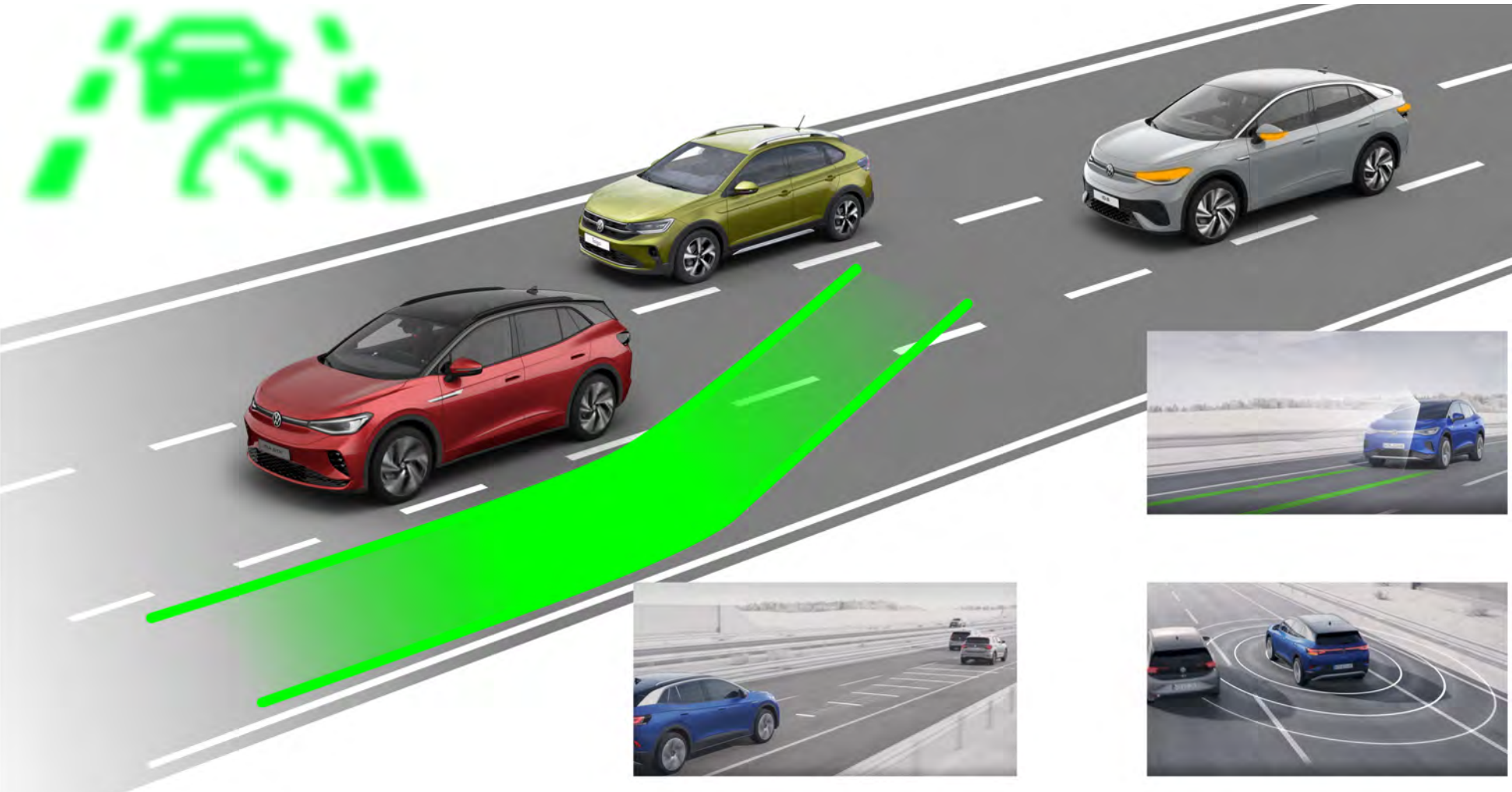




Service Training

Self-study Programme 728 – Travel Assist

Design and function



Preface

Dear colleagues,

This Self-study Programme provides an overview of the design and function of the Travel Assist driver assist system. In addition to the configuration and operation, we will look at the principles and legal background in the development of this semi-automated driver assist system. Due to the continuously growing number of functions, which are added, for example, in Car Shops or via system updates, it is also useful to be familiar with the regulations laid down by the responsible commissions. This will help you understand the system procedures and the operability.

Some sections provide references to further descriptions, for example, other Self-Study Programmes covering subsystems within Travel Assist. As a rule, you will find the detailed descriptions in the existing documents.

Thank you for your interest and we wish you successful learning.

Your Qualification Technology
Volkswagen Academy Sales & Service



Important notes on use of this Self-study Programme.

Preface

Notes on use

You will find a detailed explanation of how to use the new online self-study programmes using the menu option “Help”.

Notes on content

Self-study Programmes are used to teach users about the design and function of new developments. For current testing, adjustment and repair instructions, refer to the relevant service literature.

Legal note

The content of the Self-study Programmes is the property of Volkswagen AG. It may not be passed on to third parties without the permission of Volkswagen AG or be otherwise misappropriated.

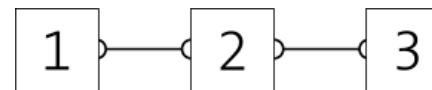
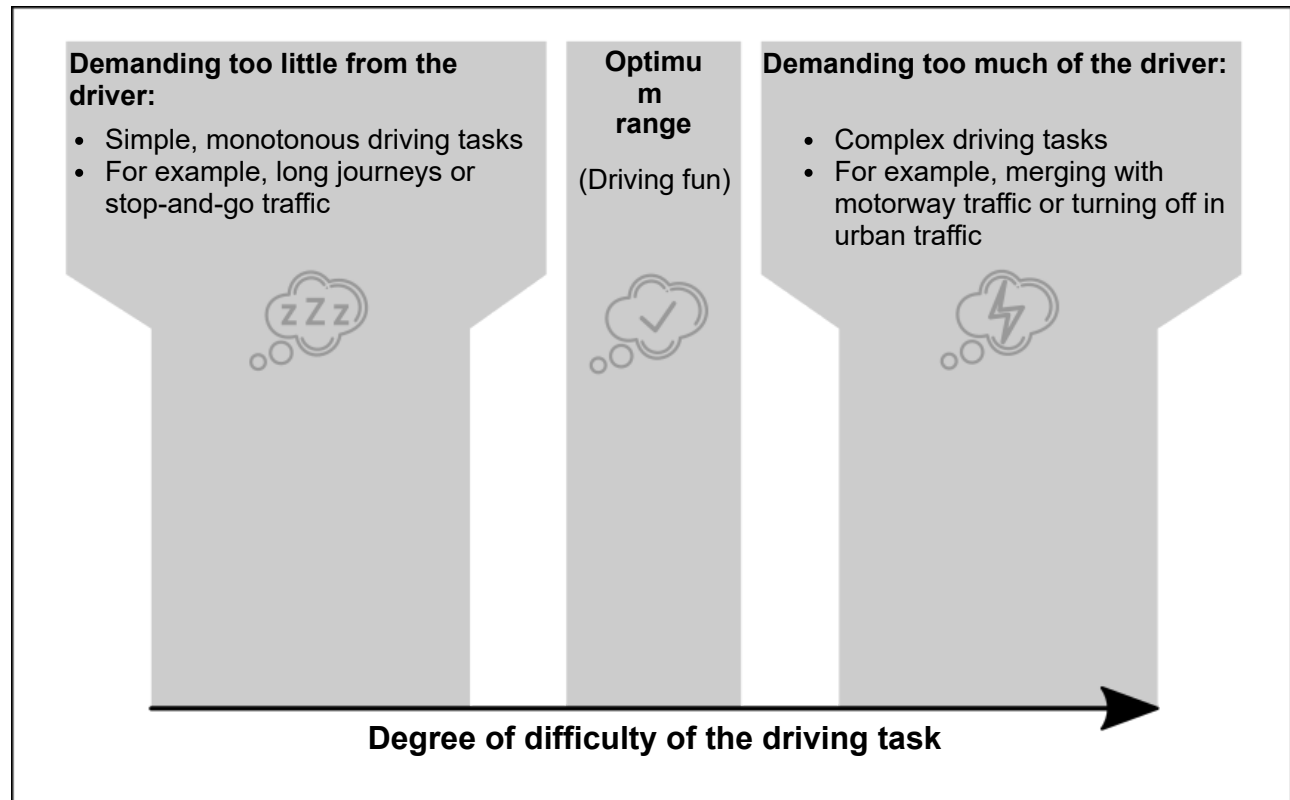
Physical mode of operation of driver assist systems

The driver assist systems provide support for drivers. In contrast to safety systems, like the anti-lock brake system or electronic stabilisation program, they can be overridden by the driver at any time.

Some driving tasks may demand too little from drivers while others pose a challenge for them. The optimum range for the driver lies in-between – better known as “driving fun”.

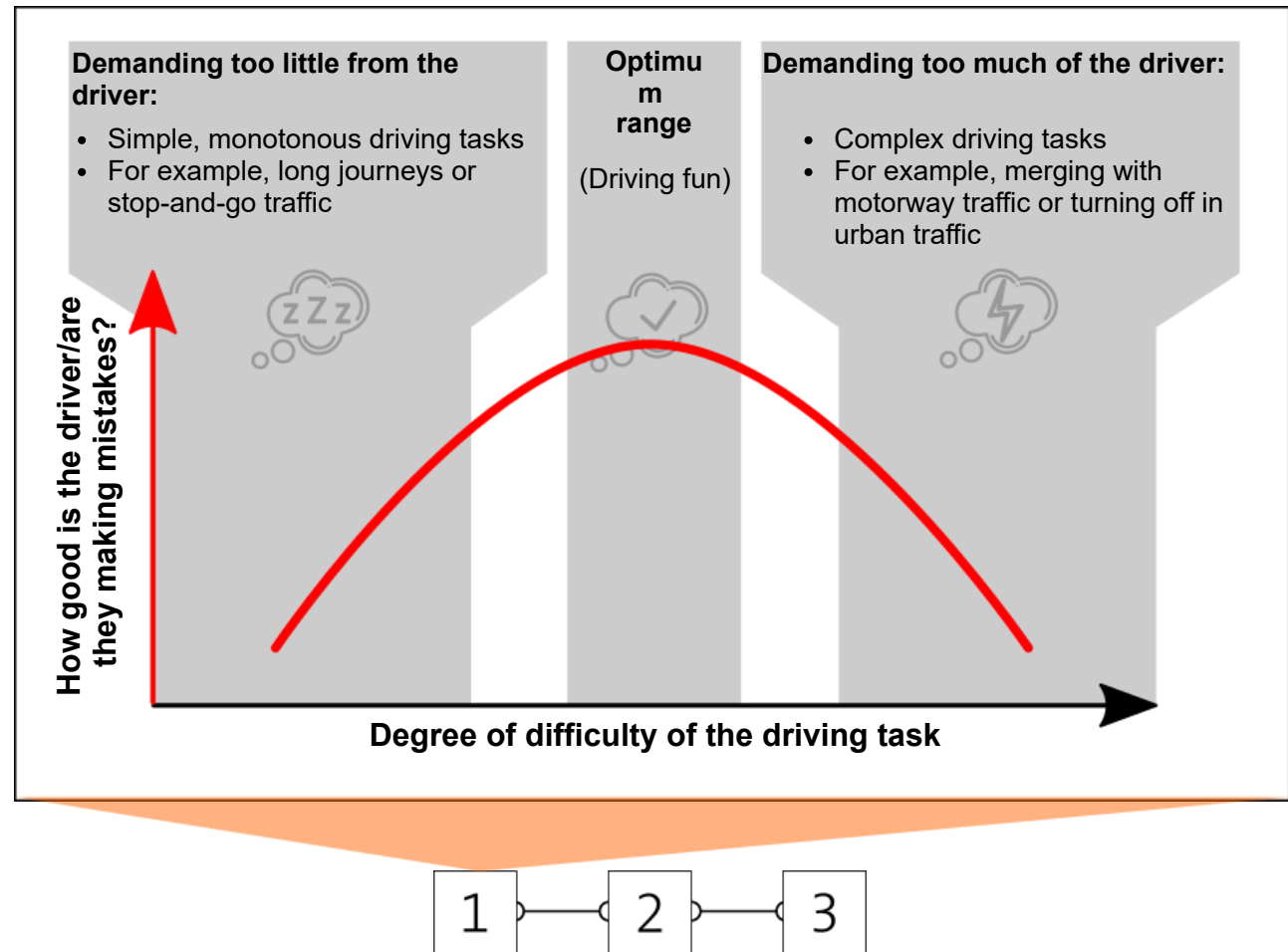
Too little is demanded from the driver when they are subjected to monotonous driving tasks for long periods and thus lapse into tiredness or boredom. In contrast, turning off at a junction used by different road users is very demanding and can lead to a stress situation – in particular for new drivers.

Due to the different driving situations, there are many different driver assist systems in today's vehicles. Travel Assist was specially developed to deal with situations where the driver may become bored when driving long distances on motorways and country roads.

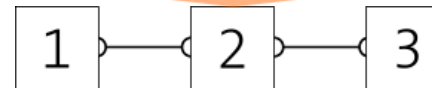
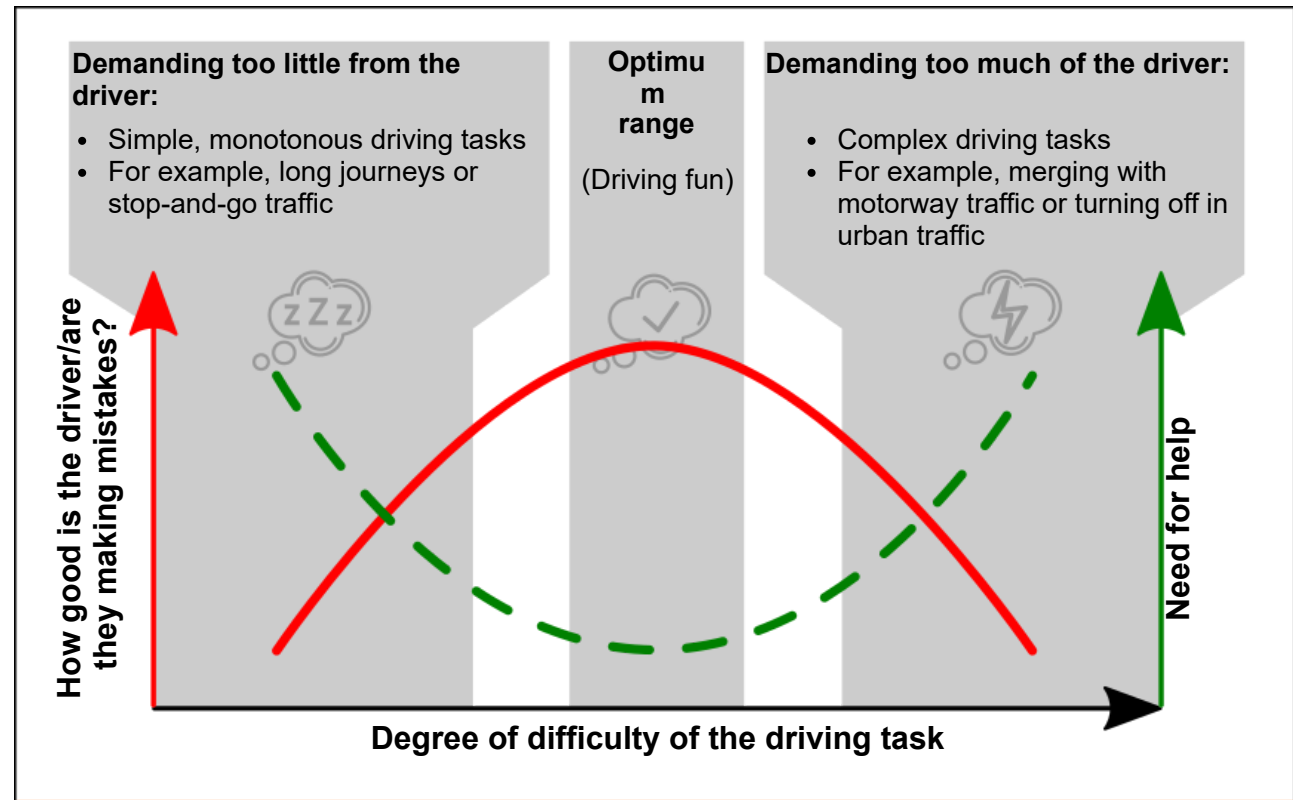


Move the mouse over the numbers to view the different layers of the diagram.

