

PORSCHE

# Electrics/electronics

Technology Workshop Cayenne



# Porsche Advanced Cockpit



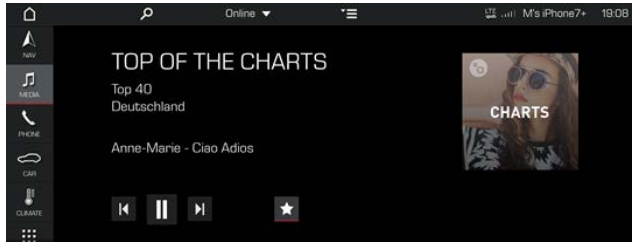
Instrument cluster with two 7" displays and central analog rev counter

Porsche Communication Management (PCM) with online navigation module and 12,3" Full-HD touchscreen with proximity sensors

Multifunction steering wheel

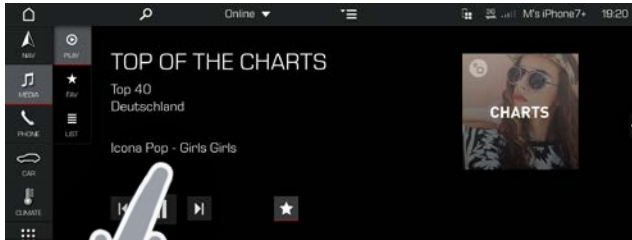
Centre console with Direct Touch Control and reduced number of buttons

