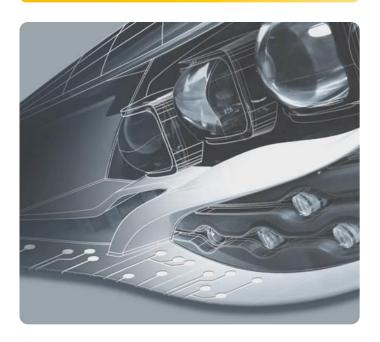


Hella & Driver Assist Technology



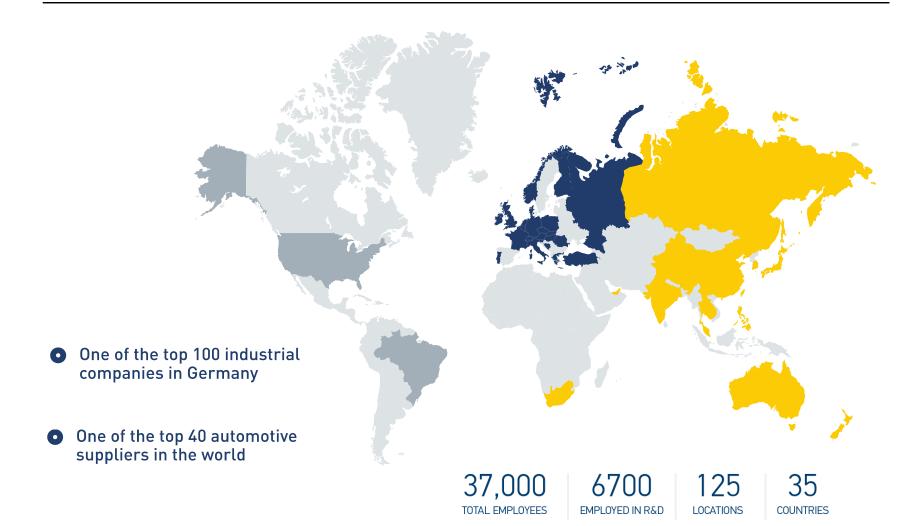
Harry Liaros







HELLA Worldwide





Systems Competence in Lighting and Electronics

Precise and reliable monitoring!











Electronics

Competence in Lighting and Electronics

Lighting



Improved visibility!



ELECTRONICS & ELECTRICS BY HELLA

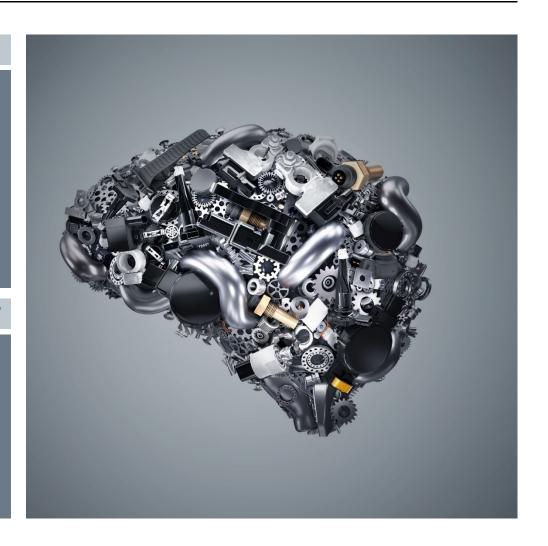
WHY?

OE EXPERTISE...

- 60 years as a reliable electronics/electrics partner
- 20 production and development locations across 10 countries
- Leading electronics provider with comprehensive product portfolio

...TRANSFER IN AFTERMARKET

- Extensive brand portfolio with wide vehicle coverage
- Efficient logistics solutions and parts identification
- State-of-the-art calibration tools and diagnostic units

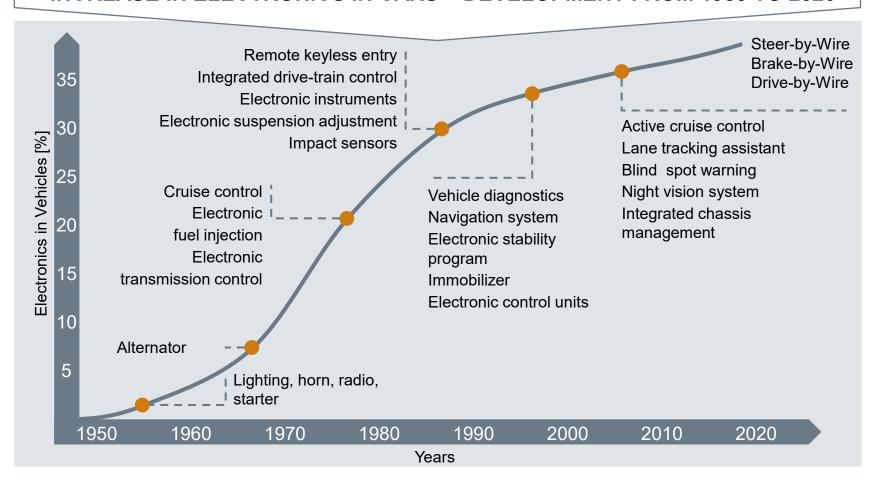




HELLA ELECTRONICS EXPERTISE

Trends and Future Prospects

INCREASE IN ELECTRONICS IN CARS – DEVELOPMENT FROM 1950 TO 2020





HELLA Competence at a glance







Intelligent Battery Sensor

• Global IAM market leader

Accelerator Pedal

Market and technological

Established standard OEM

leader

product

 More than 30 million sensors produced since year 2000



Olahal IAM wasani

Vacuum Pump

- Global IAM market leader
- More than 10 years of experience



Rain Light Sensor

- Market leader since 1999
- More than 10 years of experience



(Oil) Level Sensor

- · Global market leader
- More than 50 million sensors sold



Radar

- A pioneer for 24 GHz radars
- First one with rear applications on the market



Body Control Module

- Customized and highly integrated solutions
- Scalable and flexible integration platform



Trailer Tow Modules

- 100% exclusive OE product
- OEM experience and development competence



Remote Key Set

- Experience of 20 million keys produced annually
- OEM experience and development competence





Driver Assistance Systems for enhanced vehicle safetyDriver assistance systems based on RADAR, ultrasound and RLS

Adaptive Cruise Control RADAR



Adjusts the speed to maintain a safe distance from vehicles ahead.