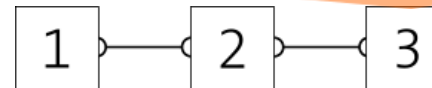
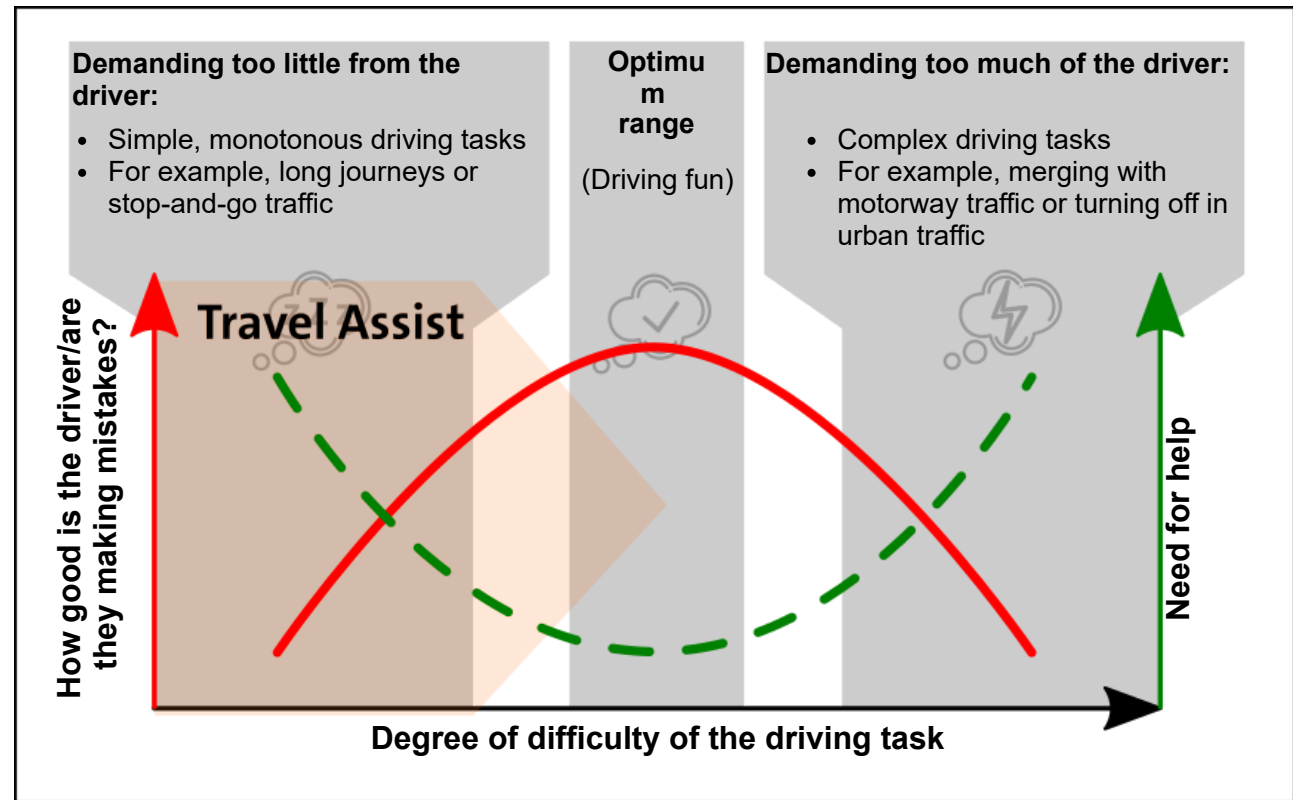
Physical mode of operation of driver assist systems



Physical mode of operation of driver assist systems



Physical mode of operation of driver assist systems

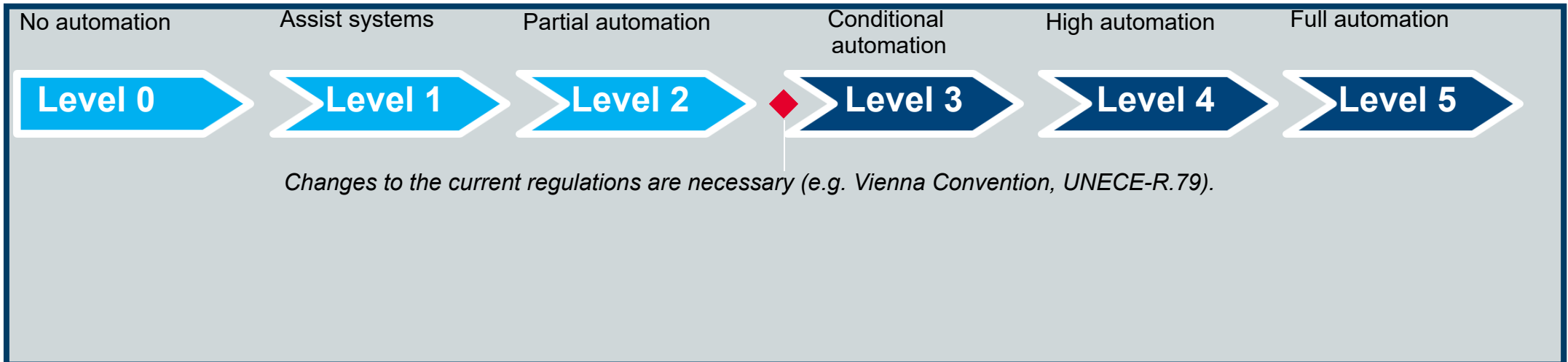


SAE J3016: levels of driving automation

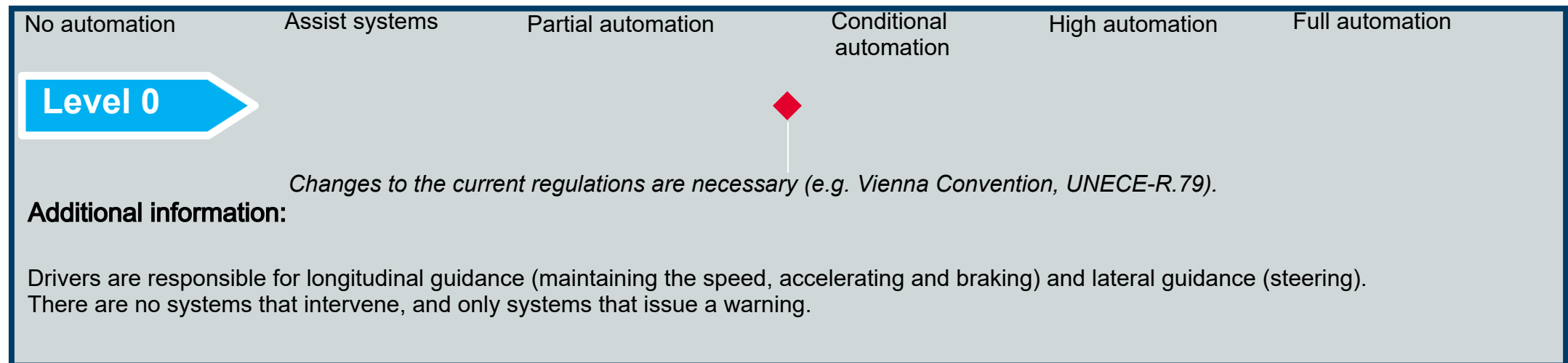
Driver assist systems support drivers on the road. Different systems help to prevent accidents or, in the best case, reduce the severity of their consequences. Current driver assist systems work in the SAE levels

(Society of Automotive Engineers) in level 0–2 (defined in SAE J3016). This means that the driver has to constantly monitor all driving situations.

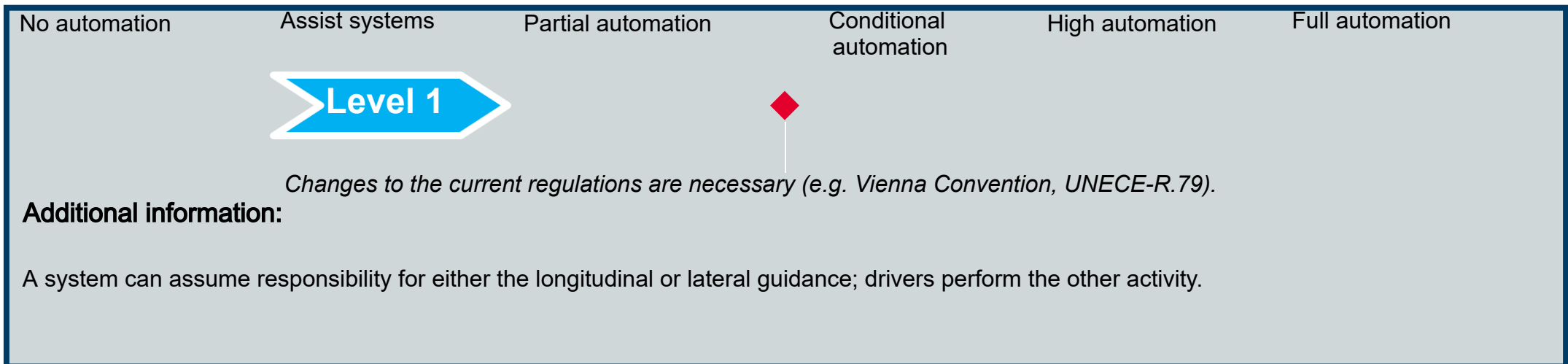
In vehicles that drive autonomously (SAE levels 3–5), drivers no longer need to assume full responsibility for monitoring driving tasks. The systems automatically detect their system limits (speed, courses taken by roads, traffic situation etc.). If the systems reach their limits, the driver is prompted to assume responsibility for the vehicle as early as possible (with a corresponding time reserve).



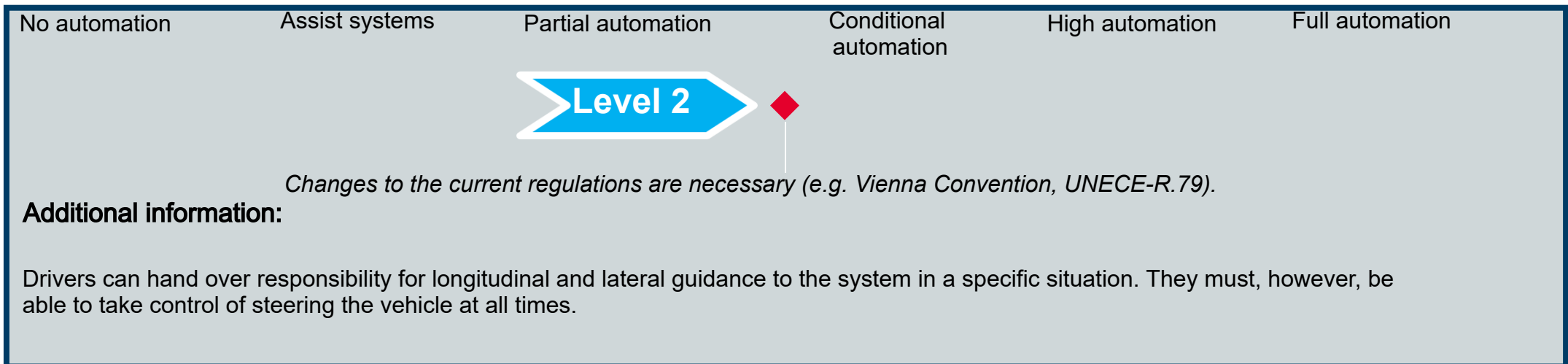
SAE J3016: levels of driving automation



SAE J3016: levels of driving automation



SAE J3016: levels of driving automation



SAE J3016: levels of driving automation

No automation Assist systems Partial automation Conditional automation High automation Full automation

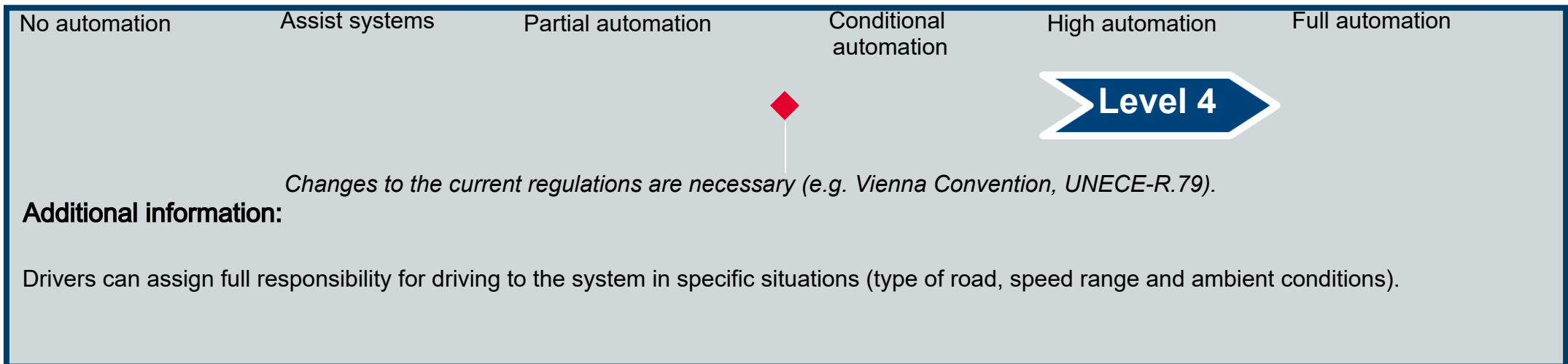


Changes to the current regulations are necessary (e.g. Vienna Convention, UNECE-R.79).