# User control fields appear on the display in response to proximity sensors

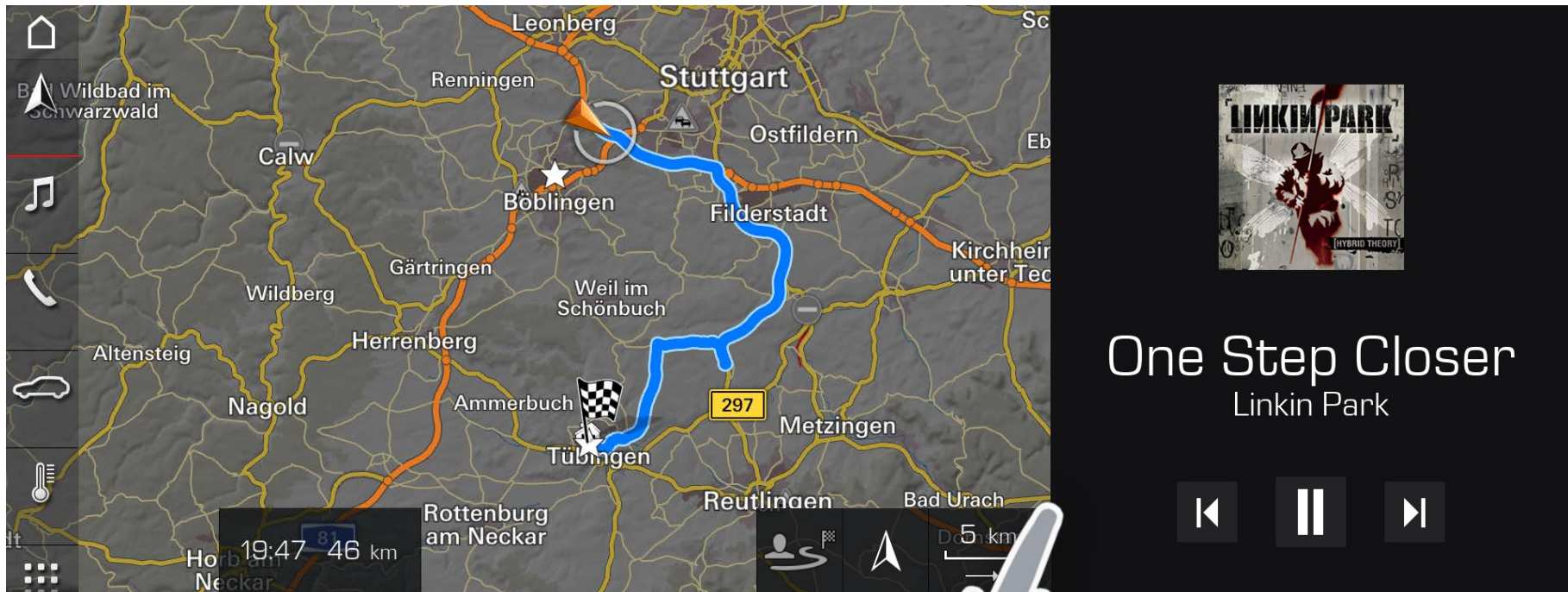


## Content shown when approaching

- | Menu bar
- | Functional touch-sensitive surfaces
- | Search field



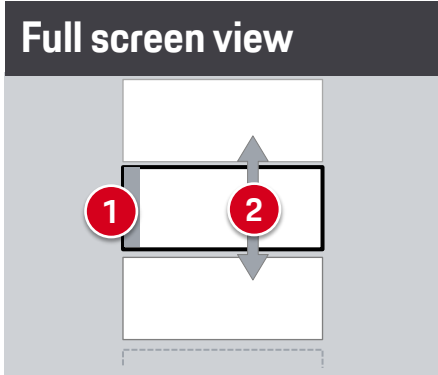
# The user can select the basic screen layout





# The context can be switched by:

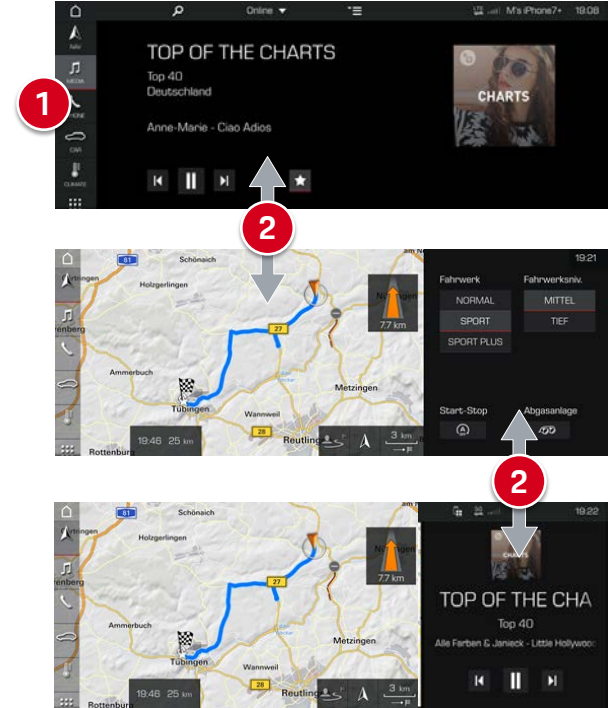
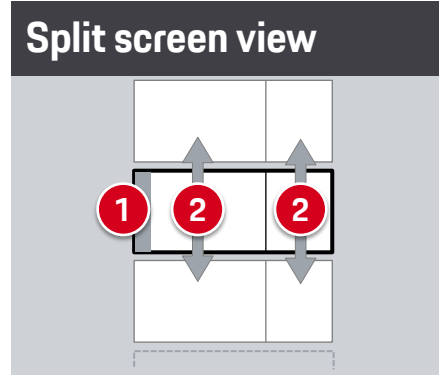
(1) touchscreen buttons, (2) swiping or (3) menu buttons



Inactive  
main context

**Active**  
main context

Inactive  
main context



# Individual MY SCREEN configuration for direct access

The screenshot displays a custom infotainment screen layout. On the left is a vertical sidebar with icons for Home, NAV, MEDIA, PHONE, CAR, and CLIMATE. The main area is divided into three sections:

- Navigation:** A map centered on Stuttgart, Germany, with a blue route highlighted. A star marks Boblingen, and a checkered flag icon is at Rottenburg am Neckar. A distance of 6.2 km is shown with an orange arrow pointing up.
- Call Log (Anrufe):**
  - Wieland, Daniela (Privat, Heute, 19:08)
  - Sterl, Mike (Mobil, Heute, 19:07)
  - Marrenbach, Jörg (Mobil, Heute, 18:54)
  - Schrott, Juergen (Mobil, Heute, 17:50)
  - Wiechmann, Stefan (Mobil, Heute, 16:11)
- Music Player:** Features a "CHARTS" album cover with a woman wearing sunglasses, the text "TOP OF THE CHARTS", and the track "Anne-Marie - Ciao Adios". Playback controls (play/pause, skip) are visible at the bottom.

