

DAIMLER TRUCK

Southern Africa

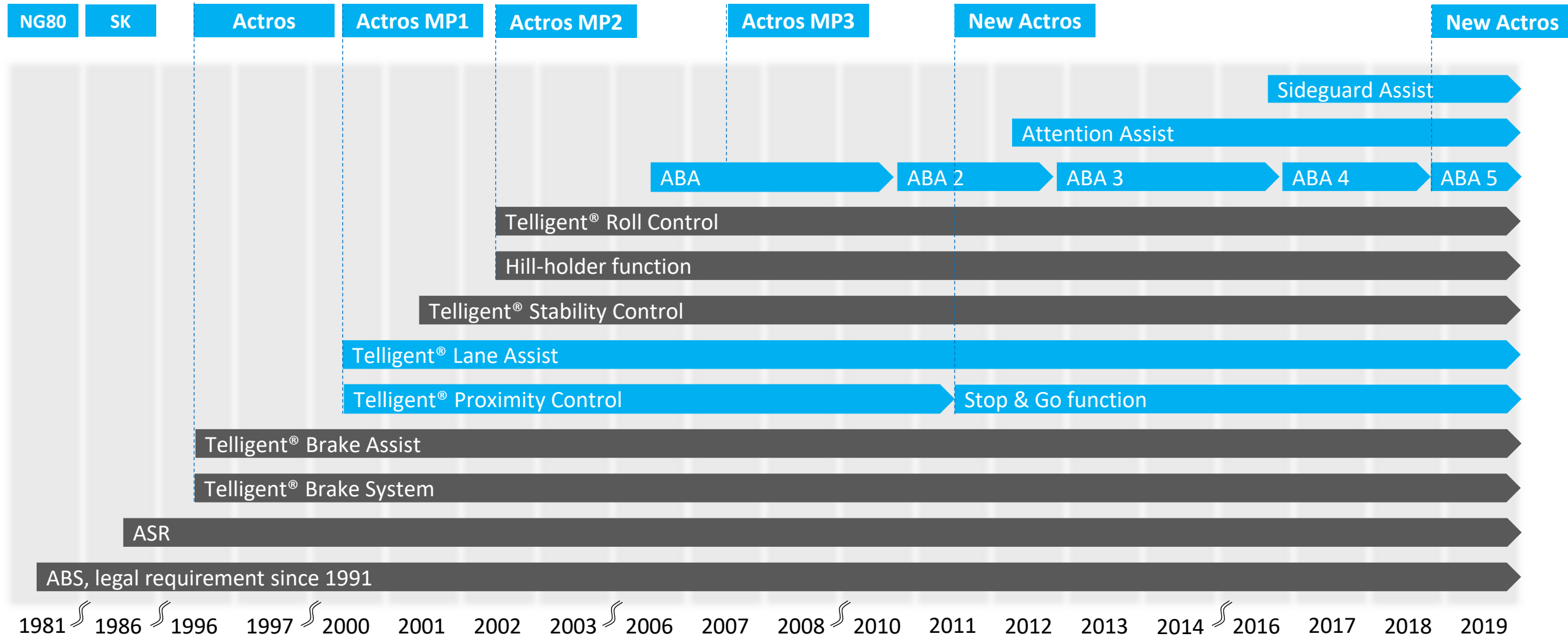


Mitigating driver fatigue with MB Truck Safety Systems.

Duncan Prince



Development of assistance systems



Active and passive safety systems

Accident avoidance

Definition	Active safety¹⁾ primarily voluntary²⁾ Covers all systems and devices in and on the vehicle whose primary purpose is to reduce the risk of an accident occurring	
Effect	Actively intervening	Preparatory
Systems	ABS, ASR, LKA Active Brake Assist, Stability control, Roll control. Telligent brake	Warning systems, Reflective film, Reversing camera, Reversing warning system.