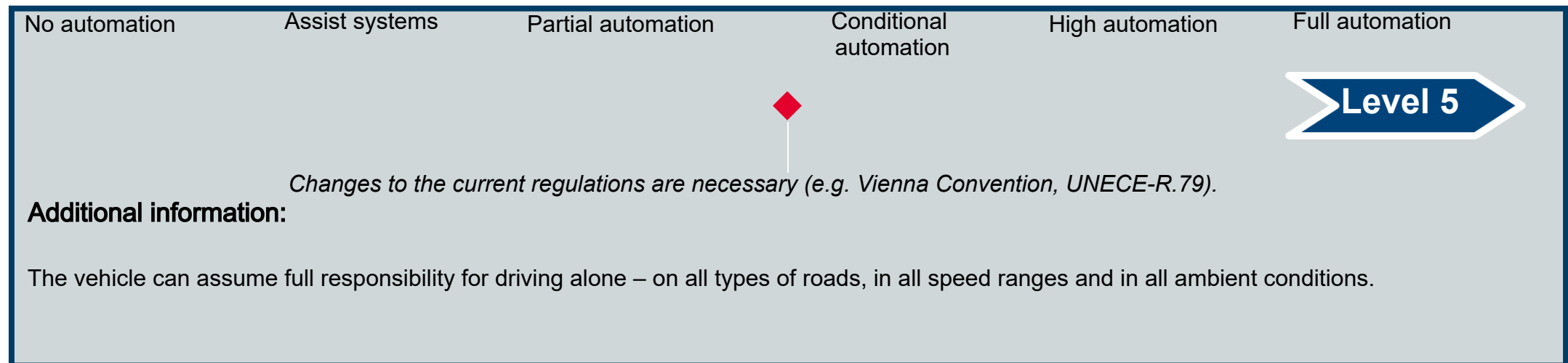
Additional information:

The system automatically detects the system limits: drivers no longer have to monitor longitudinal and lateral guidance of the vehicle at all times.

SAE J3016: levels of driving automation



SAE J3016: levels of driving automation



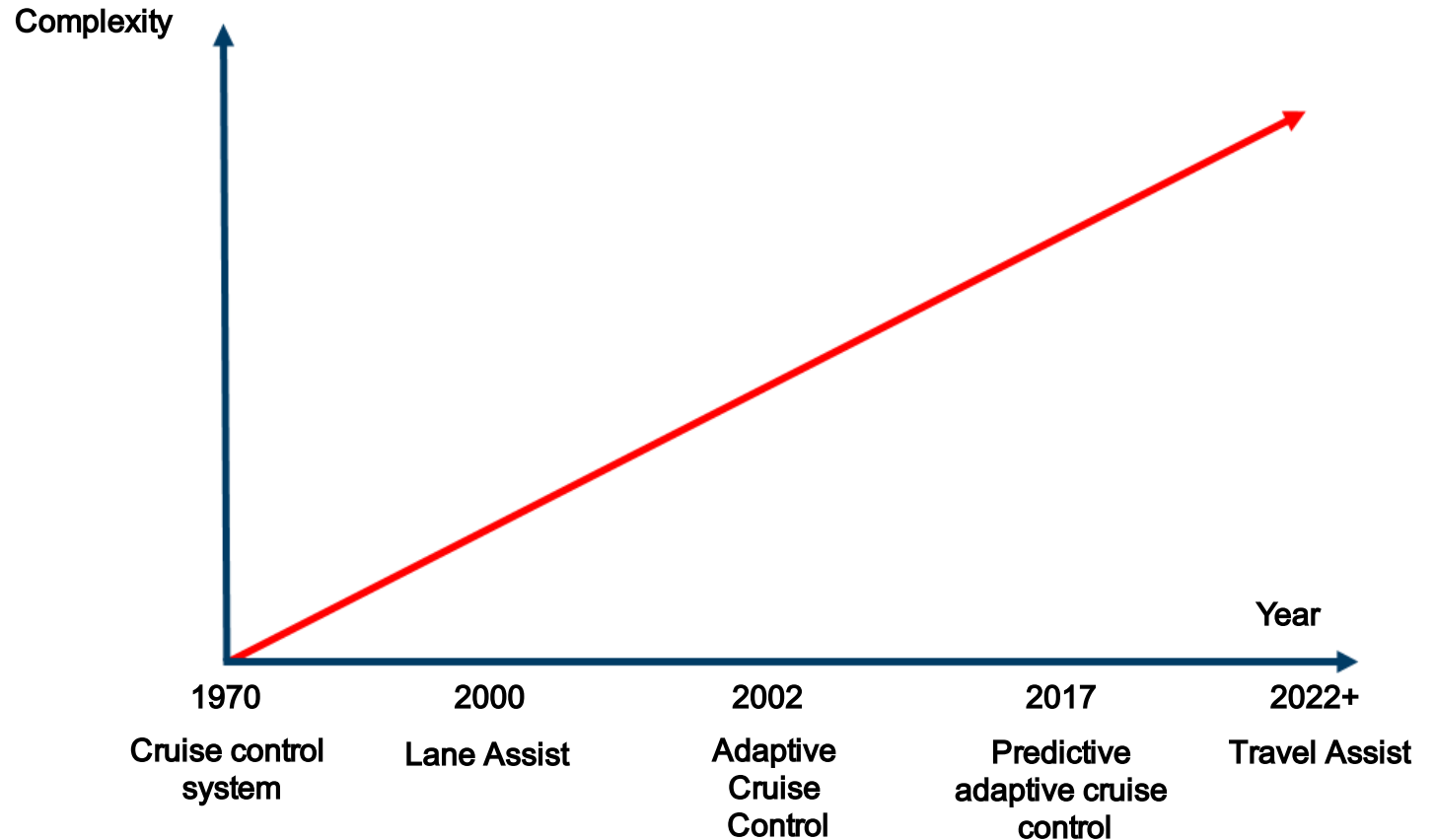
The background to Travel Assist

Travel Assist is one of the latest driver assist systems. The system is now available for most vehicles and vehicle classes. The Polo 2021 was the first car in the subcompact segment to be offered with a semi-automated system in Travel Assist.

The system builds on the functions of other driver assist systems, however. The lane departure warning – Lane Assist and the adaptive cruise control are part of Travel Assist.

New systems are being continually developed to support drivers with the increased complexity of our roads (more traffic, large and complex road networks etc.).

This page will explain the background to the system, where it originates from and which systems paved the way to semi-automated systems.



Move the mouse over the numbers to view the different layers of the diagram.

The background to Travel Assist



Cruise control system

The cruise control system is a system for automatically maintaining the set vehicle speed. The driver sets the value of the current speed, the vehicle maintains it until the driver cancels it.

The cruise control system was used for first time at Volkswagen in the Passat VR6 1991.

The background to Travel Assist

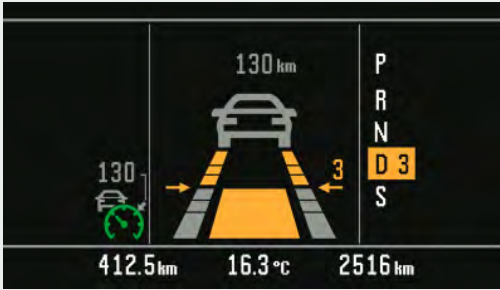


Lane departure warning

Lane departure warning is able to guide the vehicle within a lane when lane markings are recognised. A multifunction camera is built into the windscreen for this purpose and detects the road markings. This relieves the burden on the driver.

The system was introduced at Volkswagen for the first time in the Passat CC 2008.

The background to Travel Assist

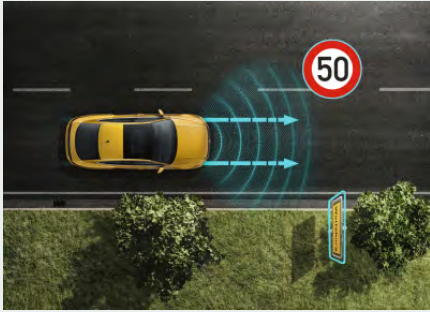


Adaptive cruise control

Adaptive cruise control maintains the distance from the vehicle driving in front as well as the previously set speed. The distance can be set using a switch. The distance is measured via one or two radar sensors that transmit waves (Doppler effect).

The Phaeton 2004 was the first Volkswagen model to feature the system.

The background to Travel Assist



Predictive cruise control system

The speed is adapted to upcoming traffic events with the aid of the system. They include traffic signs with speed limits among others. The data is taken from navigation system information and the data from the camera for driver assist systems.

The system was used for the first time in the Arteon 2017.

The background to Travel Assist



Travel Assist

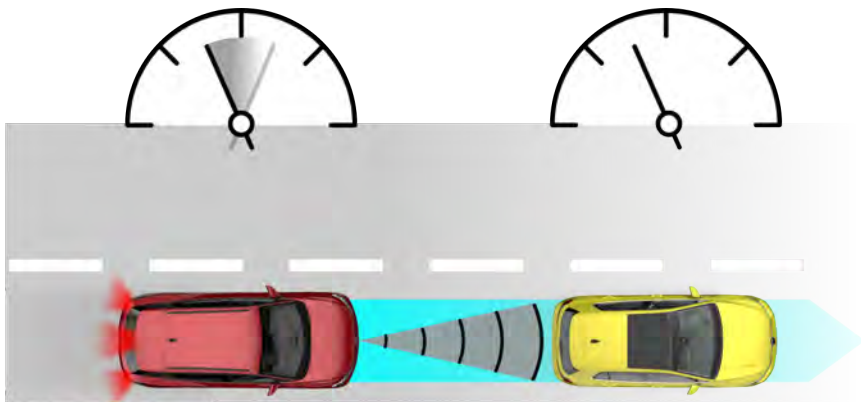
Being the first semi-automated driver assist system, Travel Assist is a combination of lane departure warning and adaptive cruise control. In the Travel Assist system with mass location data, the lane change assist is also involved. The system is capable of taking over the longitudinal and lateral control.

The Passat 2020 was the first Volkswagen model to feature Travel Assist among its driver assist systems.

What exactly is meant by longitudinal and lateral guidance?

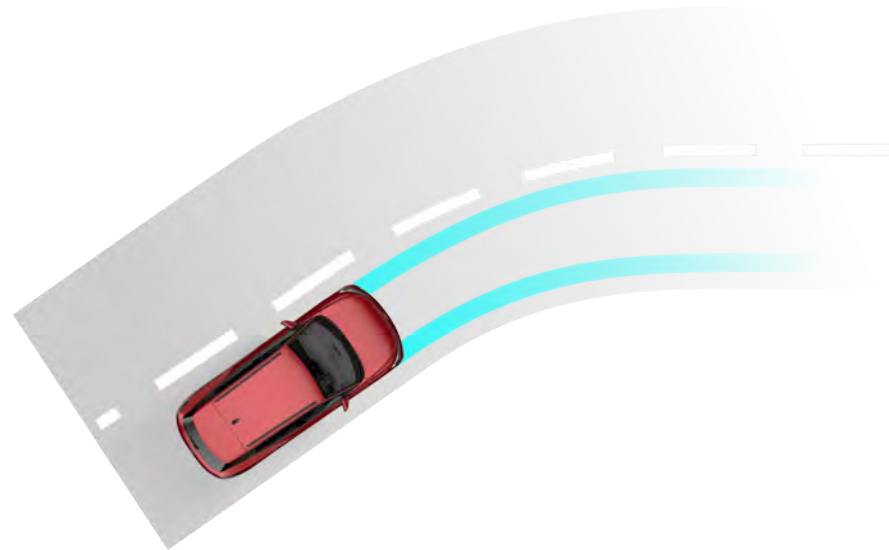
Longitudinal guidance

Longitudinal guidance refers to the guidance of the vehicle in the longitudinal direction, or also the acceleration and braking. The vehicle is travelling straight ahead. If another road user is driving in front and the adaptive cruise control (ACC) reacts and regulates both the distance and the speed, we talk of longitudinal guidance. Another example is the automatic emergency braking via the Front Assist system. We talk of longitudinal guidance in this case, too.



Lateral guidance

The lateral guidance refers to the left-hand and right-hand holding of the vehicle in the lane or also steering. If the vehicle is driving within a lane and the driver is not actively steering, the Lane Assist will keep it in the lane. The vehicle will not leave the lane. This is known as lateral guidance. Side Assist is another form of lateral guidance. Lateral guidance also works in corners as the vehicle is also kept in the lane on the left-hand and right-hand side despite the lateral forces occurring.

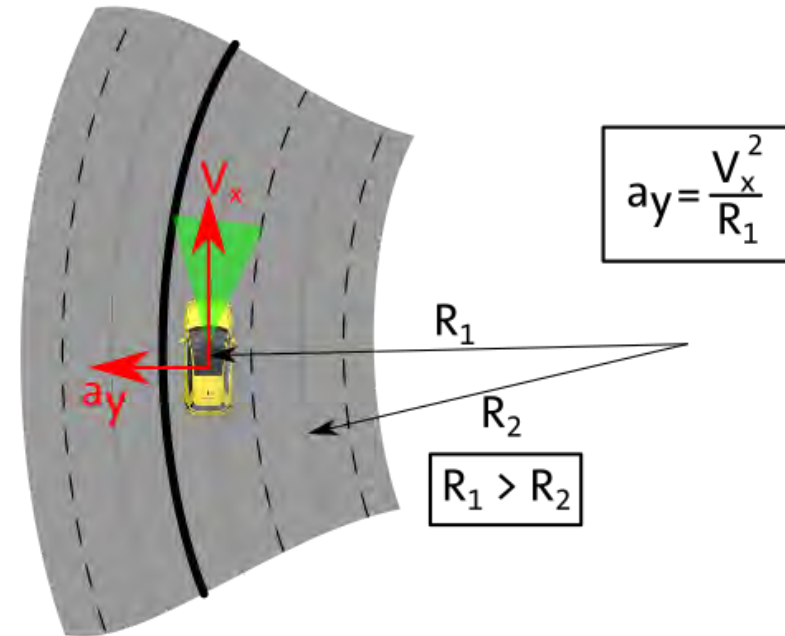


Lateral guidance coordinator

The lateral guidance coordinator is used to calculate the current lateral acceleration. In Travel Assist 2.0, the maximum lateral acceleration limit of the lateral guidance coordinator has been adapted to the new guide value from UNECE-R.79 (changed from 2.5 m/s² to 3 m/s²). UNECE-R.79 also allows the system to briefly increase the maximum value set in the system to 0.3 m/s². However, the system switches off automatically if the guideline value from UNECE-R.79 is exceeded (passive mode).