At the bottom of the screen, a status bar shows the time 19:47, a distance of 44 km to Mössing, a 10 km scale bar, and a signal strength indicator.

# Infotainment and connectivity in the new Cayenne



\*optional

New Porsche Communication Management (PCM) including online navigation module

Burmester® 3D High-End Surround Sound System\*

Bose® Surround Sound System\*

Connected-Navigation, -Speech, -Media, -POI, -Services

Porsche One Connect App

Apple® CarPlay

Extensive interfaces  
USB, SD, BT, Wifi

Mobile Phone preparation  
with Bluetooth interaction

# The new PCM – Connect Plus module (country specific)

## Connected Navigation

- | Online Routing
- | Satellite Map
- | Online Traffic/RTTI
- | Panorama view\*
- | Map update online
- | My Destinations
- | Smart Routes

## Connected POI

- | Parking Places
- | Parking+\*
- | Fuel prices
- | Finder
- | Online Search

## Connected Speech

- | Voice Pilot
- | Natural Language Understanding
- | Online Text To Speech
- | Climate Control
- | Dictate Text/E-Mail

## Connected Media

- | Online radio
- | Hybrid radio
- | Gracenote online
- | Media streaming
- | Flat rate music
- | Personalised radio

## Connectivity

- | Embedded SIM
- | Customer SIM
- | Wifi Hotspot



## Connected Services

- | Porsche ID
- | Concierge
- | Breakdown/Emergency Call
- | Flight information
- | News/Twitter
- | Events
- | Weather
- | System update online\*
- | Smart Home\*
- | Traffic Signs Online
- | Risk Radar
- | Privacy

## One Connect App

- | Remote Car Control
- | Navigation Companion
- | Media Hub
- | Calendar
- | Last/First Mile navigation
- | Apple Watch support
- | 3D Touch support

## Apple® Car Play

\*later this/next year



# Assistance systems



## Standard:

- | LED headlights
- | Warn and Brake Assist incl. predictive pedestrian protection
- | Cruise Control incl. Speedlimiter
- | ParkAssist (front and rear)

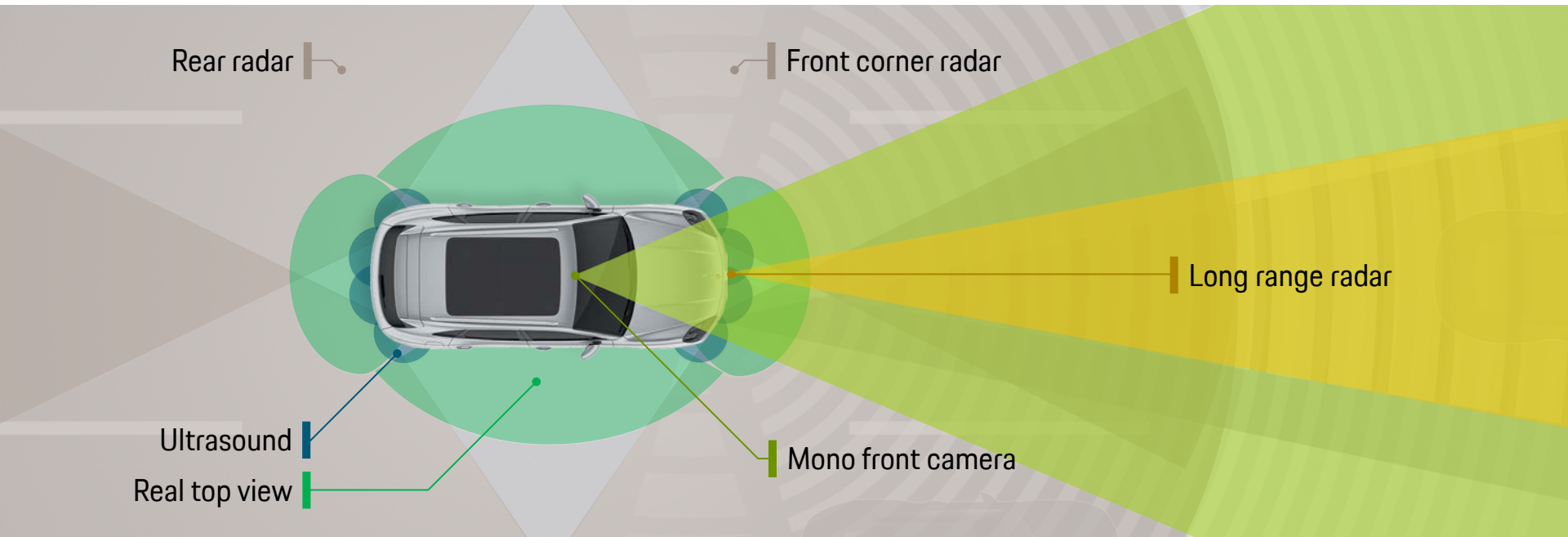
## Optional:

- | LED Matrix headlights (incl. PDLs Plus)
- | Night Vision Assist
- | Lane Change Assist
- | Lane Keep Assist including Traffic Sign Recognition
- | ParkAssist (front and rear) incl. Surround View
- | Adaptive Cruise Control

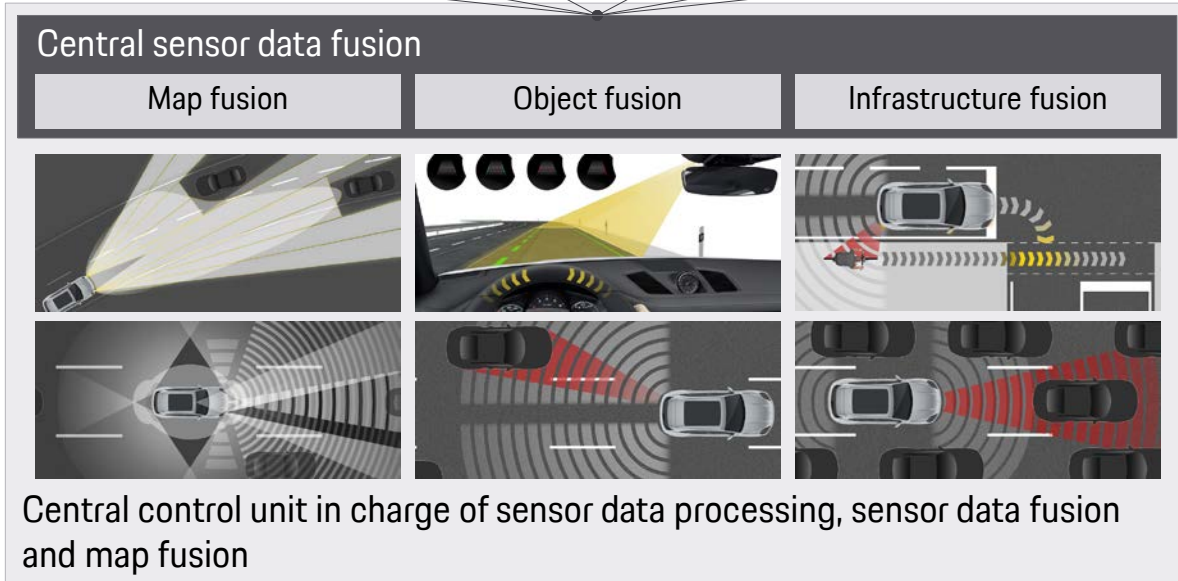
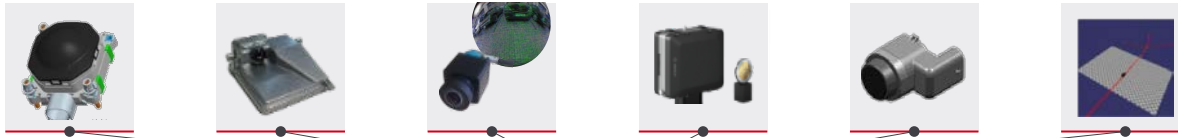
## Optional: (earliest release date mid-2018)

- | ParkAssist Plus
- | Manoeuvring Assist with rim protection
- | Trailer Manoeuvring Assist
- | Parking and Garage Pilot
- | Emergency Assist
- | Active Lane Assist
- | Enhanced traffic jam assist
- | Enhanced roadworks and bottleneck assist
- | Porsche InnoDrive incl. Adaptive Cruise Control