Traffic Jam Assistant



RADAR

Adjusts acceleration and slowing down according to the vehicle ahead

Parking Assistant

Ultra-



Measures size of the space and moves vehicle in the parking space.

Automatic Headlight Activation RLS



Measures light intensity and activates headlights of vehicle.

Automatic Wiper Control RLS



Activates wiper and controls wiper intervals according to rain intensity.



Driver assistance systems based on camera technology

Driver Drowsiness Detection



Sends alert signal after driving more than 1.5 sec. with closed eyelids.

Traffic Sign Recognition



Recognizes traffic signs. and alerts driver. Reduces speed in ACC combination.

Lane Departure Assistant



Moves vehicle to the center of the lane as soon as car gets to the lane markings.

Lane Departure Warning



Alerts driver as soon as car gets to close to the lane markings.

Top View & Rear View Camera



Adaptive glare-free High-Beam



Selectively masks the area that the other car is in from the light distribution.



Active vs. Passive ADAS systems

Active ADAS Systems

Systems that play a preventive role

Providing advance warning

 Giving the driver additional assistance in steering/controlling the vehicle.



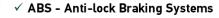
- √ Automatic Emergency Braking
- ✓ Emergency Steering
- √ Adaptive Cruise Control
- √ Lane Keeping Assist and Lane Centering
- √ Traffic Jam Assist
- ✓ Self Parking



STEERING ANGLE SENSOR

REAR RADAR

RAIN-LIGHT-SENSOR



√ ESC - Electronic Stability Control

√ TCS - Traction Control System

✓ Back-up Camera

✓ LDW - Lane Departure Warning

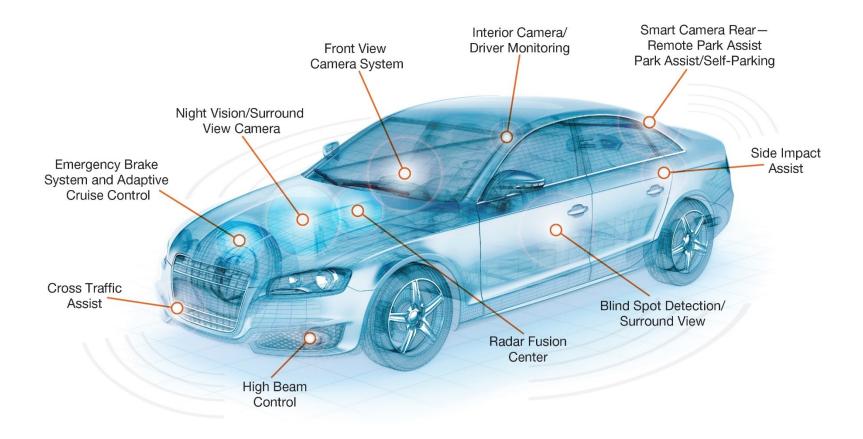
√ FCW - Forward Collision Warning

√ Blind Spot Detection

✓ Parking Assistance

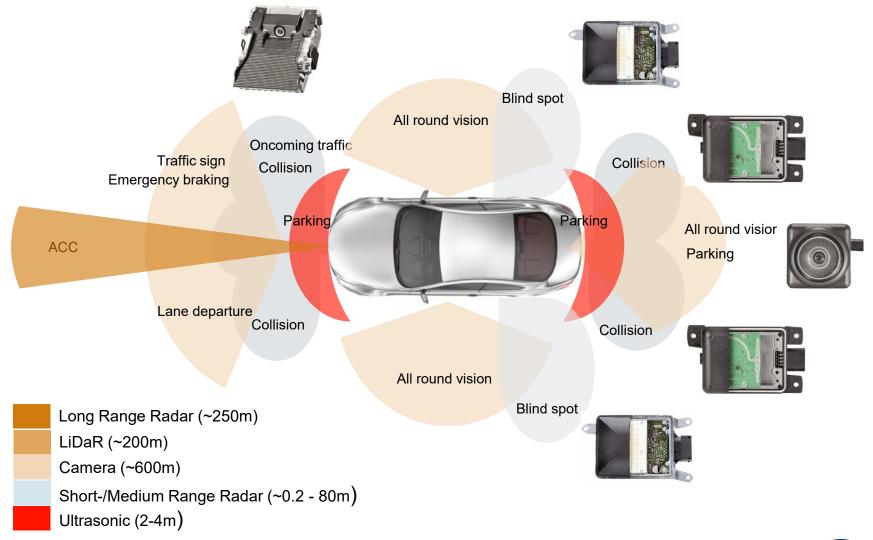


ADAS – New Technologies





Driver Assistance Systems for enhanced vehicle safetyDriver Assistance Systems





ADAS – New Technologies

- Adaptive Cruise Control ACC
- Traffic jam assistant
- Lane keep assist or lane departure warning
- Electro-mechanical steering
- Parking assist or park help
- Reverse assist or all round vision camera system
- Night vision assist
- Adaptive lighting systems
- Traffic sign recognition
- Lidar
- PALM Position Acquisition Local Mapping
- AEB Autonomous Emergency Braking
- Blind spot monitoring
- Driver drowsiness detection



ADAS – What are the drivers?



From 2016 any new vehicle will require a minimum of two ADAS systems fitted to qualify for a 5 Star NCAP Safety Rating, these must be Autonomous Emergency Braking (AEB) and Lane Departure Warning.



SAFETY

Driver Assistance Systems for enhanced vehicle safety

ADAS – What are the drivers?

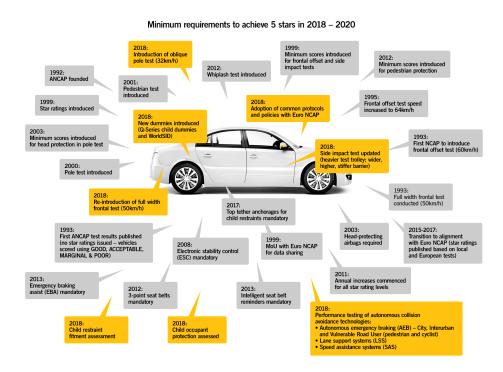
From 1st January 2018 "Safety Assist" features

- Lane Support System
- > AEB

Will be included in the scoring regime, to determine a vehicles safety rating.

From the year 2020 Junction (intersection) Assist will be included.

Testing of these systems is also planned to be included.





Driver Assistance Systems for enhanced vehicle safetyWhere is it all leading?