Another change in the calculation of the lateral acceleration a_y is the calculation of the current curve radius R . In addition, the speed formula v_x is also taken into consideration. This was previously calculated using the current steering angle with the aid of a complex formula. In the latest evolution stage, the curve radii R are stored in the navigation data and can be used directly for calculating the lateral acceleration a_y (see formula).

In addition, the front camera for driver assist systems can also be used to detect the current lane, which can be used to derive the curve radius of the lane when cornering.



	Travel Assist 1.0	Travel Assist 2.0
Lateral acceleration a_y	~2,2 m/s ²	~2,7 m/s ²
Determining the curve radius R	Steering angle	Navigation-based data

Capacitive steering wheel

All evolution stages of Travel Assist require reliable information about the driver's readiness to steer. The system is otherwise not capable of working correctly as directives currently specify that the driver has to touch the steering wheel. The driver may only let go of the steering wheel for a short, defined time. If this is exceeded, visual and acoustic warnings are issued to take control of the steering wheel.

The capacitive steering wheel detects when it is touched by the driver. A capacitive sensor and a control unit for steering wheel contact detection (J1158) have been built into the steering wheel layers. The control unit is located behind the airbag unit depending on the steering wheel design.

The sensor itself consists of a mat that is wrapped around the steering wheel and is sandwiched between two layers of foam. The mat is connected to control unit J1158. The control unit is connected to the same LIN bus as the multifunction steering wheel control unit J453. The signal from the capacitive sensor is evaluated by the control unit J1158. The control unit sends the information to the adaptive cruise control unit J428.



The individual cross sections:

- 1. Steering wheel skeleton
- 2. Foam
- 3. Mat with capacitive sensor
- 4. Foam
- 5. Leather cover



Capacitive steering wheel

How it works

The mat consists of two electrodes: one screening electrode and one sensing electrode. The screening electrode insulates the sensing electrode from the inner part of the steering wheel. Both electrodes are electrically insulated from each other.

The sensing electrode functions like the plate in a capacitor. The vehicle body functions like the second plate in a capacitor that is connected to earth. There is foam, leather and air between the two plates. They act like the dielectric in a capacitor.

The control unit supplies an alternating voltage to the measuring electrodes. A very low capacitance is created as long as no objects come into contact with the steering wheel. Since the current is proportional to the capacitance, a very low current flows between the measuring electrode and body earth.



You will find further information on the capacitive steering wheel in Self-study Programme no. 596 “The Passat 2020 – Electrical and Driver Assist Systems”.

Assignment of Travel Assist evolution stages to platforms

The different evolution stages of Travel Assist are not available for all vehicle platforms. Among other things, this is due to the software and hardware used in the vehicles, as well as the respective market positioning. This page provides an overview of which generations of Travel Assist are available for the different platforms.

Use the hotspots to view the vehicles assigned to the platform. Only current Volkswagen models are covered as the system has only been available since 2019.

The Touareg is not listed because it was developed on an Audi platform.

Travel Assist evolution stage

Platform	Vehicles	Travel Assist evolution stage		
		1.0	2.0	Mass location data
MQB27				
MQB37				
MQB37W				
MQB37A				
MQB48				
MEB				
PQ				

Assignment of Travel Assist evolution stages to platforms

MQB27



The MQB27 platform includes the following current models:

- Polo
- Taigo
- T-Cross

Assignment of Travel Assist evolution stages to platforms

MQB37



The MQB37 platform includes the following current models:

- T-Roc
- T-Roc Cabriolet

Assignment of Travel Assist evolution stages to platforms

MQB37W



The MQB37W platform includes the following current models:

- Golf
- Golf Estate

Assignment of Travel Assist evolution stages to platforms

MQB37A



The MQB37A platform includes the following current models:

- Tiguan
- Tiguan Allspace
- Touran (Travel Assist is not offered for the Touran)

Assignment of Travel Assist evolution stages to platforms

MQB48



The MQB48 platform includes the following current models:

- Passat
- Passat Estate
- Arteon
- Arteon Shooting Brake

Assignment of Travel Assist evolution stages to platforms

MEB



The MEB platform includes the following current models:

- ID.3
- ID.4
- ID.5

Assignment of Travel Assist evolution stages to platforms

PQ

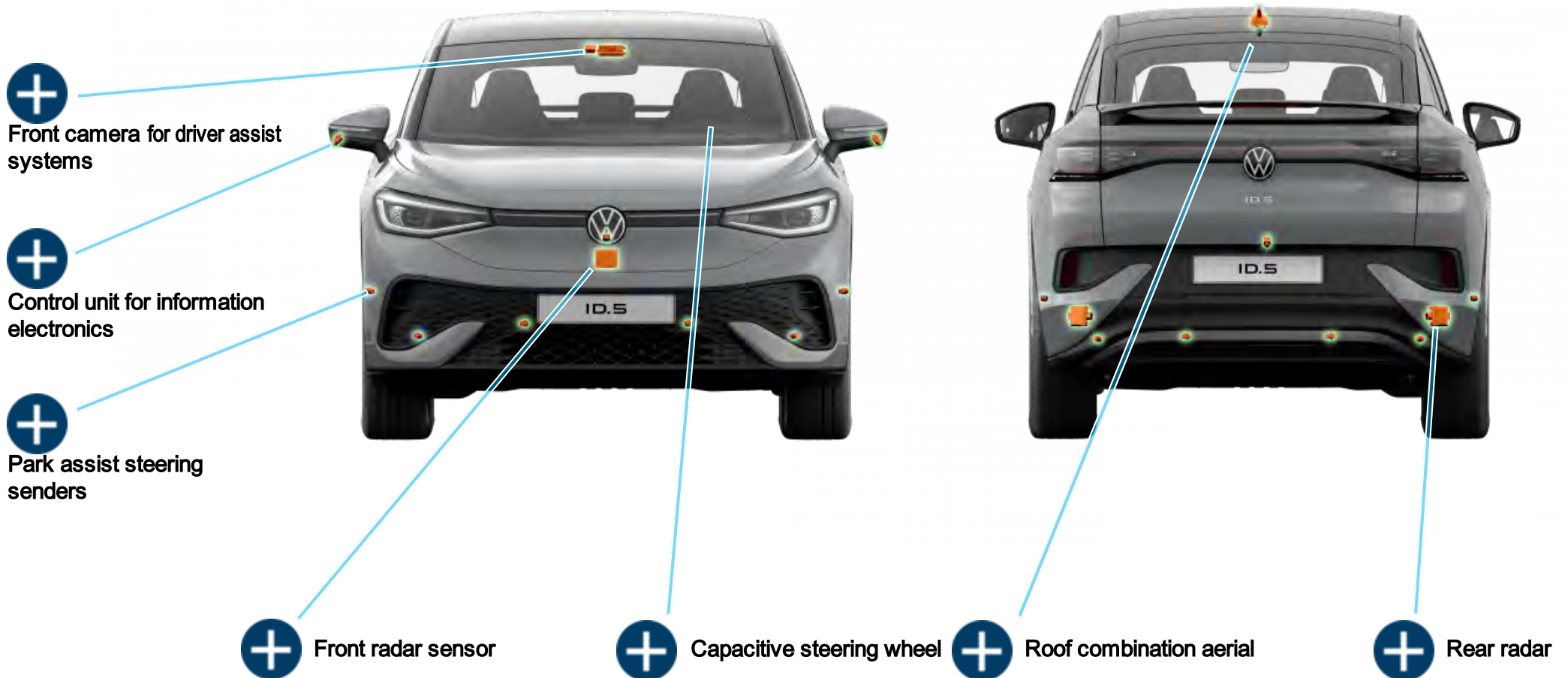


The PQ platform includes the following current models:

- up!
- Sharan

The hardware required and how the sensors work

In this section, you will learn what hardware is needed for the Travel Assist functions. An ID.5 is used as an example.



The hardware required and how the sensors work

Front camera for driver assist systems

The front camera for driver assist systems is installed in the centre of the windscreen and is the vehicle's eye. Numerous assist systems use information from the camera. In the Travel Assist system with mass location data, data on the road conditions (lanes and ambient conditions) are used to keep the vehicle in lane in conjunction with the lane departure warning and to initiate use of the mass location data.

The camera perceives grey and red hues as colours. It is installed in the evolution stages MFK2, MFK3, MFK3w and MFK4. Only the MFK4 is used with the ID. models and can be updated.

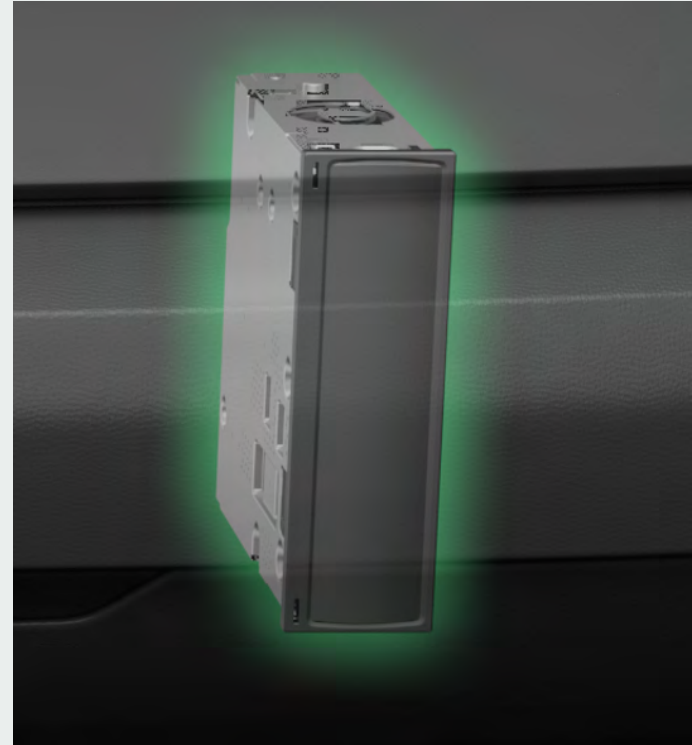


The hardware required and how the sensors work

Control unit for information electronics

In ID. models, the control unit for information electronics is installed in the dash panel insert behind the glove compartment. Together with the display unit for the Infotainment system, it is the navigation system and it is important to download data for the use of mass location data.

In the Passat 2020 and Golf 2021, it has the function of transmitting driving data to the Volkswagen back end. This only happens, however, if the driver has not disabled this function and the vehicle is online.



The hardware required and how the sensors work

Park assist steering senders

The park assist steering senders are only used with the Travel Assist with mass location data in combination with the system. They also monitor the traffic so that assisted lane changing can be carried out without any danger. These components are not used in the other evolution stages of Travel Assist.

The sensors detect obstacles and their distances by using ultrasound. The beams reflected by an obstacle are picked up again by the senders and forwarded to the control unit in the form of digital information.



The hardware required and how the sensors work

Front radar sensor

The front radar sensor is installed either below or behind the Volkswagen badge. The Travel Assist uses this information to maintain the set distance from the vehicle driving in front in combination with the adaptive cruise control.

The radar transmits electromagnetic waves. If they are reflected by an object, the sensor forwards the information to the control unit.

The following radars are currently used at Volkswagen:

- Bosch MRR
- Bosch 1.5 Evo
- Bosch FR+
- Conti ARS 300
- Conti ARS 410
- Conti ARS 510



The hardware required and how the sensors work

Capacitive steering wheel

All evolution stages of Travel Assist require the information that the driver is touching the steering wheel. The capacitive steering wheel provides this information. The capacitive function is currently only offered in combination with leather steering wheels.

You will find further information in the chapter “Capacitive steering wheel”.

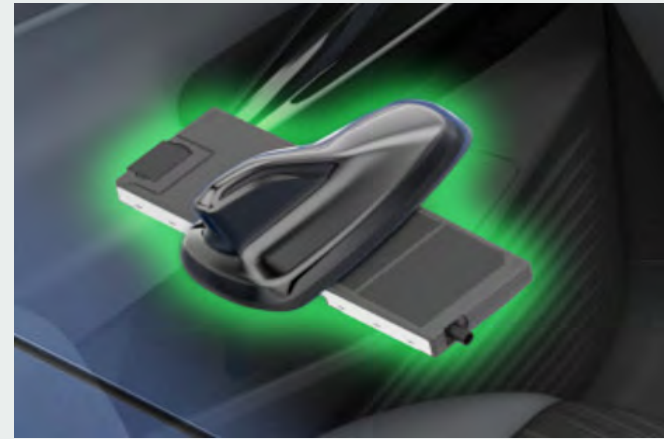


The hardware required and how the sensors work

Roof combination aerial

The roof combination aerial includes the GSM aerial, the GPS aerial, the auxiliary heater aerial and the Internet access control unit. The roof aerial is required to download the route data for the use of the mass location data and also to receive the GPS signal for navigation guidance. The Passat 2019 and Golf 2020 additionally used this aerial to transmit route data to the Volkswagen back end.

In the evolution stages Travel Assist 1.0 and 2.0, it is only used to receive the GPS signal.



The hardware required and how the sensors work

Rear radars

The Travel Assist system with mass location data is the only evolution stage to use information from the rear radars. These radars forward the information on whether and how quickly vehicles are approaching from the rear. One of the requirements covers use of this information in approving and performing assisted lane changes.

The rear radars are fitted in the rear bumpers. Just like the front radars, the rear radars also transmit electromagnetic waves and process the waves returned.



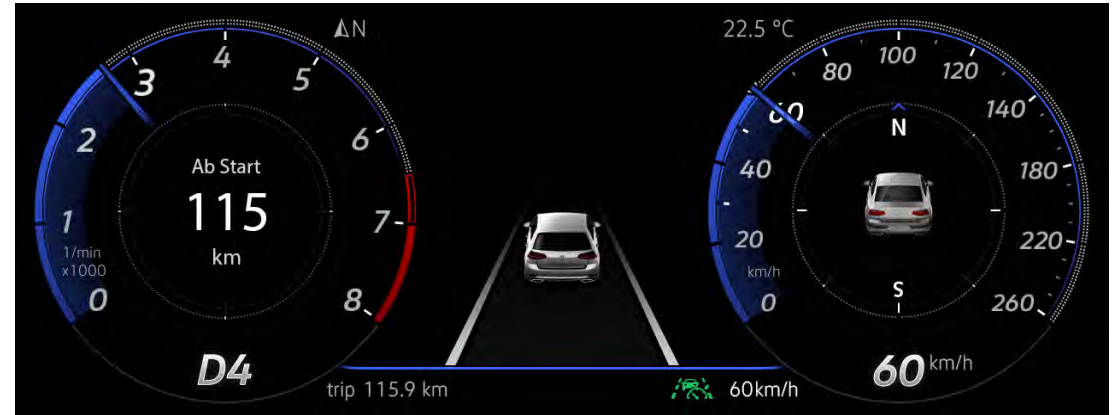
How Travel Assist works

Travel Assist 1.0

Travel Assist is a combination of the adaptive cruise control ACC and the lane departure warning – Lane Assist. The activated lane departure warning takes over lateral guidance and the adaptive cruise control takes over the longitudinal guidance. This enables semi-automatic driving up to a speed of 210 km/h.