# Surround view from the driver assistance systems in the new Cayenne



# Central driver assistance system



High-level integration of multiple ECUs

Modular architecture decouples the application from the hardware

Future proof thanks to expandability

Sensor data fusion maximises consistent representation of the environment

Information is available centrally to all assistance systems

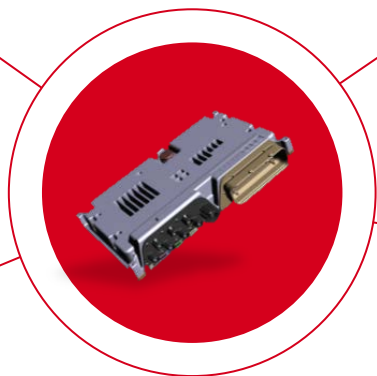
# Central driver assistance system

## Customer functions

- Parking Pilot
- Active Lane Assist
- incl. roadworks assistant
- Junction Assist
- Manoeuvring Assist
- Matrix beam

## Image processing during parking

- Processing of top view image
- Top view display
- Processing of five video streams



**Four high-performance processors** provide the new Cayenne with numerous driver assistance functions

## Sensor data processing

- Sensor fusion
- Pre-processing of sensor data
- Pre-processing of ultrasonic data
- Internal gateway

## Processing of images from front camera

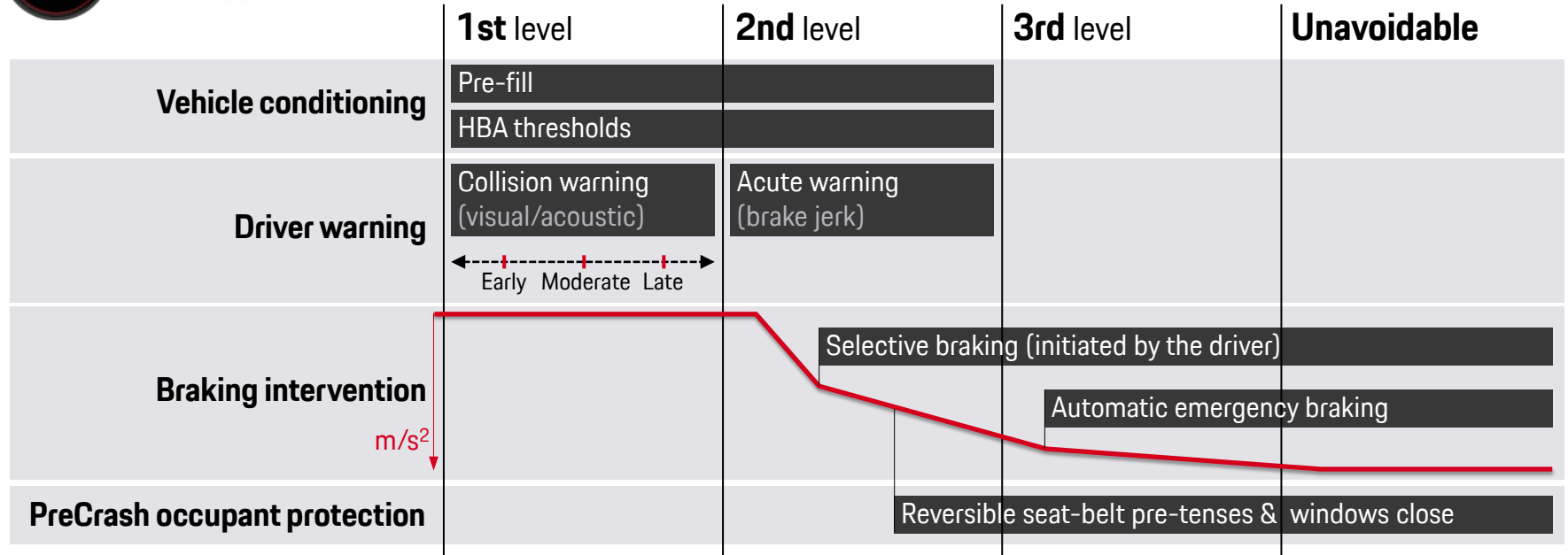
- Traffic sign recognition
- Pedestrian detection
- Vehicle detection
- Light detection
- Lane detection