Accident

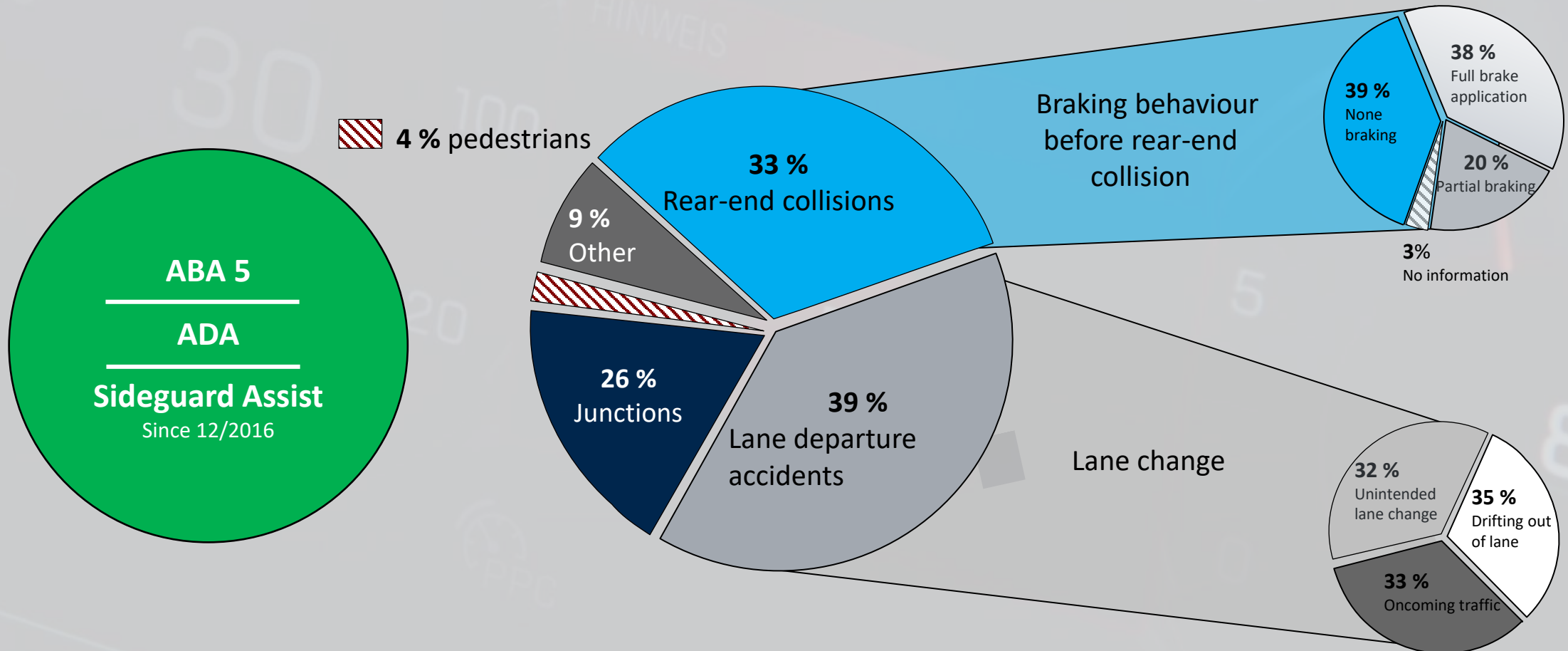
Minimising consequences of an accident

Passive safety¹⁾ primarily required by law Covers all systems and devices whose purpose is to minimise the consequences of an accident both during and after the accident		
Reducing	Protecting	Rescue
Seat belt, airbag Belt tensioners, Underride guard.		Guidelines for rescue services, Cutting marks.

¹⁾ Mercedes-Benz defined the terms "active safety" and "passive safety" way back in 1970

²⁾ ABS: required by law, based on ECE-R13

Types of serious accidents involving trucks – use of safety systems



Safety Systems - GSR

Facts

There is a **5x higher** probability that a truck will be involved in a **fatal** traffic accident compared to a car

(e.g. UK; Motorway)



Active Brake Assist

Analysis and accident research for rear-end collisions

Physics

Speed difference between truck and passenger car



Same kinetic energy during impact



Attention Assist

In the Classic Cockpit



Attention Assist monitors the driver's attention levels by assessing steering behaviour, lane keeping and driver activity.