The driver has to constantly monitor the system for legal and safety-related reasons. To guarantee this, a capacitive steering wheel is installed in all vehicles delivered with Travel Assist. This is one of the requirements for Travel Assist.

In this way, it is checked whether the driver is touching the steering wheel and monitoring the vehicle.



View of dash panel insert when Travel Assist is activated

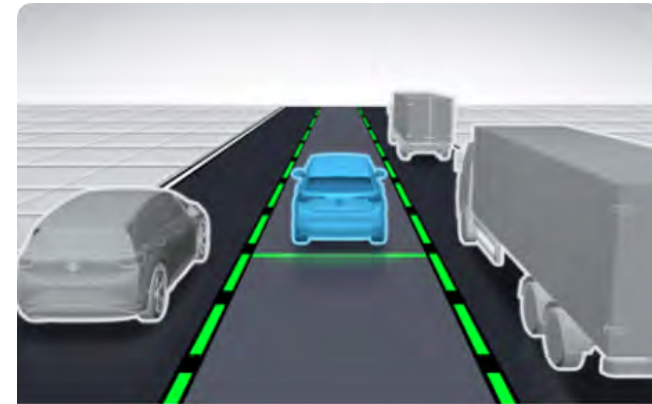
How Travel Assist works

Travel Assist 2.0

The two new features of Travel Assist 2.0 are the lateral guidance coordinator and the enhanced environment model. The functional scope of the first evolution stage has been kept.

Along with the current lane markings and the vehicle travelling in front, the enhanced environment model also maps all nearby vehicles, including their types (motorcycles, cars and lorries) in adjacent traffic lanes (diagram on right). If another road user changes lane, then this is also shown on the dash panel insert display. Since the MQB37w dash panel insert has a higher resolution display, it now shows additional environment details. For example, the turn signal on your own vehicle, weaving in the lane and a zoom function when switching the assist system.

The lateral guidance coordinator for calculating the permitted lateral acceleration when cornering with active lane guidance uses navigation-based data instead of the steering angle. This enables improved predictive cornering when Travel Assist mode is activated.



View in dash panel insert in MEB



View in dash panel insert in MQB37w

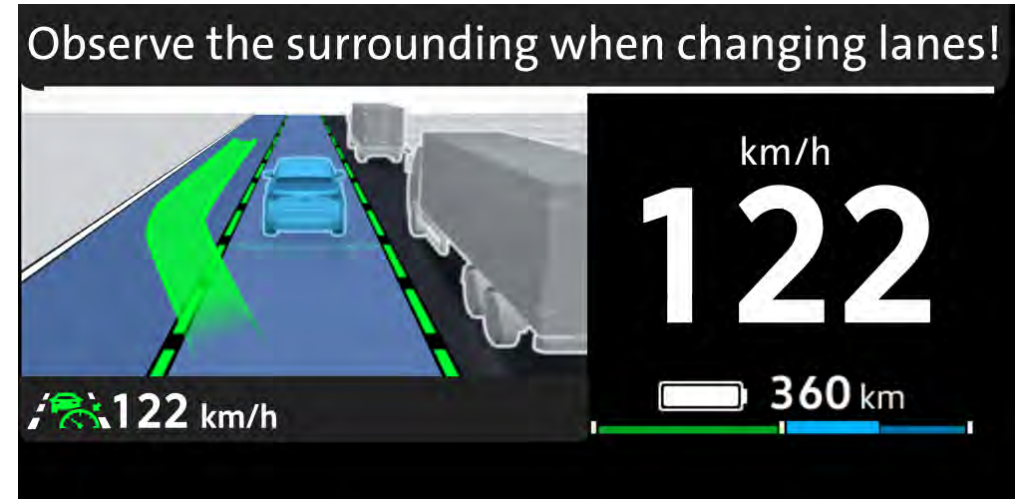
How Travel Assist works

Travel Assist with mass location data

In the Travel Assist system with mass location data, all functions and extensions from the other stages have been retained. The lateral guidance with mass location data and the assisted lane change are new additions.

As soon as all requirements are met, the system offers this function and initiates an assisted lane change. Longitudinal and lateral guidance are taken over by the system, the lane is changed in addition. The driver has to keep their hands on the steering wheel during this and observe the surrounding area.

The lateral guidance with mass location data helps to take over the lateral guidance where the other evolution stages would switch to passive mode. This is the case, for example, on roads that do not have a centre line. By downloading data that was generated by other vehicles, the vehicle can create an imaginary centre line and be guided close to the right-hand (or left-hand in left-hand traffic) edge of the carriageway.



View of dash panel insert during assisted lane change

Using Travel Assist

In all evolution stages, Travel Assist is selected and operated via a button on the multifunction steering wheel. Which variant of the steering wheel is fitted is not relevant – whether with physical buttons or touch operation.


The button is located at the bottom right of the left-hand button panel on the multifunction steering wheel. When you press the button, an indication that Travel Assist is activated will appear in the dash panel insert. In addition, the warning lamp for Travel Assist lights up green.


There are several ways to deactivate Travel Assist if necessary:

- Pressing the on/off button on the multifunction steering wheel (above the Travel Assist button)
- Active braking by the driver

The distance set by the driver remains stored in the system after deactivation. If the driver is no longer touching the steering wheel, Emergency Assist will be initiated by the system. In vehicles without Emergency Assist, Travel Assist will switch itself off in this case. Other settings (distance, speed and regulating behaviour) should be made immediately as with the adaptive cruise control – ACC.



 Warning lamps

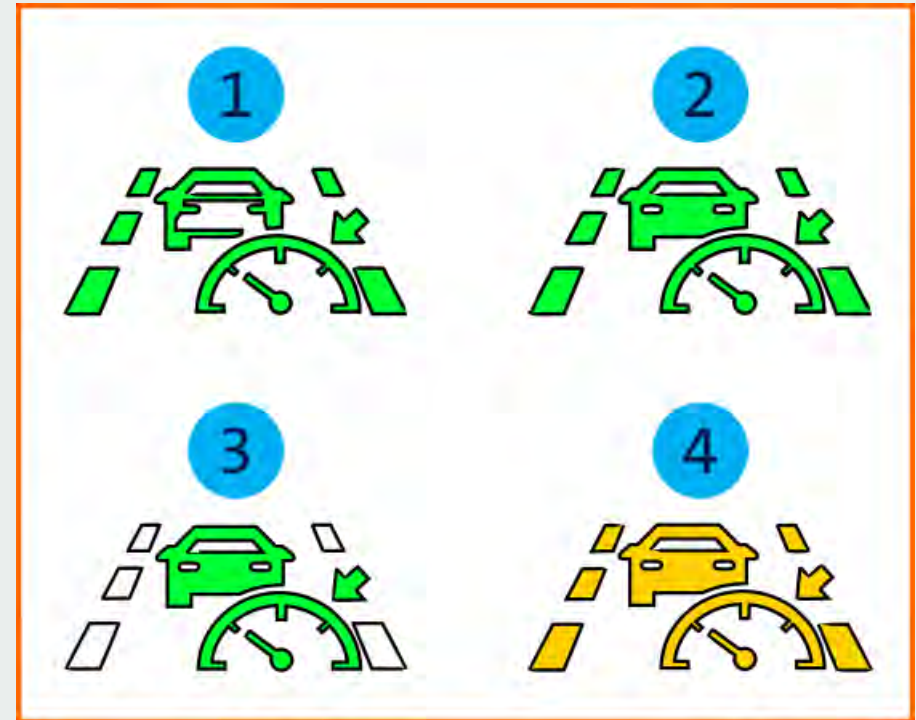
 The new operating logic from Travel Assist with mass location data

Using Travel Assist

Warning lamps

The warning lamps for Travel Assist are displayed in the dash panel insert. Depending on the system status, they can light up in various ways and drivers can inform themselves about the system status. Here is an overview of the lamps:

- 1. Travel Assist active, adaptive cruise control passive and adaptive lane guidance active
- 2. Travel Assist active, adaptive cruise control active and adaptive lane guidance active
- 3. Travel Assist active, adaptive cruise control active and adaptive lane guidance passive
- 4. Travel Assist cannot be activated. Alert indicating a system error



Using Travel Assist

The new operating logic from Travel Assist with mass location data

Now you use the Travel Assist button on the multifunction steering wheel to switch between the adaptive cruise control – ACC and Travel Assist.

You simply need to press the button to do this. You still activate respective functions via the RES or SET button on the multifunction steering wheel.

If you do not want to use the assisted lane change function, you can change the configuration at any time. You can deselect the assisted lane change via the Infotainment system in the driver assist menu under the point “Lane Change”. The function then remains continuously deactivated.



Requirements

Several requirements and conditions need to be met for the assisted lane change to be enabled by the system. They are as follows:

- Generally only possible on an at least two-lane carriageway in one direction of travel (only on motorways)
- After entering the motorway, the driver needs to act (set/res) to switch to the Travel Assist lane change mode
- The minimum speed for activation is 90 km/h
- Lane markings need to be present and recognisable by the camera for driver assist systems
- Upon first activation of the Travel Assist function via terminal 15, the rear radar on your own vehicle needs to recognise an object at a distance greater than 55 m
- After terminal 15 switching, your own vehicle needs to be overtaken again for assisted lane changing to be offered
- The rear radar check for traffic behind the vehicle is a legal requirement according to UNECE R.79
- The capacitive steering wheel needs to be touched



Stand-by lane change



Lane change possibility

Assisted lane change

Overtaking manoeuvre

Assisted lane changing is based on the requirements of UNECE R.79 whereby the procedure is divided into six steps. After activating the convenience turn signal, the deceleration phase is automatically activated. This is required according to UNECE R.79 to confirm the approval of the assisted lane change.

The actual lane change is then started. The driver side front wheel needs to cross the centre line within the defined time interval (3–5 seconds).

During the lane change manoeuvre, the passenger side rear wheel needs to have left the previous lane by crossing the centre line in less than 5 seconds. The front camera for driver assist systems recognises the new lane and activates the lane keeping function within Travel Assist.

Following this, the convenience turn signal is deactivated by the system and the assisted lane change is completed. Move the mouse over the word blocks to view the individual steps.