# Warn and Brake Assist



Increased risk of collision



# From a simple Lane Departure Warning system to an Active Lane Assist with Emergency Assist

2014



## Lane Departure Warning

- Visual and acoustic warning if the vehicle leaves the lane

2017



## Lane Keep Assist

- Corrective steering interventions assist the driver to keep in lane
- Active at 65–250 km/h
- Reduces the risk of accidentally deviating from the lane

2018



## Active Lane Assist

- Combined longitudinal and lateral guidance at a speed range of 0–210 km/h
- Enhanced functionality for roadblocks and bottlenecks
- More convenient as it reduces the strain on the driver

# Emergency Assist (EA)



## Detects potential emergency due to absence of driver activities

| The emergency stop escalates in three levels:

| Alerts driver through acoustic warning.  
Assumes vehicle control via Lane Keep Assist or Active Lane Assist and avoids collision within defined system parameters

| Alerts driver and decelerates vehicle via brake jerks

| Triggers emergency call in standstill of vehicle

# ParkAssist with Surround View

200x



## ParkAssist

- Standard ParkAssist front & rear
- Optical and acoustic warning during manoeuvring and parking
- Deployment of ultra-sound sensors at front and rear

2017



## Surround View 2D

- Calculates 360° surround view from four cameras
- Supports parking and exiting as well as manoeuvring
- Displays surround view in Porsche Communication Management

2018

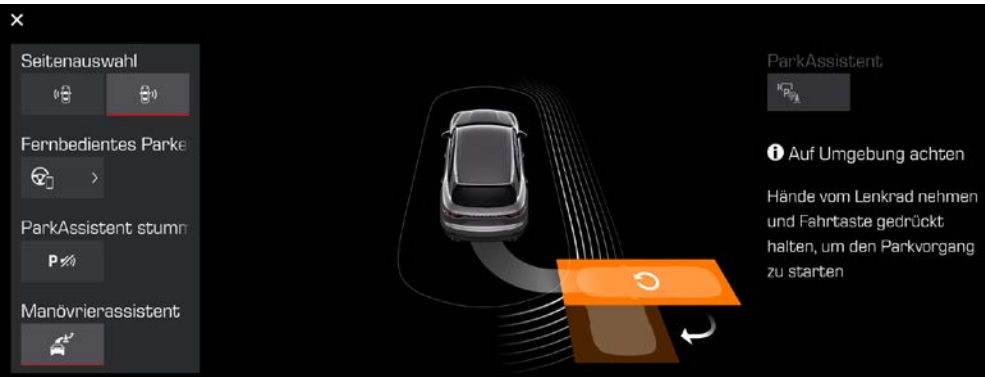


## Surround View 3D

- Calculates an **animated three-dimensional** 360° surround view from four cameras
- Supports parking exiting as well as manoeuvring
- Displays surround view in Porsche Communication Management



# Active ParkAssist – Park Pilot and Garage Pilot



Detects suitable parking space  
Assumes steering, acceleration/braking  
and gear shifts

Automatic parking and exiting in lateral and cross  
parking spaces. Backs into lateral parking spaces  
and backs into & drives forward into cross spaces

Parking and exiting manoeuvres also possible  
with driver outside of vehicle via smartphone

Garage Pilot allows remote parking in tight  
garages

# Manoeuvring Assist with Rim Protection function



## Manoeuvring Assist

Provides support with tight and limited vision manoeuvring situations at speeds below 10 km/h through steering and braking interventions to avoid collisions

## Rim Protection

Warns at speeds below 10 km/h through display in the Porsche Communication Management against impending collision of the tyres and rims

# Porsche InnoDrive route preview offers greater efficiency and driving convenience

2009



## ACC

- Automatically maintains the correct distance in traffic
- Automatically keeps the pre-set speed in free traffic situations