SAE levels of Autonomous Driving

0 NO DRIVER ASSISTANCE



The driver is fully responsible & permanently carries all aspects of the driving tasks.

No system needed.

<u>1</u>

ASSISTED MODE



The driver stays fully responsible.

The system supports the driver during steering or accelerating / breaking.

2

PARTIALLY AUTOMATED



The driver stays fully responsible.

The system supports the driver during steering and accelerating / breaking. 3

HIGHLY AUTOMATED



The driver can turn attention away from the road, but must be always ready to take full control again.

The system can autonomously control the vehicle on defined & released routes. 4

FULLY AUTOMATED



The driver can dedicate himself to other activities. He has to take over the responsibility when leaving the defined route.

The system performs all driving tasks on defined routes.

____5

AUTONOMOUS DRIVING



No driver needed – only passenger, no driver license necessary.

The system is able to perform all driving tasks under all conditions.



Number of ECUs in vehicles

Even a low end car today can have 30 – 50 ECUs.

Todays luxury vehicles can have over 150. 1993 2007 2017



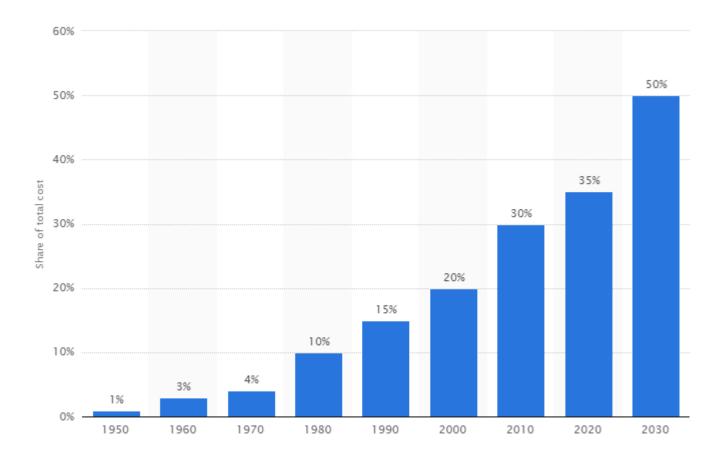
Functions of the ECUs – Becoming more complex due to ever increasing computing power.

It is not uncommon for a car today, to have over 100 million lines of software code. This compares to some 14 million in the Boeing 787.





Cost share of ECUs with respect to the overall cost of the car

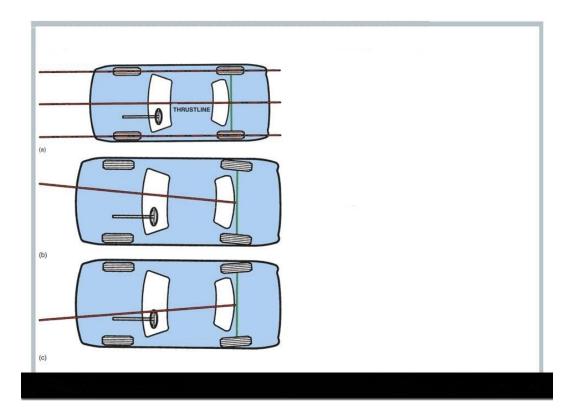




Driver Assistance Systems for enhanced vehicle safetyThrust Line - Definition

A vehicles Thrust Line is defined as:

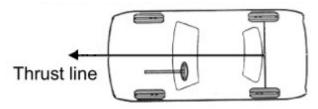
An imaginary line drawn perpendicular to the rear axle's centerline.





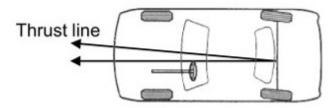
Driver Assistance Systems for enhanced vehicle safety Importance of thrust line

Vehicle with perfect alignment

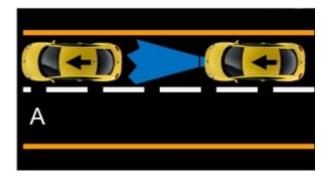


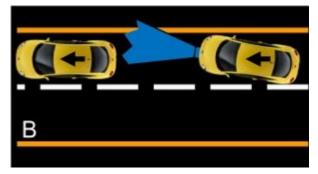
The centreline and thrust line are equal if the rear toe is set perfectly. The camera/radar are pointing in the same direction the vehicle is travelling. (Image A)

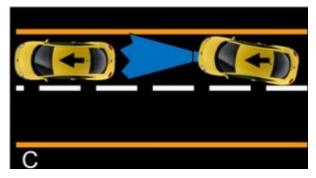
Vehicle with rear toe setting not perfect



If the vehicle centre line is different from the thrust line, the vehicle will not travel down the road in the same direction as the centreline, but the camera/radar will be aimed at the vehicle centreline (image B)

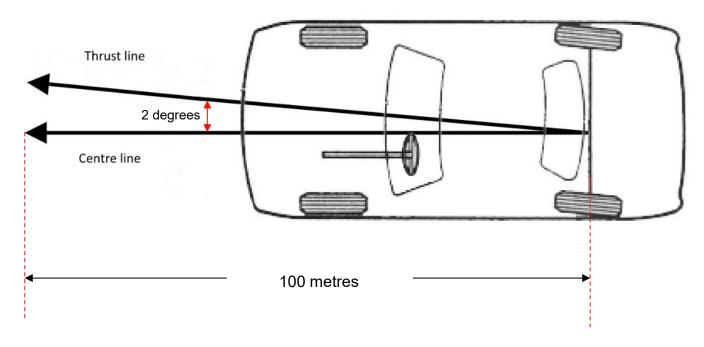








Driver Assistance Systems for enhanced vehicle safety Importance of thrust line



If we consider a misalignment angle of:

- 2 degrees
- Distance of 100 metres
- Misalignment distance = 3.5 metres









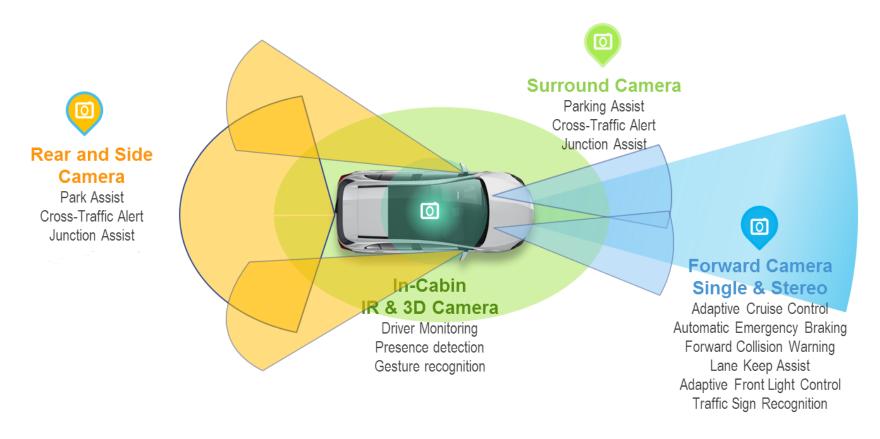


Driver Assistance Systems for enhanced vehicle safetyHella Driver Assistance Systems

Sensor Type	Vision	Infrared / Thermal	Long Range Radar	Short / Mid Range Radar	Lidar
Application		Illelillai	7681MHz	2426 / 7681 GHz	
Adaptive Front Lighting (AFL), Traffic Sign Recognition (TSR)	x				
Night vision (NV)	Х	Х			
Adaptive Cruise Control (ACC)	Х		х	х	Х
Lane Departure Warning (LDW)	х				
Low-Speed ACC, Emergency Brake Assist (EBA), Lane Keep Support (LKS)	Х			х	х
Pedestrian detection	х	Х		х	
Blind Spot Detection (BSD), Rear Collision Warning (RCW), Lane Change Assist (LCA)	X			х	Х
Park Assist (PA)	х			Х	Х
Camera monitor systems (CMS)	Х				
LRR Infrared	Video	SRR/MRR	Lidar	SRR	Video



/| \$| (6) N = 1 (6) Y| (6) R R (6) Y/





Cameras - Front



The camera may be:

- •Mono has a single camera lens.
- •Stereo has two camera lenses.
- Combined camera and Lidar (Light Detection & Ranging)

 — incorporates the camera and Lidar in one housing, (typically Toyota).

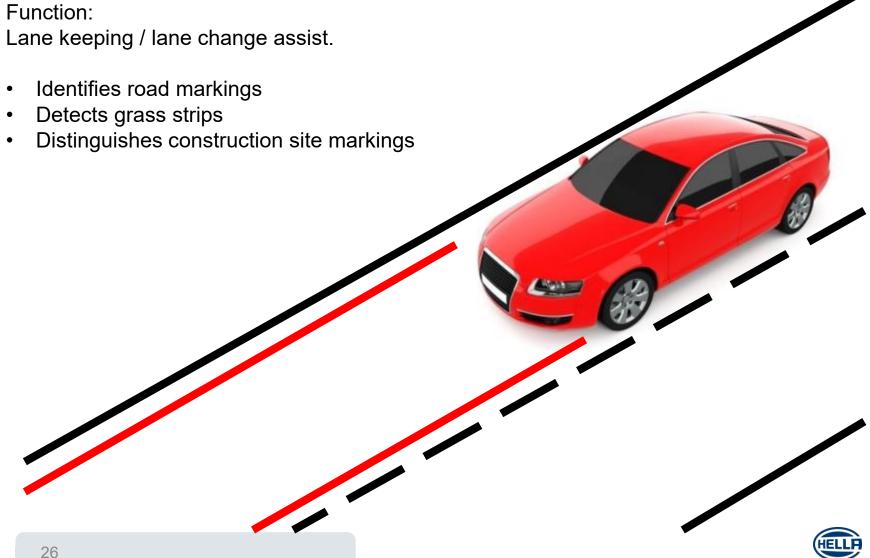






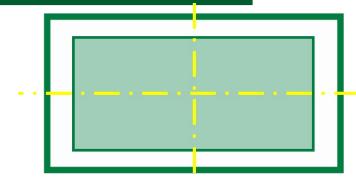


Driver Assistance Systems for enhanced vehicle safety Cameras - Front

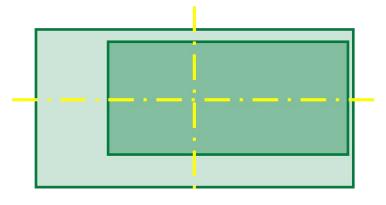


Front Camera System

Correct versus approximate calibration



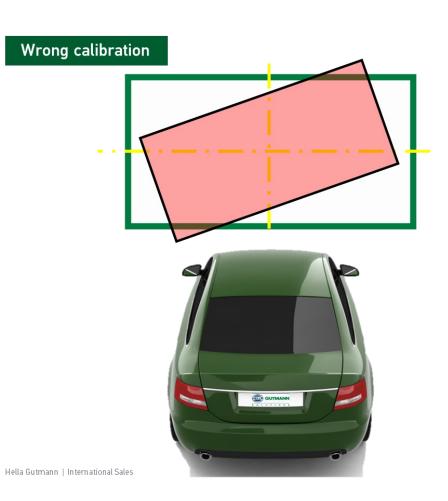


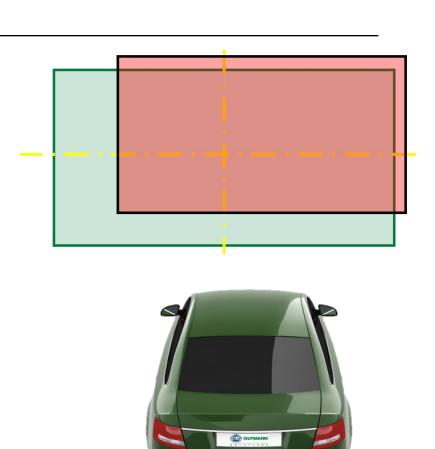






Front Camera System













Front Camera System

Correct camera calibration



The road is perceived distorted



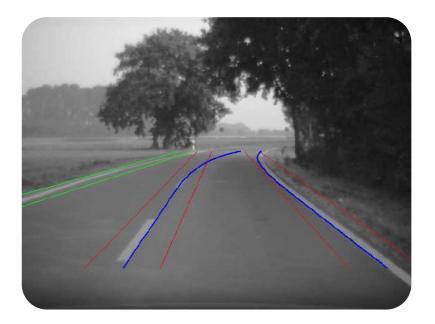


Driver Assistance Systems for enhanced vehicle safetyCameras - Front

From the perspective of the lens:

• The markings show the orientation points of the camera.