Activation of
convenience turn
signal

Deceleration
phase

Start
lane change

Lane change
manoeuvre

Restart
lane keeping function

Activation of
convenience turn signal




Assisted lane change

Overtaking manoeuvre

Activation of
convenience turn
signal

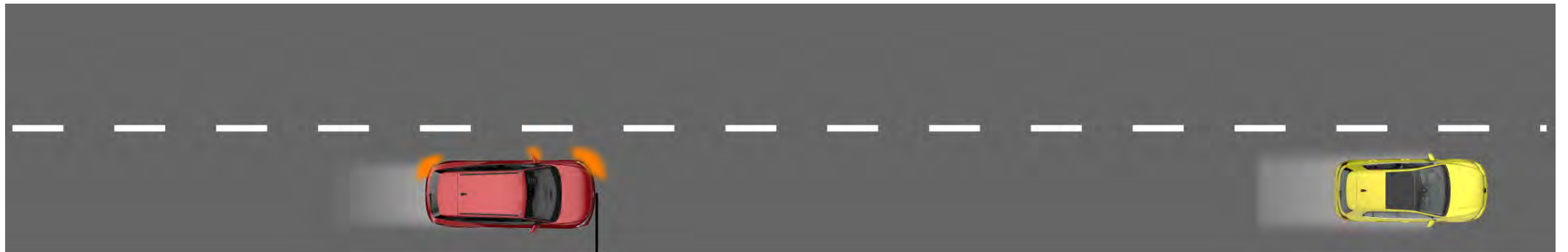



 = 0 sec

Assisted lane change

Overtaking manoeuvre

Deceleration
phase




 = 1 sec

Assisted lane change

Overtaking manoeuvre

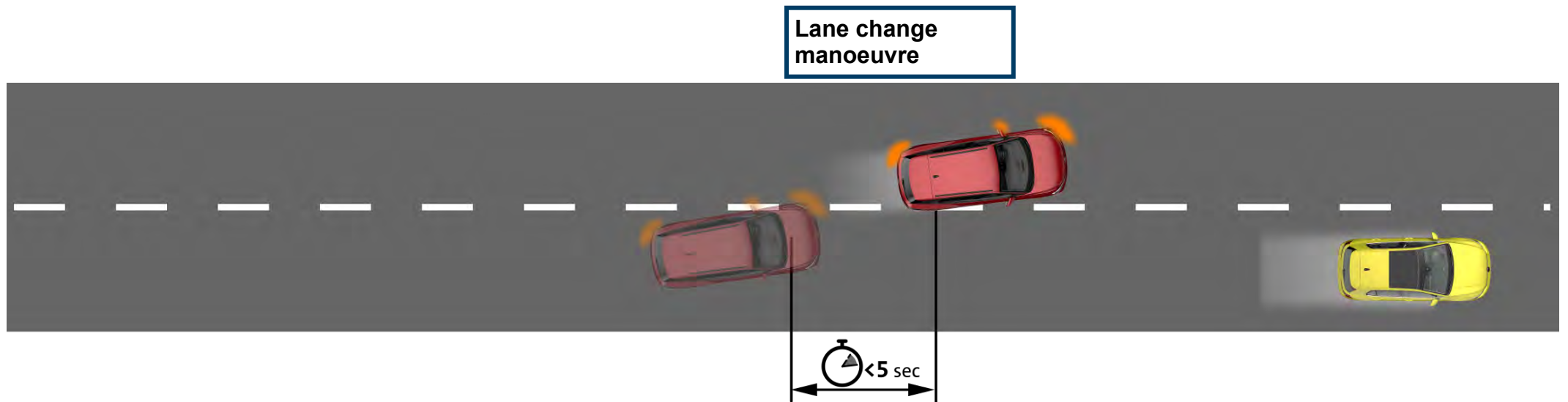
Start
lane change



 = 3-5 sec

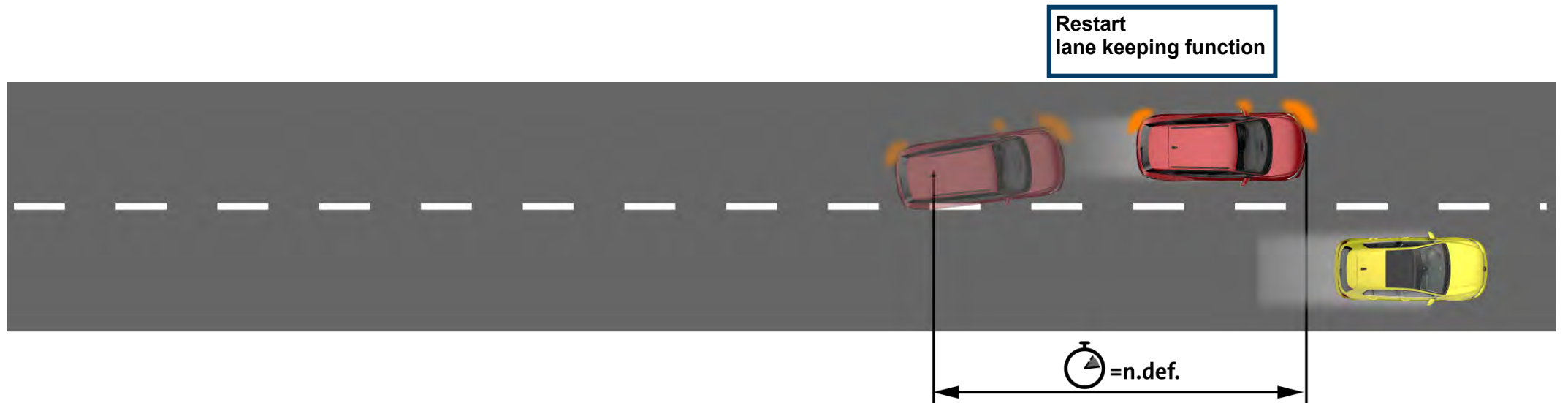
Assisted lane change

Overtaking manoeuvre



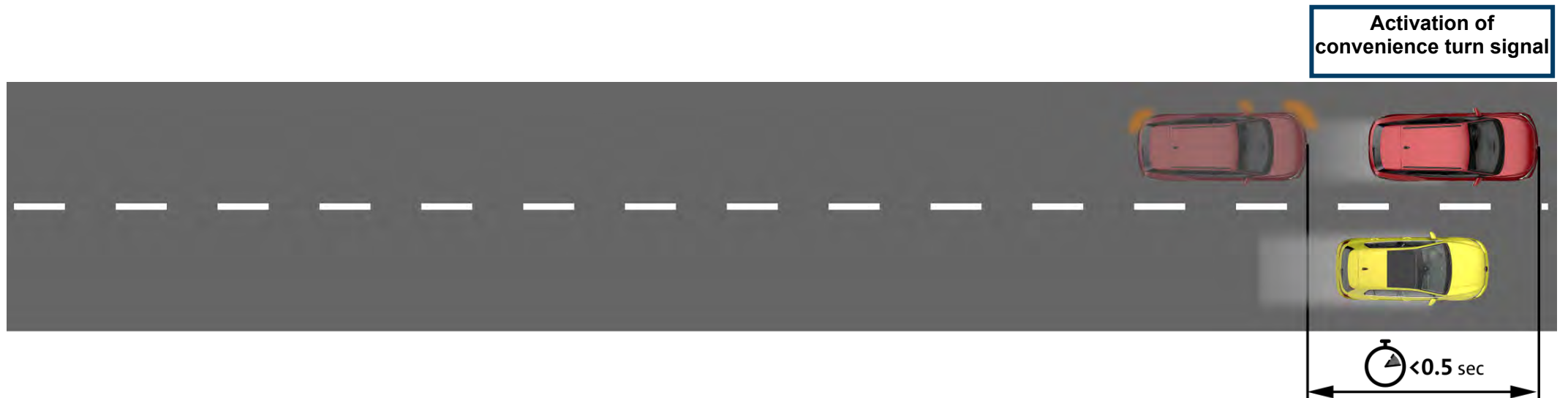
Assisted lane change

Overtaking manoeuvre



Assisted lane change

Overtaking manoeuvre



Assisted lane change

The merging manoeuvre differs from the previously presented overtaking manoeuvre in a few points. Before the system issues an approval for the merging manoeuvre, both the front and also the rear radars measure the distance between the vehicles between which the vehicle is merging. To approve the merging manoeuvre, the time interval between your vehicle and the other vehicles may be a minimum of 1 sec and a minimum of 3 sec between the two other vehicles.

Merging manoeuvre

As long as no vehicles are driving in the adjacent lane, the merging manoeuvre is the same as the overtaking manoeuvre. After the convenience turn signal is deactivated in the last phase, the adaptive cruise control also takes over in addition to the lane keeping function. It adapts the vehicle's speed to that of the vehicle in front (longitudinal and lateral guidance).

Activation of
convenience turn signal

Deceleration
phase

Start
lane change

Start
lane change

Restart
lane keeping function

Deactivation of
convenience turn signal

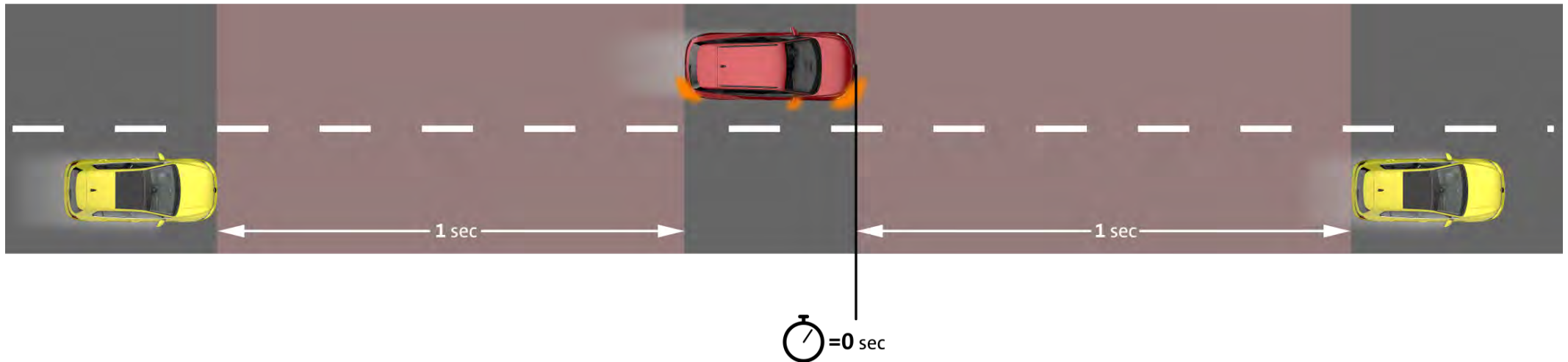


Assisted lane change



Merging manoeuvre

Activation of convenience turn signal




Assisted lane change



Merging manoeuvre

Deceleration phase



 = 1 sec


Assisted lane change



Merging manoeuvre

Start
lane change



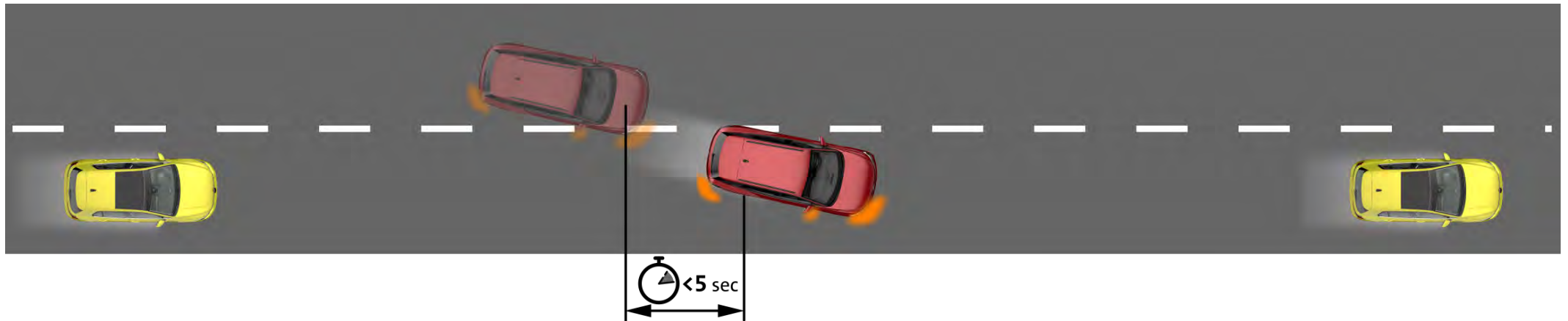
 = 3-5 sec

Assisted lane change



Merging manoeuvre

Start
lane change

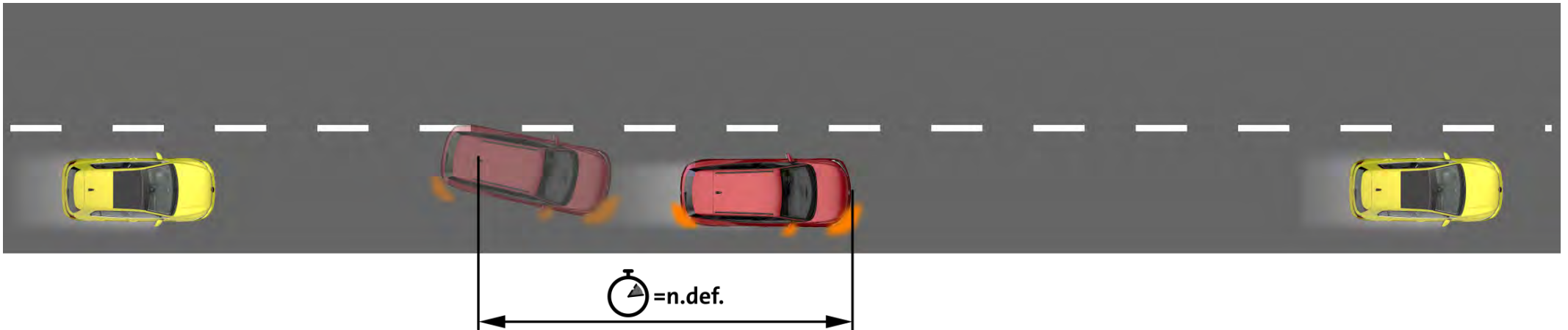


Assisted lane change



Merging manoeuvre

Restart
lane keeping function

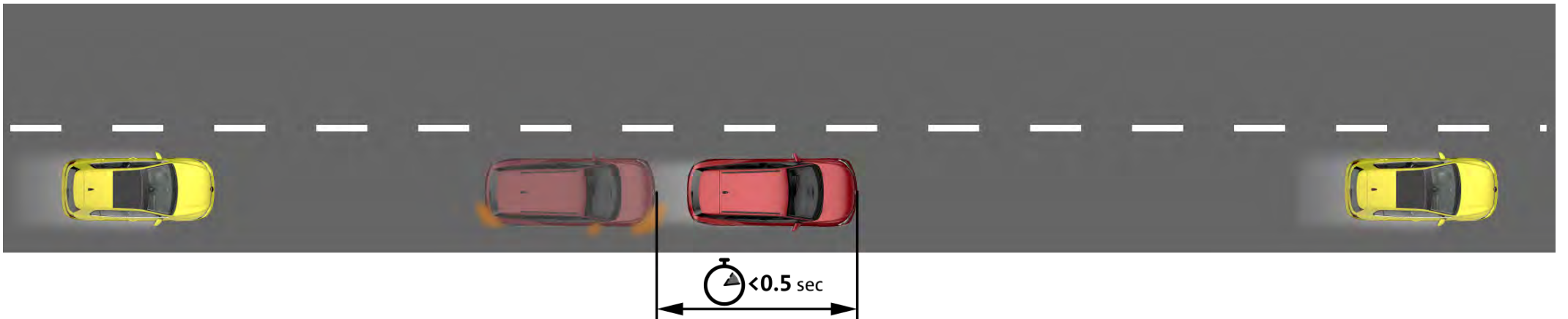


Assisted lane change



Merging manoeuvre

Deactivation of convenience turn signal



Cancellation criteria

The assisted lane change function can be cancelled through various cancel conditions/situations during the lane change procedure. Here is a list of the criteria:

- The additional lateral acceleration exceeding the value 1 m/s^2
- Falling below or exceeding the time interval
- Critical situations if, for example, a vehicle approaches too quickly from behind
- Steering against or steering with the system The steering moment may not be greater than 3 Nm
- Taking your hands off the steering wheel (active hands-off detection)
- Hands-off detected when starting the assisted lane change
- Operating the turn signal or using the convenience turn signal again in the same or opposite direction
- Operating the hazard warning lights system
- Operating the brakes
- Pressing the Travel Assist button on the steering wheel (switch to ACC)
- Speed falling below 87 km/h
- Loss of lane markings (visually via the camera)
- Unfastening the seat belt

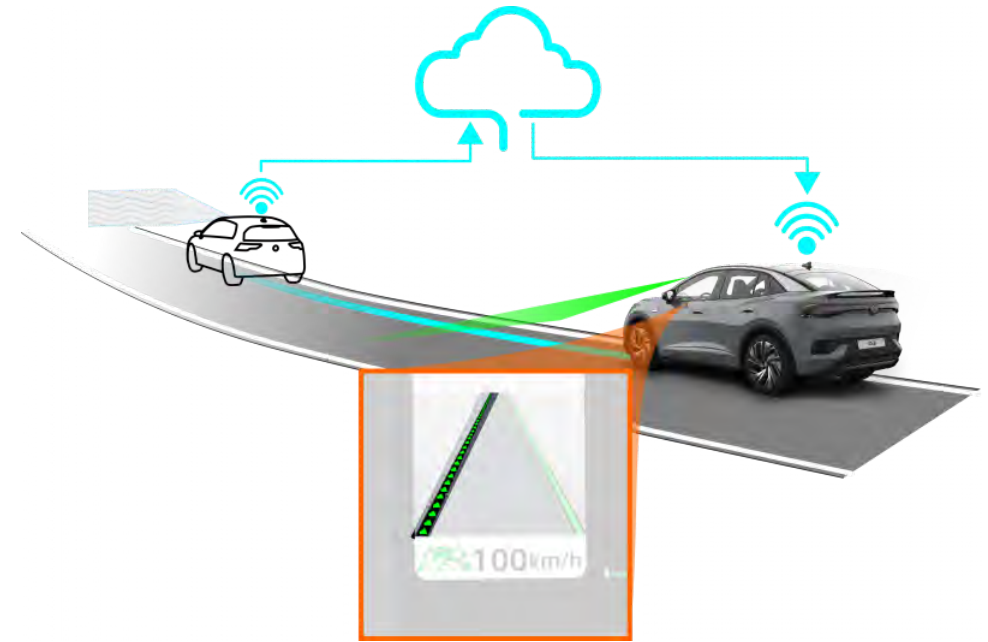


Lateral guidance with REM™ data

The lateral guidance has been improved as a further function. Using the mass location data enables the vehicle to keep in lane even on roads where there is no centre marking. Travel Assist 2.0 switches to passive mode in such road conditions.