2014



## ACC 2nd generation

- Incorporates the coasting function and start/stop function

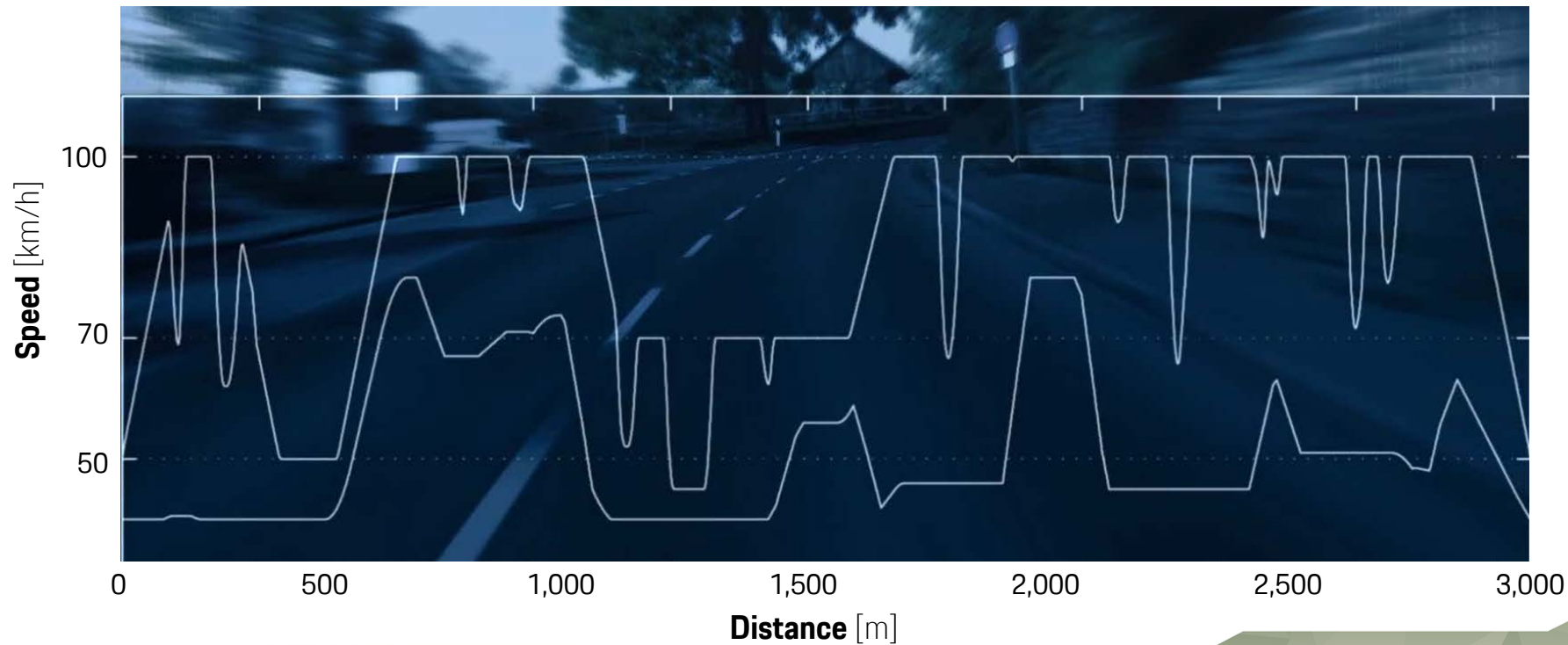
2018



## Porsche InnoDrive

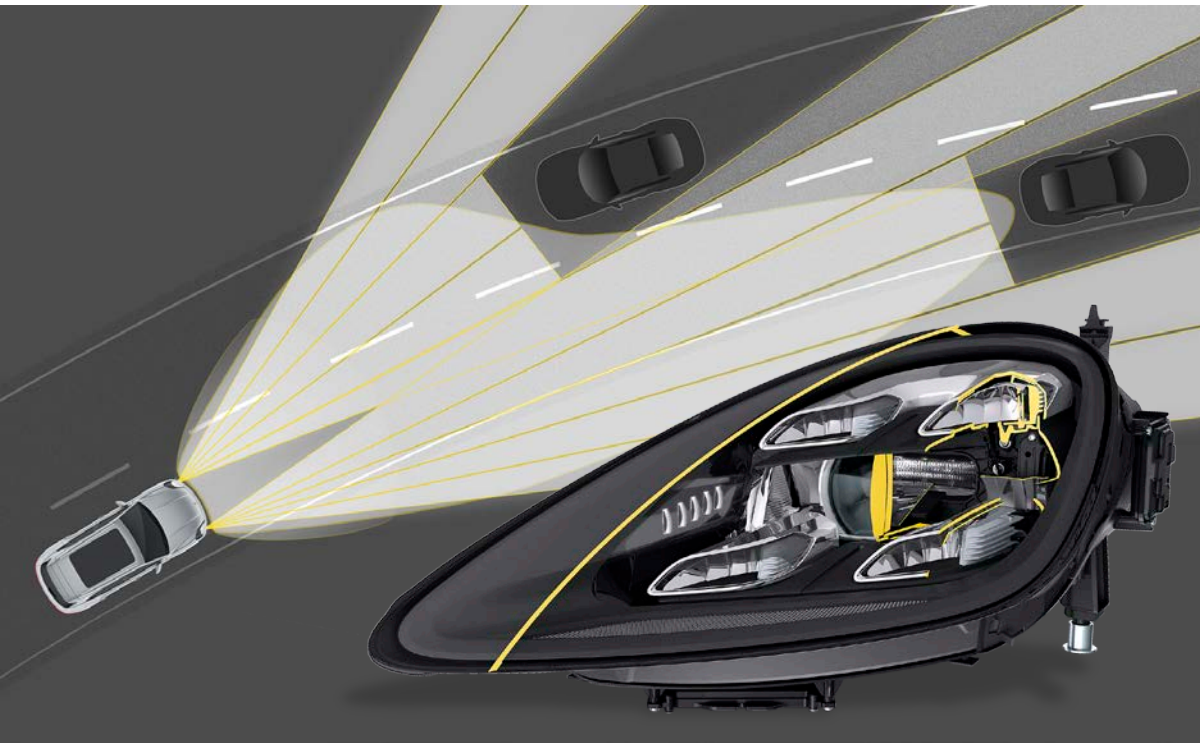
- Automatically adjusts the speed to the road conditions and speed limits
- Predictive control of gear selection, coasting and engine load

# Porsche InnoDrive calculates the optimal driving strategy in real time – for up to three kilometres in advance





# LED-Matrix beam inclusive PDLs Plus



## Light Styling

Consistent further development of the Porsche four spot light signature

## Technology and functions

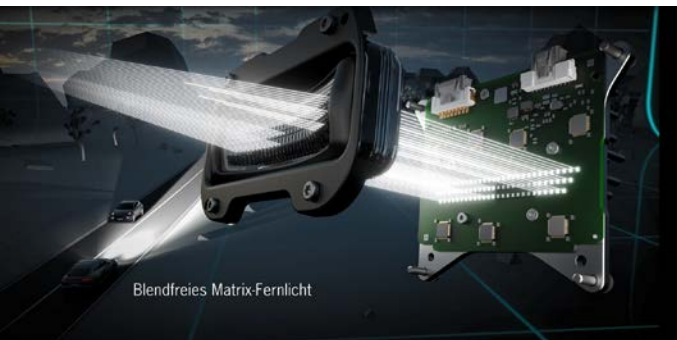
Efficient and powerful illumination with over 220 lx for high beam

Highly complex 84-Pixel system for Matrix beam

High beam functionalities enhanced over previous matrix systems:

- | No glare of trailing & oncoming objects
- | Traffic signs anti-glare
- | Marking light in connection with Night Vision Assist

# Automatic Headlamp Calibration (AHC)



## AHC functionality

- | Update for the Cayenne: Automatic headlamp calibration for the Matrix beam
- | Identification of incorrect headlight positions using a driver assistance system camera
- | Calibration when stopped at traffic lights and when a suitable projection surface is available (minimum distance of 5 m)
- | Calibration begins automatically provided that there are no obstacles in the roadway
- | During calibration, the customer perceives a simulated cornering light that moves continuously from right to left

## Roadmap for AHC in the Cayenne

- | From 2017 onwards, calibration can be performed in the presences of the customer; calibration results can be used for customer service purposes
- | From mid-2018 onwards, calibration values can be used directly in the lighting algorithm