Cameras - Front

Function:

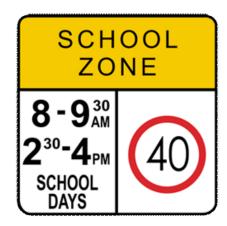
Road sign recognition.

- Speed limitations
- Passing prohibitions











Driver Assistance Systems for enhanced vehicle safetyCameras - Front







Cameras - Front

Function:

Antiglare high beam / high beam assist.

- Camera detects traffic driving ahead.
- Camera detects oncoming traffic.







Driver Assistance Systems for enhanced vehicle safetyCameras - Front

Function:

- Optical support for ACC.
- Optical support for AEB.











Driver Assistance Systems for enhanced vehicle safetyCameras – Front

The camera can support several function. These can include a combination of:

- Autonomous Emergency Braking
- Adaptive Cruise Control
- Lane Guidance
- Lane Departure Warning
- Lane Keep Assist
- Traffic Sign Recognition
- Traffic Light Recognition
- Adaptive Lighting
- High Beam Assist

Cameras may work in conjunction with other ADAS components on more complex systems.



Driver Assistance Systems for enhanced vehicle safetyCameras

- The camera is the only device (currently) that is capable of capturing color, texture and contrast, e.g. reading traffic signs, lane markings etc. The high level of detail captured by cameras allow them to be the leading technology for object classification.
- The camera FoV (field of view) is limited to ~ 50 60 degrees
- Massive data amounts are generated by camera, e.g. 1 gb per sec at 30fps
- Cameras, similar to the human eye, are susceptible to adverse weather conditions and variations in lighting
- The high level of detail captured by cameras allow them to be the leading technology for classification.

These features, combined with the ever-increasing pixel resolution and the low-price point, make camera sensors indispensable and volume leader for ADAS and Autonomous systems.



Driver Assistance Systems for enhanced vehicle safety

Cameras – Rear

Location:

Is situated at the rear of the vehicle, usually in the tailgate or boot lid and usually fitted centrally in the number plate plinth/number plate lamp housing or outer handle area. The camera may be visible, or it may be hidden under a cover when not in use, i.e. some Mercedes and VW models.







Driver Assistance Systems for enhanced vehicle safetyCameras – Rear

Function:

In its basic form the camera is used to give a view of the area to the rear of the vehicle, which is viewed on the vehicles multimedia/infotainment display or rear view mirror.





Driver Assistance Systems for enhanced vehicle safetyCameras – Rear

- The camera can work in conjunction with rear Radar or ultrasonic sensors to provide reversing guidance on the multimedia display.
- The rear facing camera can also be part of a 360 degree system, blind spot, parking assist systems, or systems where the camera is used for recognition of pedestrians and other objects.
- They can also work in conjunction with other ultrasonic sensors and Radars on the vehicle to give more advanced driver assistance.





Driver Assistance Systems for enhanced vehicle safety

Cameras – Door Mirror

LOCATION:

Is situated in or on the casing of the door mirror. Usually one each side, however some systems such as Honda's LaneWatch only have a camera on the passenger door mirror.



BMW 5 Series camera



Honda LaneWatch camera

FUNCTION:

Cameras mounted on the door mirrors will usually be part of a 360 degree surround view/area view/birds eye view system. In some cases they can be part of a blind spot system where a visual recognition is required, (as opposed to the usual radar/ultrasonic recognition). The camera gives the driver a view around the car; they usually work in conjunction with cameras mounted at the front, (grille area) and rear, (number plate plinth area). They can also work in conjunction with the vehicles ultrasonic sensors and radars to give more advanced driver assistance.



Driver Assistance Systems for enhanced vehicle safety

Cameras – Front Grille / Front Bumper

LOCATION:

Is usually located centrally in the front grille/front bumper or in the vehicle makers logo badge.



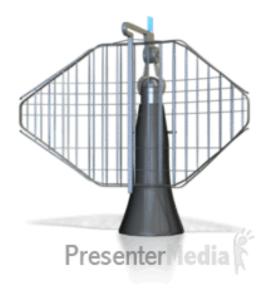


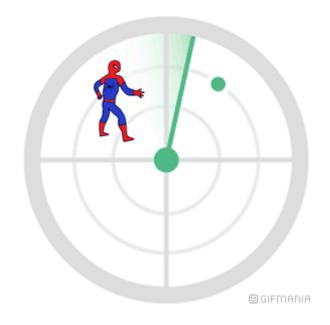
FUNCTION:

Cameras located at the front of the vehicle will usually be part of a 360 degree surround view, area view, birds eye view system. The camera gives the driver a view around the car, they usually work in conjunction with cameras mounted at the sides, (in each door mirror), and in the rear (number plate plinth area). They can also work in conjunction with the vehicles ultrasonic sensors and radars to give more advanced driver assistance



Driver Assistance Systems for enhanced vehicle safety RADAR





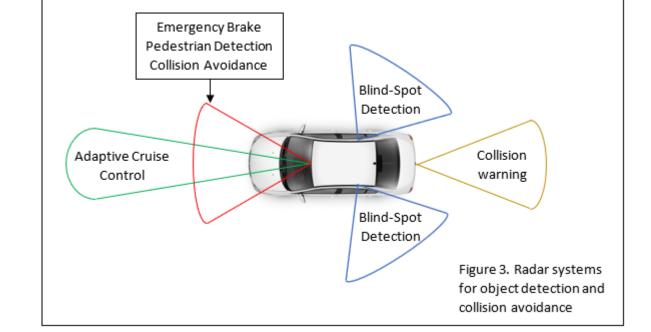


Driver Assistance Systems for enhanced vehicle safetyHella Driver Assistance Systems

Sensor Type	Vision	Infrared / Thermal	Long Range Radar	Short / Mid Range Radar	Lidar
Application		memiai	7681MHz	2426 / 7681 GHz	
Adaptive Front Lighting (AFL), Traffic Sign Recognition (TSR)	x				
Night vision (NV)	Х	Х			
Adaptive Cruise Control (ACC)	Х		х	х	Х
Lane Departure Warning (LDW)	х				
Low-Speed ACC, Emergency Brake Assist (EBA), Lane Keep Support (LKS)	Х			х	х
Pedestrian detection	х	Х		х	
Blind Spot Detection (BSD), Rear Collision Warning (RCW), Lane Change Assist (LCA)	X			х	Х
Park Assist (PA)	х			Х	Х
Camera monitor systems (CMS)	Х				
LRR Infrared	Video	SRR/MRR	Lidar	SRR	Video



Driver Assistance Systems for enhanced vehicle safety RADAR











Driver Assistance Systems for enhanced vehicle safety RADAR

RADAR can support several functions. These can include a combination of:

- Autonomous Emergency Braking
- Adaptive Cruise Control
- Lane Guidance
- Lane Departure Warning
- Lane Keep Assist
- Cross Traffic Alert
- Exit Alert
- Adaptive Lighting
- High Beam Assist
- Emergency Brake Assist
- Collision Mitigation Systems

RADAR may work in conjunction with other ADAS components on more complex systems.