Data from vehicles driving in front is used to keep your vehicle in the lane. The vehicles (currently Passat 2020 and Golf 2021) transmit route data to a back end. There the data is then converted into digital road maps (so-called mass location data). This data is downloaded by the MEB vehicle. The mass location data is only used when just one lane is recognised by the camera for driver assist systems. As soon as the camera recognises both lanes, there is no check against the REM™ data. You will find further information on the REM™ data in the glossary for this Self-study Programme:

In the hot spots below, you can see how the lateral guidance by the Travel Assist has been improved with mass location data. They also show comparisons of the displays in the dash panel insert used in Travel Assist 2.0 and Travel Assist with mass location data.



 Country road with markings

 Narrow road without centre marking

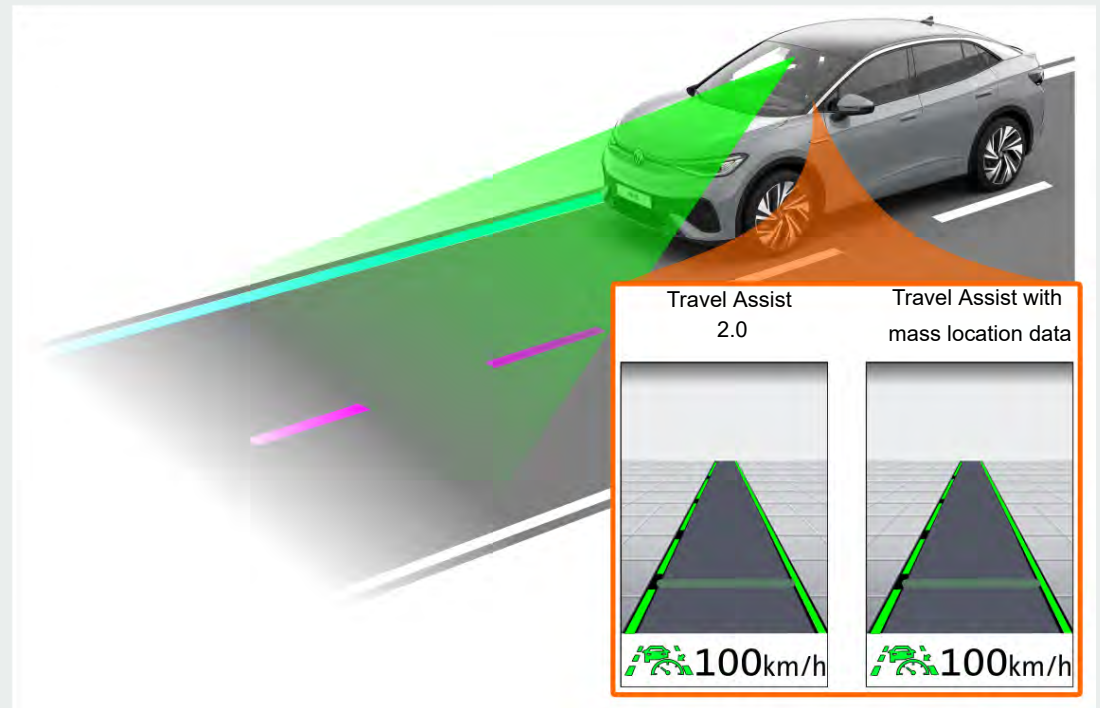
 Wide road without centre marking

Lateral guidance with REM™ data

Country road with markings

The vehicle is driving along a country road that has centre markings and additionally a second solid line at the side. It is a normal country road with sufficient space for two lanes. Both the Travel Assist and also the Travel Assist with mass location data offer active lane guidance in this case.

In both evolution stages, the camera detects the line at the side and the broken centre line, and thus enables adaptive lane guidance.

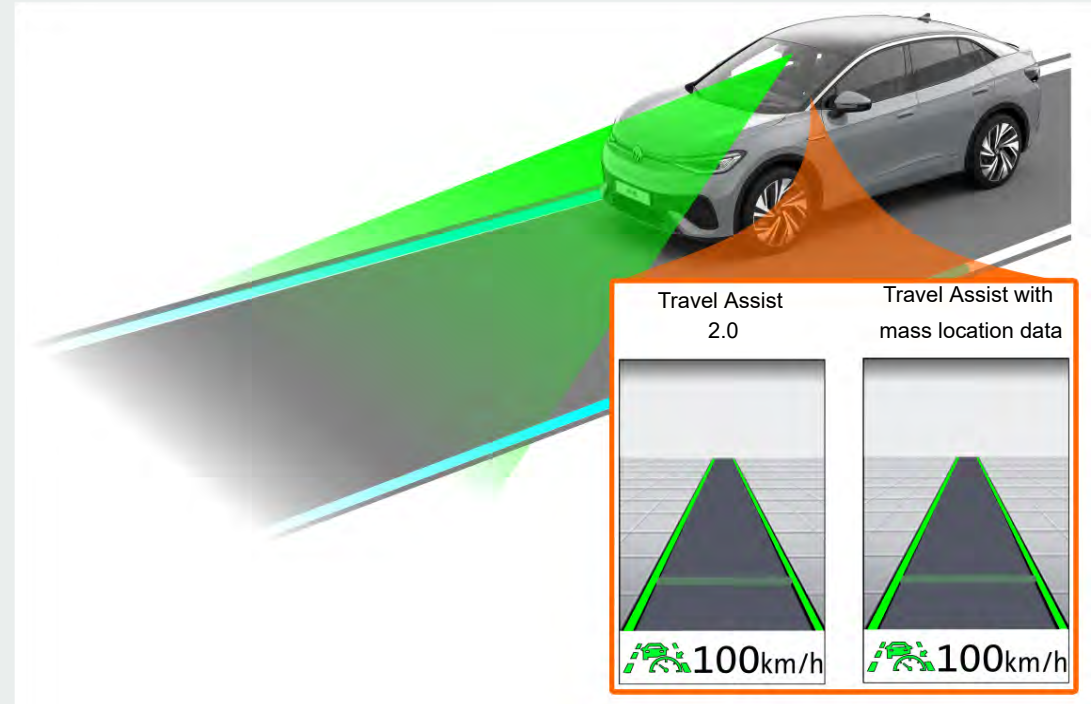


Lateral guidance with REM™ data

Narrow road without centre marking

The vehicle is driving along a narrow country road that does not have centre markings. Two solid lines at the side mark out the road boundaries. Both Travel Assist 2.0 and also Travel Assist with mass location data offer active lane guidance in this case.

Since these side lines are close to each other, the camera detects both lines. Improved lateral guidance with mass location data is not offered. There is therefore no difference between the evolution stages.



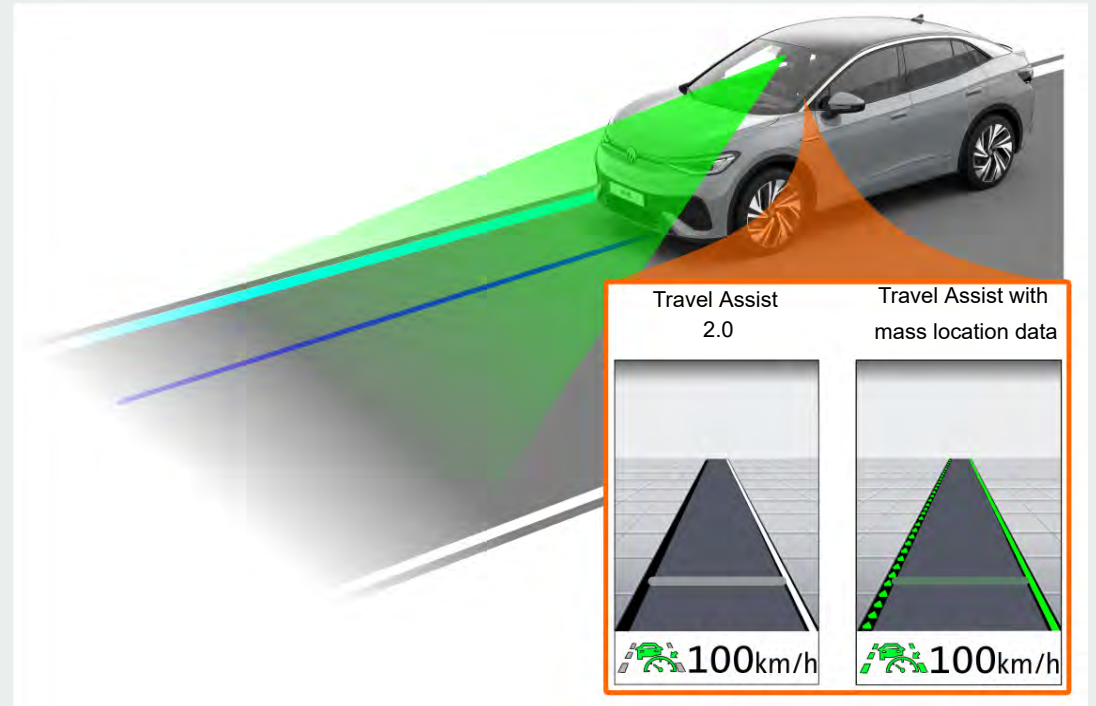
Lateral guidance with REM™ data

Wide road without centre marking

The vehicle is driving along a wide country road that does not have centre markings. Two solid lines at the side mark out the road boundaries.

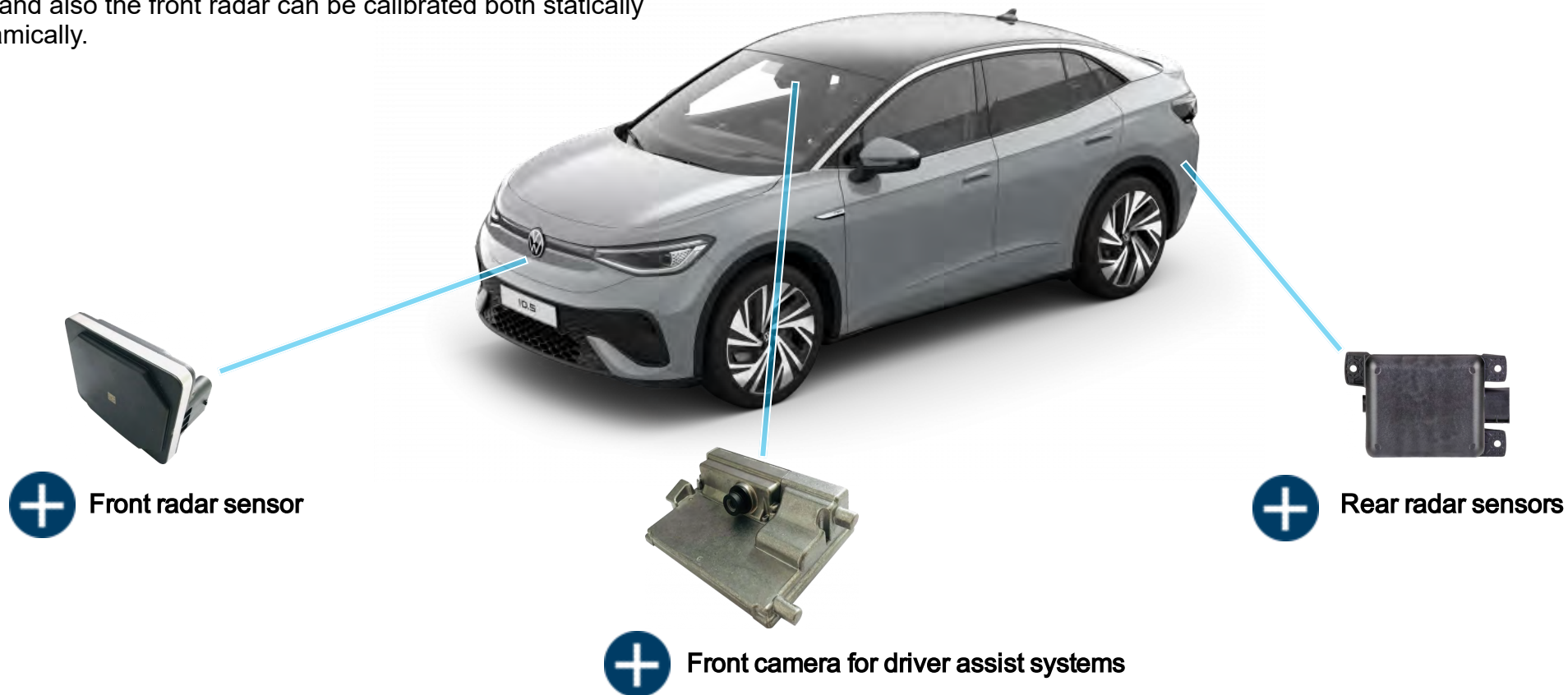
The carriageway is wide enough so there is space for the oncoming traffic and traffic in your direction of travel. However, the camera detects only the right-hand road demarcation due to the width. Travel Assist 2.0 can therefore not intervene, ACC takes over as a function and Travel Assist switches to passive mode.

Due to the use of mass location data, the latest evolution stage can now continue to offer lateral guidance of the vehicle. In the dash panel insert, this is indicated by arrows that replicate the centre line. Collected mass location data enables the vehicle to be guided close to the right-hand side. This is also the case if only one centre line and no side lanes are detected.



Calibration

For Travel Assist to function correctly, various sensors need to be calibrated if necessary after service work. This page provides you with an overview of the components that need to be calibrated for the Travel Assist functions. The front camera for driver assist systems and also the front radar can be calibrated both statically and dynamically.



Front radar sensor

Static calibration is always recommended in poor weather conditions (for example, dense fog, snow or sleet). The poor road conditions could falsify the calibration result or the calibration would be invalid. The front radar needs to be calibrated if:

- The front radar has been renewed
- The front bumper has been removed
- There are faults on the display
- Adjustments are made to the rear axle

The setting device basic set VAS 6430/1 and the calibration board VAS 6430/4, the adjuster VAS 6190/2 and the ACC reflector mirror VAS 6430/10 are used as special tools.

In addition, an axle alignment computer is required.



Front camera for driver assist systems

The front camera for driver assist systems needs to be calibrated if the following situations occur:

- A fault in the control unit
- Replacement of camera, control unit for lane departure warning or windscreen
- Track adjustments on the rear axle
- Body height changes due to work on running gear

The setting device basic set VAS 6430/1, the calibration board VAS 6430/4 and the adjuster VAS 6190/2 are used as special tools. It can be calibrated both statically and also dynamically.

In addition, an axle alignment computer is required.



Rear radar sensors

The rear radars from the latest generation no longer have to be calibrated using a Doppler generator as was originally the case.

Calibration in repair cases is not necessary.



UNECE Regulation No. 79

UNECE stands for United Nations Economic Commission for Europe. It is one of five regional commissions within the United Nations Economic and Social Council (ECOSOC). The other commissions are assigned to the different regions of the world (for example, Africa or Asia and Pacific).

The regulation no. 79 defines standard conditions for the approval of vehicles related to the steering system. Furthermore, references are also made to the driver assist systems in these regulations. For example, it is stipulated that the driver can override the assist functions at any time with conscious intervention. Further regulations on control systems, system information data, building regulations, approvals and much more need to be observed in the design of such driver assist systems.