The system:

- Issues a visual and audible warning if it detects inattention
- Activates Lane Assist at the first warning (even if it is deactivated)
- Issues another warning after 15 minutes or if inattention increases
- The system is based on Lane Keeping Assist
- Expanded to include a steering wheel angle sensor

Active Brake Assist

ABA radar and camera



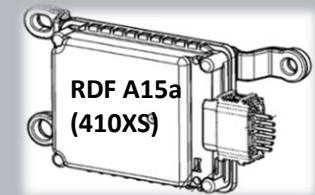
Driver assistance camera

Front radar

Active and passive safety systems

Front radar sensor

- The radar sensor transmits electromagnetic waves which are reflected from obstacles.
- The reflected signals are received and evaluated by the sensor.
- The signal propagation time is how long it takes the signal to travel from the radar sensor to the object and back again.
- The speed and acceleration of the object ahead are also calculated using a particular method (Doppler effect).



Active Brake Assist

The interaction of front radar with driver assistance camera



Active Brake Assist

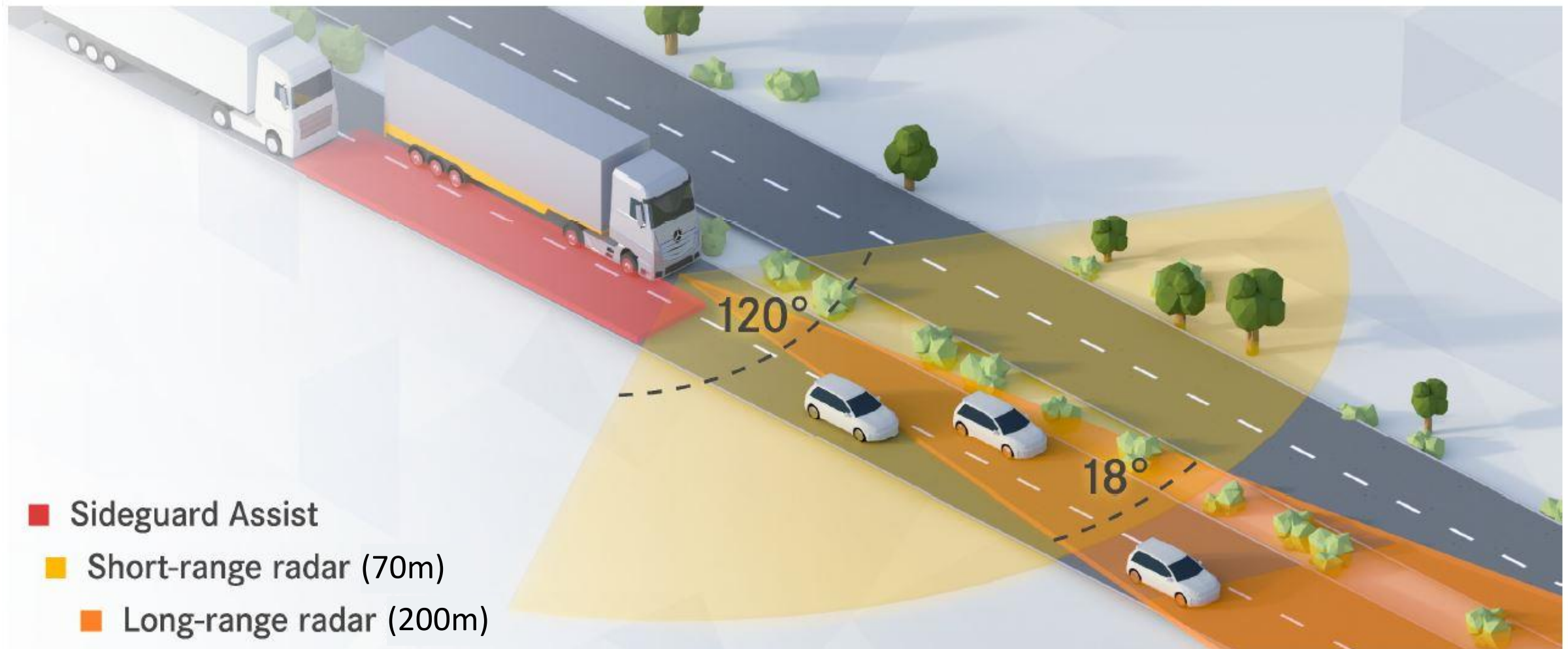
Detection in urban traffic conditions

The radar sensor can detect up to **100** objects simultaneously, of which 13 objects are prioritized and assigned to a category