Driver Assistance Systems for enhanced vehicle safetyRADAR – Front

Location:

Is situated at the front end of the vehicle, usually mounted on a bracket which is then mounted to the front panel (or a component of it). Some may be fitted to the front bumper reinforcement panel or foam impact pad, bumper cover, or integrated into the grille or front badge. Volvo and Renault have models with the RADAR mounted on the windscreen. Some vehicles may have two RADARs one each side of the vehicle front. On some vehicles the RADAR is visible, in others it may be hidden by the front bumper cover. The RADAR may be located centrally or to one side.









Driver Assistance Systems for enhanced vehicle safetyRADAR – Front

Function:

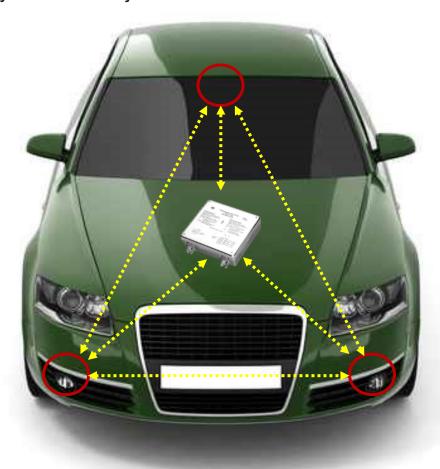
The Radar is used to detect the presence, range, and distance of preceding vehicles, using a repeating measurement cycle to determine speed. The information gathered by the Radar can be utilised within ADAS systems such as Autonomous Emergency Braking (AEB), Adaptive Cruise Control (ACC), and Adaptive Lighting.





Driver Assistance Systems for enhanced vehicle safetyRADAR – Front

The front RADAR also be used to detect objects, working in conjunction (fusion) with the camera system to identify what the object is.





Driver Assistance Systems for enhanced vehicle safetyRADAR – Rear







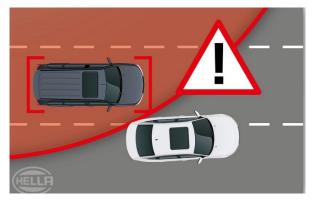
Location:

The Radar will usually be located, one on each rear corner, usually behind the bumper cover/s. They can be mounted on the inside of the bumper cover or on the corner of the vehicle rear panel/quarter panel extension or front panel. They will not usually be visible with the bumper cover in place.



Driver Assistance Systems for enhanced vehicle safety

RADAR - Rear - Function

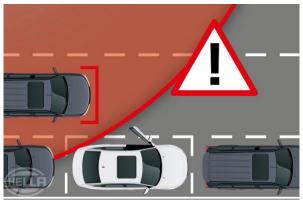


Blind Spot Monitoring





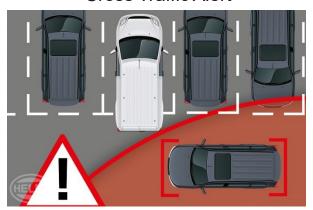
Exit Assist





Collision Mitigation Systems

Cross Traffic Alert





Driver Assistance Systems for enhanced vehicle safetyRADAR – Rear

Function:

The lane change assistant "Side Assist" takes effect from a speed of 30 km/h. The sensing area of the radar sensors is approx. 50 m to the rear and approx. 3.6 m to the side of the vehicle.

The system uses radar sensors to monitor the traffic behind and next to the vehicle. The area monitored includes the "blind spot" which the driver cannot see on both the driver and passenger sides.

If there is a vehicle in the monitored area and if a lane change is not taking place, the driver is informed by the LED displays in the right and left outside mirrors lighting up a little. The luminous intensity is lower so the driver is not distracted unnecessarily. In this situation, should the driver actuate the direction indicator lever for changing lane, he or she is warned by the warning lamp in the outside mirror of the corresponding side flashing intensively.

If the system senses a vehicle, the control unit in question also calculates the time remaining before a potential collision. This evaluation is used by the system to distinguish between vehicles which are approaching, flowing with the traffic and falling behind.

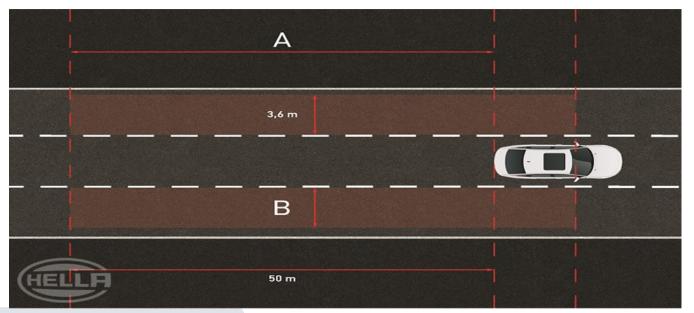


Driver Assistance Systems for enhanced vehicle safetyRADAR – Rear

Function:

The Radar is used to detect vehicles and objects. It can be used in Lane Change Assist or Blind Spot systems to warn of other vehicles or objects in the drivers blind spot. It can also be used in Cross Traffic Alert systems to warn of and avoid other vehicles when emerging from a junction or when reversing.

They can also be used in collision mitigation systems to prepare the vehicle, increasing brake pressure and pre-tensioning seat belts, etc., if an imminent collision is detected with other vehicles.





