limit monitoring

Products:
- Radar sensors (24 GHz, 77 GHz)
- Camera sensor
- Lidar sensor

Occupant Classification

Functions:
- Adaptation of restraint systems to the size and weight of the passenger

Products:
- Occupant classification system (OCS) & electronic (OCE)

Product Integration & Validation

Functions:
- Restraint Systems
- Integrated Safety
- Testing/Engineering

Services:
- Vehicle Safety Development
- Small Volume Restraint Components
- Safety Tests and Simulation
## Passive Safety & ADAS

### Key Products

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<td>24 GHz Radar Sensor</td>
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<td>Pressure Satellites (pSat, clipSat)</td>
<td>Camera Sensor: one &amp; two box design</td>
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<td>Crash Impact Sound Sensing (CISS)</td>
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<td>Occupant Classification System (OCS)</td>
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### Key Strengths

- Worldwide market leader in passive safety electronics with more than 20 years of experience
- First in market with Pressure Satellite for side crash sensing
- Innovation leader with Crash Impact Sound Sensing (CISS): crash sensing with structure-borne noise
- Modular safety platform for efficient & economical design SPEED to offer customer specific solutions for airbag control units
- Engineering partner for active and passive system integration through test & crash center in Alzenau

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SPEED: Safety Platform for Efficient & Economical Design

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Passive Safety & ADAS Development Locations

- Sibiu (Romania)
- Yokohama (Japan)
- Auburn Hills Troy (USA)
- Guadalajara (Mexico)
- Ingolstadt
- Regensburg
- Lindau
- Alzenau
- Timisoara (Romania)
- Sibiu (Romania)
- Ichon (Korea)
- Changchun (China)
- Yokohama (Japan)

Germany

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Key Products

Advanced Driver Assistance Systems (ADAS)
- 77 GHz radar sensor
- 24 GHz radar sensor
- Camera system: one box design
- Camera system: two box design
- Short Range Lidar Sensor

Key Strengths

- Key player in a fast growing market
- Wide technological portfolio
- System design of complete Driver Assistance Systems & Validation
Megatrend Safety
Vehicle Surrounding Sensors: 360° View

- Adaptive cruise control
- Adaptive cruise control + Stop&Go
- Forward collision warning
- Emergency brake assist
- Advanced emergency braking system
- Intelligent headlamp control
- Traffic sign recognition
- Lane departure warning
- Lane keeping support
- Blind spot detection
- Lane change assist
- Back-up aid

Advanced Driver Assistance Systems
ADAS Functions
Overview & Motivation

Adaptive Cruise Control
Blind Spot Detection
Speed Limit Monitoring
Lane Departure Warning
Intelligent Headlamp Control
Emergency Brake Assist

“70% of all serious accidents could be avoided by Driver Assistance Systems” (BAST Germany)

Increase SAFETY & COMFORT is our mission!
ADAS
Safety and Comfort - Driven by Innovation

First to market
Radar based ACC in Europe

First to market
Blind Spot Detection
Video based
(in co-operation with Schenefacker (Visiocorp))

Radar based
• ACC + Stop&Go (ACC+S&G)
• Advanced Emergency Braking System (AEBS)

First to market
Video bundle:
• Speed Limit Monitoring
• Intelligent Headlamp Control
• LDW

First to market
• Emergency Brake Assist - City
• Advanced Occupant Safety
  “as standard equipment”

Radar based
• ACC+S&G
• AEBS

Video bundle:
• Speed Limit Monitoring
• Intelligent Headlamp Control
• LDW

1999 2001 2005 2007 2008 2009
ADAS Function:
Adaptive Cruise Control + Stop&Go (ACC+S&G)

This system controls the distance to the traffic in front, even if it’s only stop-and-go. It makes things a whole lot easier for the driver, particularly in congested traffic and tailback situations.

**BENEFITS**

- Comfortable, stress-free driving with the flow of traffic
- Greater safety due to defined distance and warning if emergency braking is needed
ACC
77GHz Radar Environment Sensor - New Generation

**Features**

- Broad field of view realized by two independent scans
  - (9 up to 200m and 28 up to 60m)
- Supports ACC+Stop&Go with one single sensor
- Very precise detection of stationary objects
- Easy to integrate due to auto-alignment capability
ADAS Function: Blind Spot Detection (BSD)

The Blind Spot Detection System is intended to warn the driver of potential collisions with vehicles in the blind spot zone. Especially for lane change maneuvers in heavy traffic on multi-lane motorways or highways, but in city traffic as well.

**BENEFITS**

- Safer lane changes and overtaking
- Avoid accident-conducive situations
- Significantly reduce the driver’s workload
- The system enables more relaxed driving
Features

- Classification of detected objects; distinguish between road users and infrastructure
- Alert of driver to the presence of relevant objects within the detection zone
- Signal processing integrated into the radar unit
ADAS Function: Emergency Brake Assist – City (EBA-City)

Optimized for the urban traffic, many rear-end collisions at low driving speeds can be avoided entirely; if this does not succeed, the consequences of a rear-end collision are far less serious.