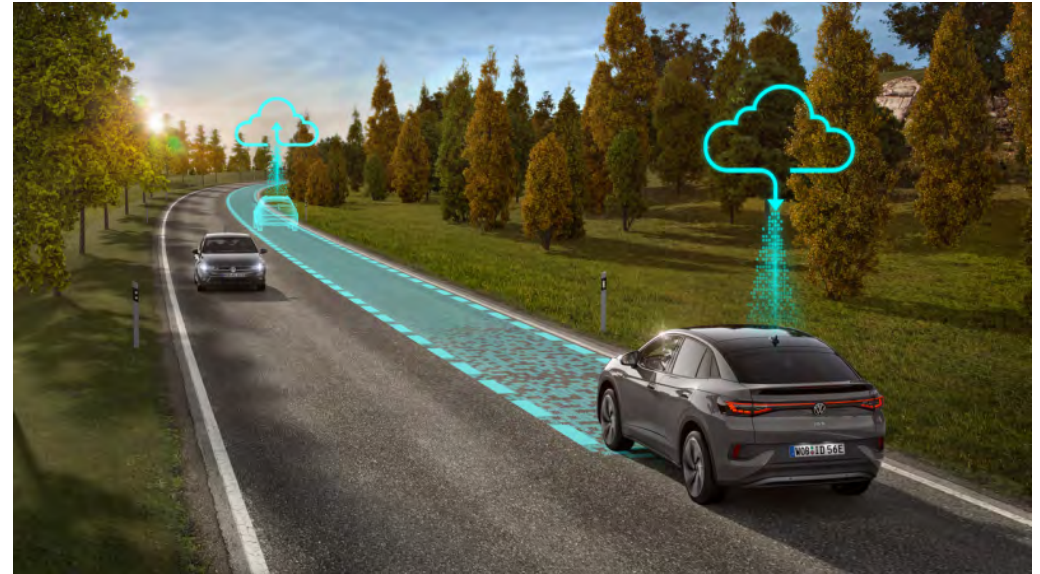
You will find further information in the regulations of UNECE number 79.



REM™ data

The abbreviation REM™ stands for Road Experience Management and is camera-based map and localisation technology. The producer Mobileye collects geolocation data from vehicles like the Golf 2021 and the Passat 2020 to localise lane data. This collected data is then evaluated by Mobileye and entered in a route network. This so-called REM™ data is then downloaded and used as route data by the vehicles that are using Travel Assist with mass location data.

The drivers of the vehicles supplying the data need to have enabled transfer of the route data to the Volkswagen back end in the data protection settings. This data is anonymised upon arrival in the back end and cannot be traced to a specific vehicle.



The following information is gathered from the vehicle



How route data is created

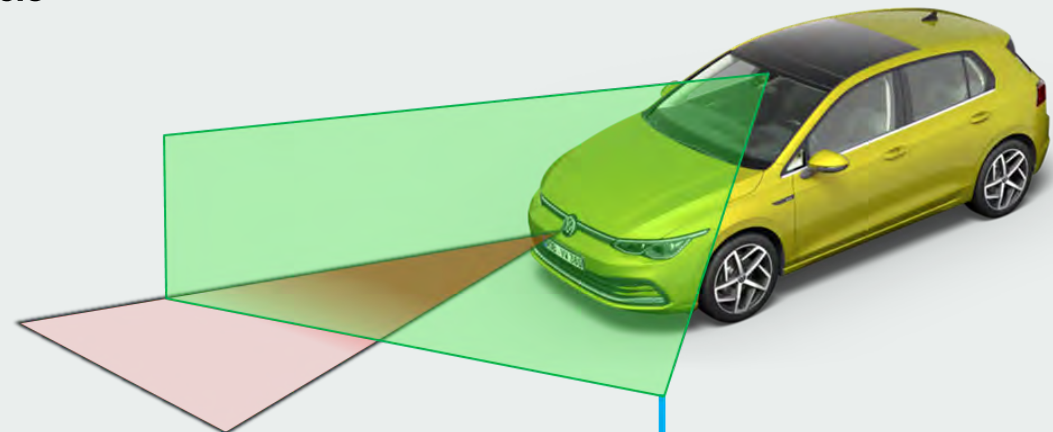
The following information is gathered from the vehicle



Time of measurement

Vehicle position

Acceleration and speed



Radar sensor information

Camera sensor information

How route data is created

Vehicles that are equipped with corresponding REM™ technology automatically collect real driving and environment data every 10 seconds. This data is anonymised, prepared and simplified in the control unit before being transmitted to the Volkswagen back end. All collected data information from the transmitting vehicles for a road section is consolidated in a digital road map (road book).

The algorithm uses the objects to learn all distinctive outlines of the traffic infrastructures (road signs, ground markings etc.). Thanks to classification of the learned objects, the algorithm can recognise real surrounding objects later on, orient itself on the digital road map and calculate a lane from it.

Move the mouse over the text blocks to view the individual steps.

Real picture of surroundings



Collection and transfer of data

Collection and consolidation of data

Modelling of the data

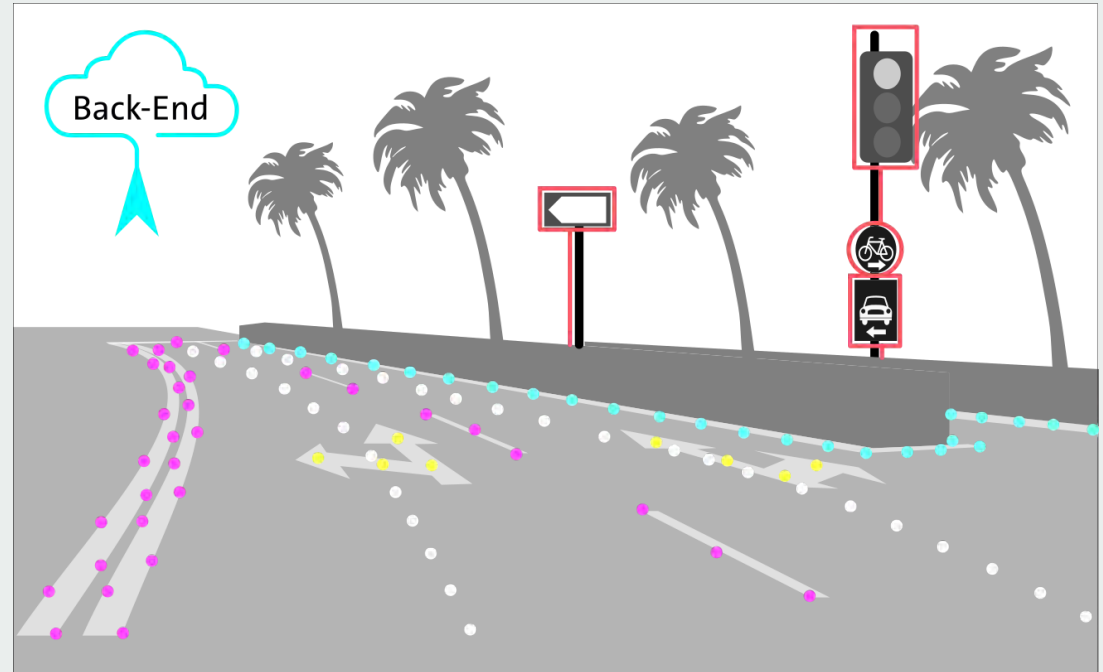
Identification of data

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Collection and transfer of data

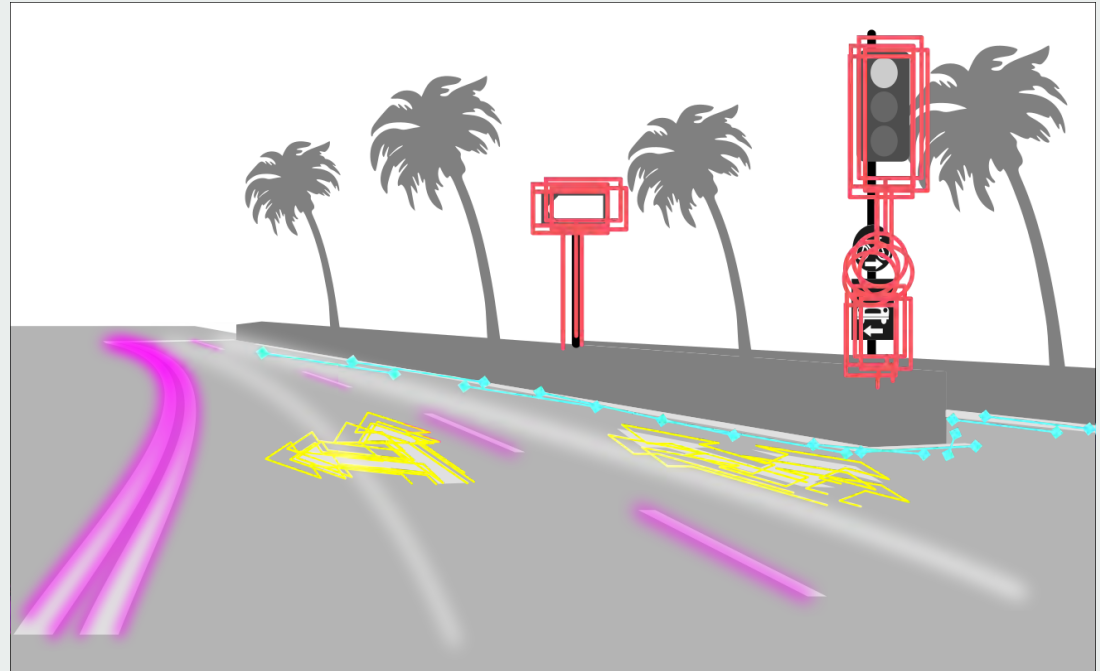


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Collection and consolidation of data

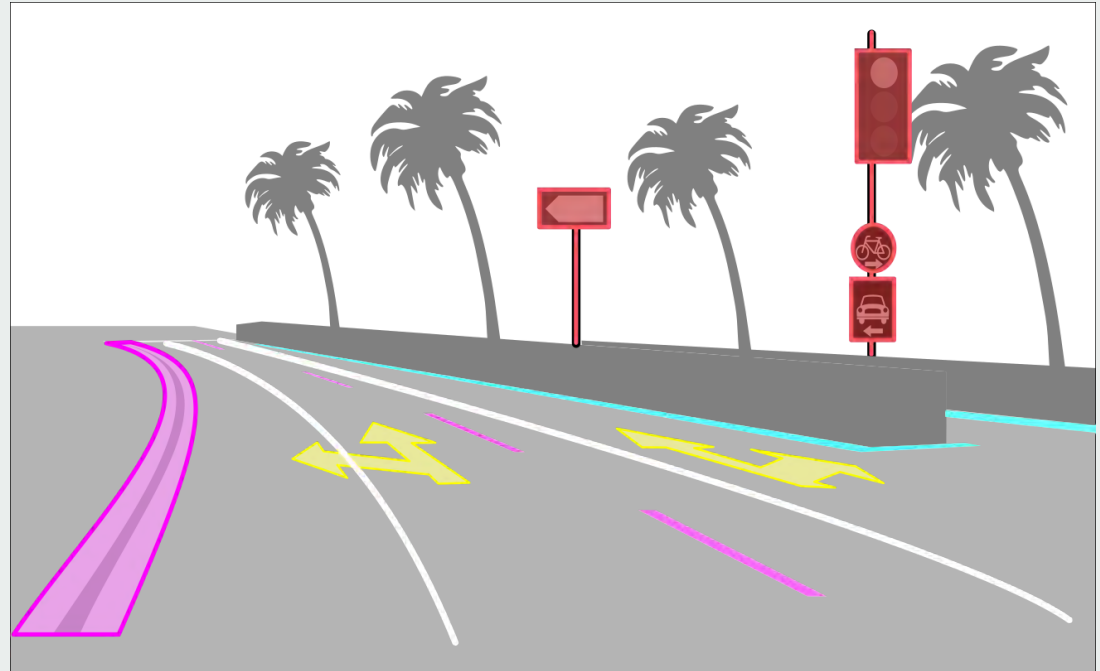


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Modelling of the data

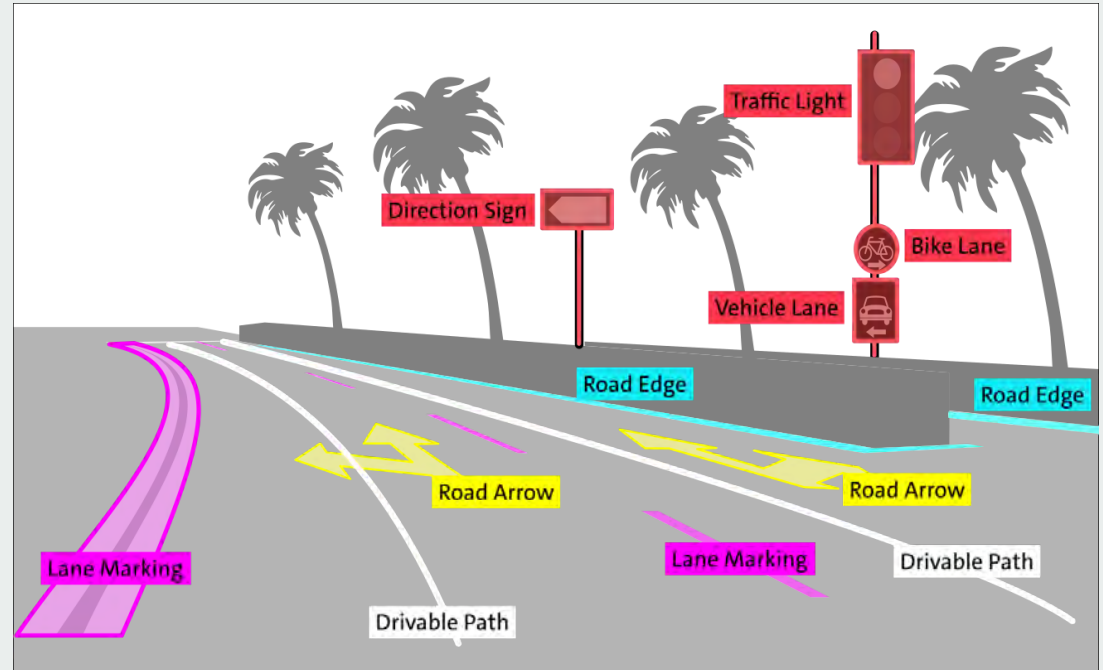


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Identification of data



A photograph of a modern building facade with a grid pattern. The Volkswagen logo is on the left, and the text 'Volkswagen Academy Sales & Service' is mounted in large, dark, 3D letters. The sun is shining from the top left, creating a lens flare effect.

Thank you for your interest.

Please send any questions or suggestions by email to the following address:

technical.training@volkswagen.de

You can now close the Self-study Programme, or click your way through the topics again using the table of contents.

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