Sensor Type		Vision	Infrared / Thermal	Long Range Radar	Short / Mid Range Radar	Lidar
Application				7681MHz	2426 / 7681 GHz	
Adaptive Front Lighting (AFL), Traf Recognition (TSR)	fic Sign	х				
Night vision (NV)		Х	х			
Adaptive Cruise Control (ACC)		Х		х	х	Х
Lane Departure Warning (LDW)		х				
Low-Speed ACC, Emergency Brake (EBA), Lane Keep Support (LKS)	Assist	Х			х	х
Pedestrian detection		х	Х		х	
Blind Spot Detection (BSD), Rear C Warning (RCW), Lane Change Assi		X			х	Х
Park Assist (PA)		Х			Х	Х
Camera monitor systems (CMS)		Х				
LRR	Infrared	Video	SRR/MRR	Lidar	SRR	Video
1 to 280m	0.2 to 120m	0 to 80m	0.2 to 160m		0.2 to 90	m 0 to 80m



This will usually be clipped into a bracket which is affixed to the windscreen. The bracket is usually bonded to the windscreen.









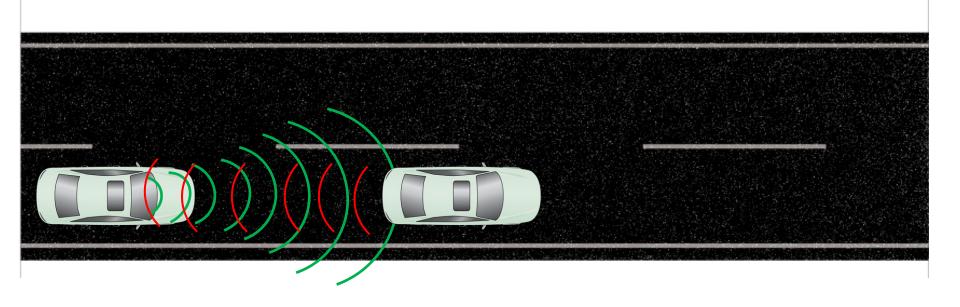








Function of the LiDAR system





FUNCTION

The Lidar consists of emitters and detectors housed in a single unit. The emitter fires rapid pulses of laser light and when the light hits an object it is reflected back onto detectors which perceive the object and determine the distance.

The Lidar provides Autonomous Emergency Braking (AEB) on vehicles that do not use a radar or camera based system. Ford's Active City Stop, Fiat's City Brake Control and VW's City Emergency Braking are examples of systems using Lidar, with Volvo's City Safety and Mazda's Smart City Brake Support being the most common.

REPAIR IMPLICATIONS

• In most cases, if the Lidar is only being removed and re-installed, a calibration is not required. However, Fiat stipulate a calibration/diagnostic confirmation on some of their vehicles.



OTHER CONSIDERATIONS

- •The performance of the Lidar can be affected by anything that obscures its view such as a dirty windscreen, ice, snow, fog, etc., in these cases the driver should receive a warning that the system is unavailable. These should be considered before attempting to calibrate.
- Damage or repairs to the windscreen in the area in front of the Lidar may affect the Lidar performance and calibration process.
- •Scanning Lidar is now being seen on vehicles with complex autonomous systems to support the camera and radar systems. An example of this is the 'Valeo SCALA' laser scanner on the Audi A8.

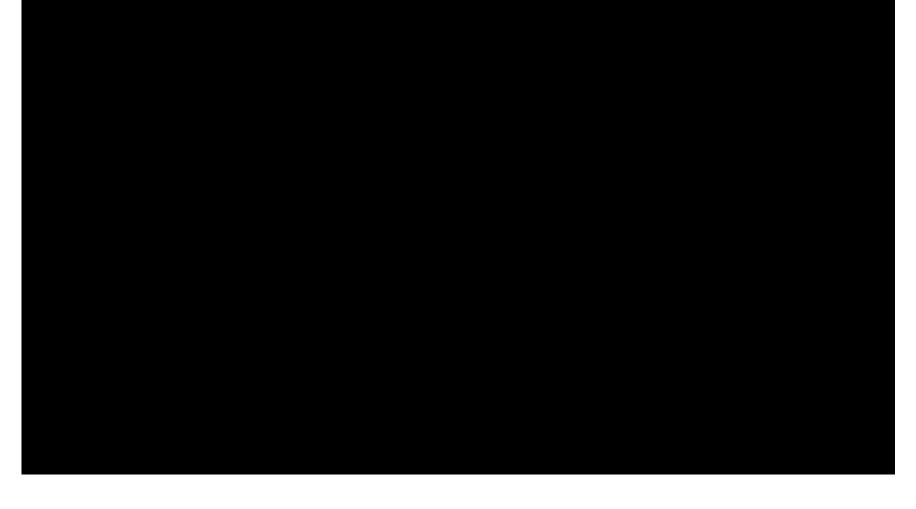






Driver Assistance Systems for enhanced vehicle safety

HUD (Head up Display)





LOCATION

The HUD unit is located in the facia, in front of the driver. It can be a unit that rises up from and retracts back into the top of the instrument panel, or a projector unit that sits in and to the back of the facia closer to the windscreen.







IDENTIFICATION

There are two main types of HUD:

- •Combiner system a projector is used to transmit vehicle information onto a transparent screen or 'combiner' which is usually situated in the top of the instrument panel, in front of the driver. Most of these systems are capable of raising the screen when in use and lowering it into the facia when not in use.
- •The other system uses a projector to transmit vehicle information directly onto the windscreen. These systems alleviate the potential distraction of the combiner screen and are usually found on more premium vehicles.

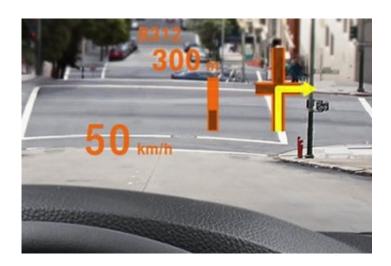


FUNCTION

The HUD displays vehicle information directly in front of the driver, just below their direct line of sight, reducing the need for them to take their eyes off the road.

The display usually includes the vehicle speed and the speed limit for the road you are on, it can also be used to display turn by turn sat nav information, vehicle warnings and other vehicle and traffic information, depending on the complexity of the system and the systems fitted to the vehicle.





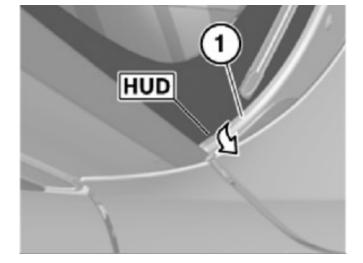


REPAIR IMPLICATIONS

- When carrying out repairs, the HUD screen should be retracted or covered to protect it from damage and dust and debris ingress.
- •When replacing the windscreen, it should be compatible with the HUD system. A windscreen suitable for HUD will incorporate a special reflective, or shaped, type material within the laminate interlayer. (Not applicable to combiner systems as they do not project onto the windscreen).