**BENEFITS**

- Reduction of impact speed and impact energy
- Possible interfaces for pre-crash applications, restraint systems or pedestrian protection
Low Speed Range Emergency Braking Assist
Short Range Lidar Sensor

Features

- Autonomous braking at low speed
- Crash type classification are provided
- Enhance supplemental restraint systems
- Low cost
ADAS Function: Emergency Brake Assist (EBA)

Optimized to the complete speed range, rear-end collisions can be avoided entirely; if this does not succeed, the consequences of a rear-end collision are far less serious.

**BENEFITS**

- Enhanced driving safety thanks to active braking support
- Reduction of impact speed and impact energy
- Possible interfaces for pre-crash applications, restraint systems or pedestrian protection

- 80% of the accidents are due to momentary inattention of the driver
- A deduction of 0.5 sec. from the human reaction time can avoid 65% of rear end collisions
ADAS Function: Emergency Brake Assist (EBA)

Case A:
- Driver with no reaction

Case B:
- Driver with reaction

Brake force vs. time graph showing:
- Prefill
- Prebrake
- Collision warning
- Collision likely
- Max. g
- Full emergency braking
- Driver is braking
ACC Radar System New Generation

Features

- Broad field of view realized by two independent scans
  (9 up to 200m and 28 up to 60m)
- Supports ACC+Stop&Go with one single sensor
- Very precise detection of stationary objects
- Easy to integrate due to auto-alignment capability
ADAS Function: Lane Departure Warning (LDW)

A brief loss of concentration when driving can easily lead to an unintentional lane change. Lane Departure Warning provides the driver with optical or haptic warnings, such as steering wheel vibrations, protecting him from inadvertently changing lanes.

**BENEFITS**

- Prevents dangerous situations due to inattention
- The system enables more relaxed driving and enhanced safety without distracting the driver
ADAS Function: Intelligent Headlamp Control (IHC)

The Intelligent Headlamp Control (IHC), which optimizes lighting capabilities during night-time drives, promises enhanced visibility and an end to the tiring changes between full-beam and dipped headlights.

**BENEFITS**

- Comfortable, safer driving thanks to better vision at night
- Improved visibility when encountering oncoming traffic, especially on rural roads
ADAS Function: Speed Limit Monitoring (SLM)

In the sign post forests of today it’s not always easy to stay on top of things. The automatic Speed Limit Monitoring (SLM) features automatic recognition functions through a link between images captured by a camera and the speed limit information stored in the navigation system.

**BENEFITS**
- The system enables more relaxed driving
- Easy way to avoid speeding
ADAS Function:
Speed Limit Monitoring (SLM)

Helps to avoid receiving speeding tickets
LDW – IHC – SLM
Multi Functional Camera New Generation

Features

- Multi purpose Camera:
  - Lane Departure Warning
  - Speed Limit Monitoring
  - Intelligent Headlamp Control
- Compact One Box Design
- Scalable approach
- Color CMOS imager, 752x480 pixels
Thank you for your attention!
Driver Assistance of Continental ‘inside’

Mercedes-Benz with ACC+Stop&Go and Pre-Safe©

S-Class  
SL-Class  
CL-Class  
CLK-Class  
E-Class - Coupe  
CLS-Class  
M-Class  
R-Class  
E-Class
Driver Assistance of Continental ‘inside’

Mercedes-Benz with Lane Departure Warning, Speed Limit Monitoring and Intelligent Headlamp Control

S-Class

E-Class

E-Class - Coupe
Driver Assistance of Continental ‘inside’

GM with ACC

Cadillac STS

Cadillac DTS
Driver Assistance of Continental ‘inside’

Hyundai Genisis

Hyundai with ACC and Emergency Brake Assist

Hyundai Equss
Driver Assistance of Continental ‘inside’

*Mercedes offers also an Advanced Emergency Braking System
Driver Assistance of Continental ‘inside’

Trucks with Blind Spot Detection

Volvo Truck
Driver Assistance of Continental ‘inside’

Trucks with Lane Departure Warning

Volvo Truck
Driver Assistance of Continental ‘inside’

Audi with Lane Departure Warning

A4

A8

A6

Q7

Q5

A5
Driver Assistance of Continental ‘inside’

VW Passat

Volkswagen with Lane Keeping Support

VW Passat CC
Driver Assistance of Continental ‘inside’

BMW with LDW

5er Series

6er Series
Driver Assistance of Continental ‘inside’

BMW with
Lane Departure Warning
Speed Limit Monitoring and
Automatic High Beam Control

7er Series
Driver Assistance of Continental ‘inside’

Volvo with Blind Spot Warning

XC90  XC70
V50  S80
V70  C30
S40
XC60
Driver Assistance of Continental ‘inside’

Volvo with „City Safety“

XC60
Driver Assistance of Continental ‘inside’

Mazda with Blind Spot Warning

CX 9

CX 7

Mazda 6