♦ For example BMW windscreens will be marked with 'HUD' on their outside bottom corner,

under the seal:





REPAIR IMPLICATIONS

- •Stone chips, or damage to the windscreen in the area of the HUD displayed image may necessitate windscreen replacement as the image can be distorted. Even where repair is possible, unless it is perfectly transparent, it may still visibly distort the HUD image. This should be considered before a repair is performed.
- •All HUD systems will incorporate the ability for the driver to adjust the displayed image to suit their driving position. The adjustment process will be found within the owner's handbook for the vehicle.
- •Some vehicle manufacturers stipulate a calibration process when the windscreen is removed/refitted/renewed
- Most vehicle manufacturers will stipulate a calibration if the HUD unit is renewed.
- •When handling the HUD unit, or components of it, the repairer should be aware of the effects of Electro Static Discharge and precautions should be taken to prevent component damage.

Always adhere to manufacturers instructions!



Driver Assistance Systems for enhanced vehicle safetyNight Vision

Location

Cameras can be located at the front of the vehicle in the area of the grille, behind the windscreen, or within the headlamp/s. Some vehicles can have more than one camera, or a combination of cameras and sensors, depending on the complexity and type of system.







Driver Assistance Systems for enhanced vehicle safetyNight Vision

Function

Active systems use an infrared light to illuminate the road ahead of the vehicle, (invisible to humans), with Charge Coupled Device cameras used to recognise the image and display it on the multimedia/infotainment screen, or the Head Up Display where fitted. Active systems usually display the images in grayscale.

Passive systems use thermal imaging cameras to capture images which identify heat sources, such as those emitted from humans and animals.





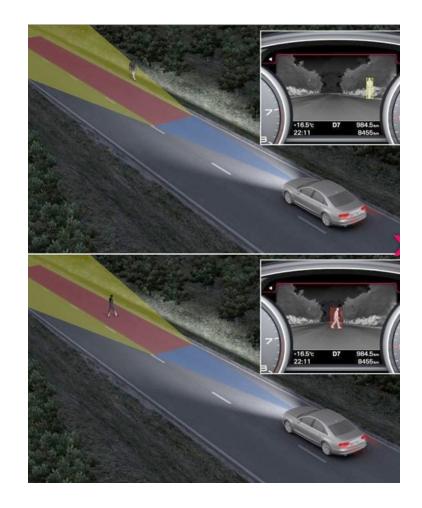
Driver Assistance Systems for enhanced vehicle safetyNight Vision

Function

More advanced systems can identify the difference between objects, animals and humans and can show humans as yellow images and animals as orange images, or place coloured boxes around the 'obstacle'. When an object is detected and the system detects a potential collision the image can be turned red as a warning to the driver.

Other advanced systems can use the vehicles adaptive headlamp system to pick out the person/animal so that they are more visible to the driver, even having the ability to adapt the beam so as not to scare the animal.

The system can also identify whether there is a risk of collision and send a warning to the driver, or to brake the vehicle should the driver ignore the warnings.





It is common for the Vehicle Manufacturer (VM) to stipulate camera/radar calibration in the following instances:

- Removing and installing, or replacing the camera/radar.
- Removing and installing, or replacing the windscreen.
- Where changes have been made to the vehicle's ride height.
- Where changes have been made to the vehicle's suspension or to the steering geometry, particularly rear toe.
- Where the vehicle has undergone a body shop crash repair.
- Where a relevant ECU has been replaced.
- Where it is identified by a diagnostic check.*

Always adhere to manufacturers instructions!

*It is important to understand that a general diagnostic check will not necessarily identify that the camera/radar is out of calibration and the camera/radar being out of calibration will not necessarily display any warning lights.



Dynamic calibration processes

Ford Opel Mitsubishi **Land Rover BMW** Volvo **Jaguar**



Static calibration processes – a different way of calibration Mercedes Toyota Kia Audi Nissan Subaru Skoda VW Mazda **Porsche** Seat Lexus Renault Hyundai Honda **Fiat** Jeep 73

Reinstatement Process for ADAS Systems

This is a process that you may want to follow when fitting or refitting windscreens, repairing or replacing panels, making any geometry/suspension changes and/or replacing or refitting body-mounted ADAS sensors and system components.

Understanding

- a) Assess whether the vehicle has ADAS systems fitted, which systems they are, and the locations of the sensors.
- b) Understand the possible implications to the vehicles ADAS, as a result of the work you perform.
- c) Determine which ADAS function(s) require which type of calibration, i.e. static, dynamic & Self-calibration or combination of these.
- d) Determine the required methods and equipment.



Awareness

- a) Ensure that the customer is aware that they have a vehicle with ADAS features fitted.
- b) Make the customer aware of the need for the system to be calibrated in accordance with the Vehicle Manufacturer's instructions once the repairs are complete.
- c) Ensure that the customer is aware that ADAS functionality may be impaired until the system has been successfully calibrated.
- d) However under exceptional circumstances where calibration through mobile windscreen replacement providers cannot be undertaken, it is still the responsibility of the work provider/supplier/repairer undertaking the work to make arrangements for the ADAS system to be calibrated at the customers earliest convenience.
- e) Provide customers with a written communication regarding their vehicle's ADAS technology, setting out the following facts:
 - Calibration requirements (including how their system will be calibrated if undertaken or managed by you as the service provider);
 - That correct functionality of the ADAS system should not be assumed unless/until it has been successfully calibrated;
 - iii. Their insurance company, employer and/or fleet manager should be notified of the position
- f) The supply of a calibration certificate will aid the audit trail of the vehicle repair and as such should be considered for retention of records.
- g) The audit trail will be defined by the work provider/customer and the business completing the repair/ calibration.



Scheduling the job

- a) Where a vehicle requires static calibration, this will need to be conducted as per the Vehicle Manufacturer's requirements, which may stipulate the use of specialist equipment or for the calibration to be sub-contracted to a specialist supplier.
- b) Make sure that ADAS related components and procedures/methods meet the correct specification for the ADAS system to work as the Vehicle Manufacturer intended.
- c) Make the customer aware that if dynamic calibration is required, their vehicle will need to be driven on public roads in order to complete the calibration service.







Thank you for your attention