These 13 objects are composed as follows:

- 6x traveling objects
- 1x stationary object
- 6x pedestrian objects

Active Brake Assist



Active Brake Assist

Emergency braking procedure for Mercedes-Benz high-end system

1.

Approaching the critical distance

The truck is approaching a vehicle travelling ahead or a stationary vehicle ahead

2.

Warning

Visual by means of a red status indicator and warning triangle, audible by means of warning sound

3.

Partial braking

Using 50 % of the maximum braking power

4.

Full brake application

Avoidance of collision with vehicle travelling ahead

Avoidance of collision with stationary obstacle, at speeds **up to 80 km/h**

Surpasses the legal requirements!

Active Brake Assist

ABA reacts equally to both **moving** and **stationary** vehicles.

Stage 1 (Warning)



- Visual and acoustic warning (intermittent)
- Radio and telephone muted

Stage 2 (partial braking)



- Visual and acoustic warning (intermittent)
- Radio and telephone muted
- 50 % partial braking

Stage 3 (emergency braking)



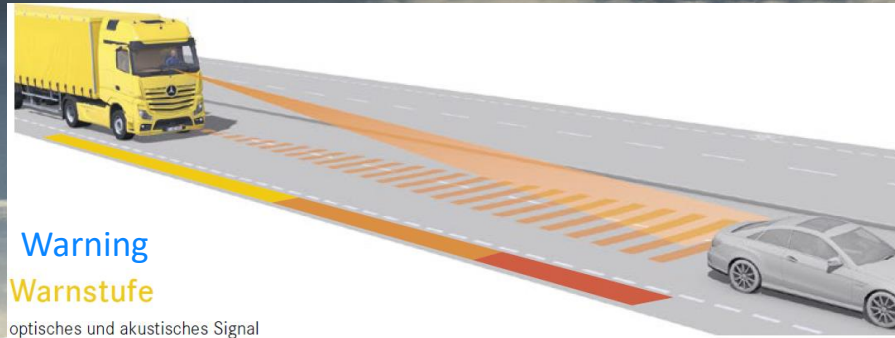
- Visual and acoustic warning (continuous warning)
- Radio and telephone muted
- 100 % emergency braking
- Hazard warning lights activated at double frequency

Stage 4 (Hold-Brake)



- Service brake remains on indefinitely
- Hazard warning lights remain active (if they were active in stage 3)
- Display shows "Emergency braking ended."
- If the driver leaves the driver's seat or opens the door, **the parking brake is applied.**

Active Brake Assist.





Active Brake Assist

Cancellation of the warning cascade due to actions of the driver

Warning Action		Optical – accustical Warning	Partial braking	Full braking
Steering		✓	✓	✗
Indicate		✓	✓	✗
Accelerate		✓	✓	✗
Braking		✗	✗	✗
Kickdown		✓	✓	✓
ABA OFF		✓	✓	✓

✓ Cancellation possible ✗ Cancellation **not** possible

A new chapter of safety –
Frontguard – Assist (FGA)



Safety Systems - GSR

Position of four additional sensors and the camera Actros



Sensors right and left at the front

Sensors right and left

Camera at the frame end cross member

Active Brake Assist 6

Pedestrian detection incl. Cyclists



Detection

1.

The system can detect **moving or stationary** pedestrians at speeds of up to **60 km/h**. **Cyclists** are detected up to a **differential speed of 60 km/h**.



Warning + partial braking

2.

visually by means of a red status display and warning triangle, acoustically by means of a warning tone, as well as with simultaneous partial braking at **50 %** of the maximum braking power



Emergency braking

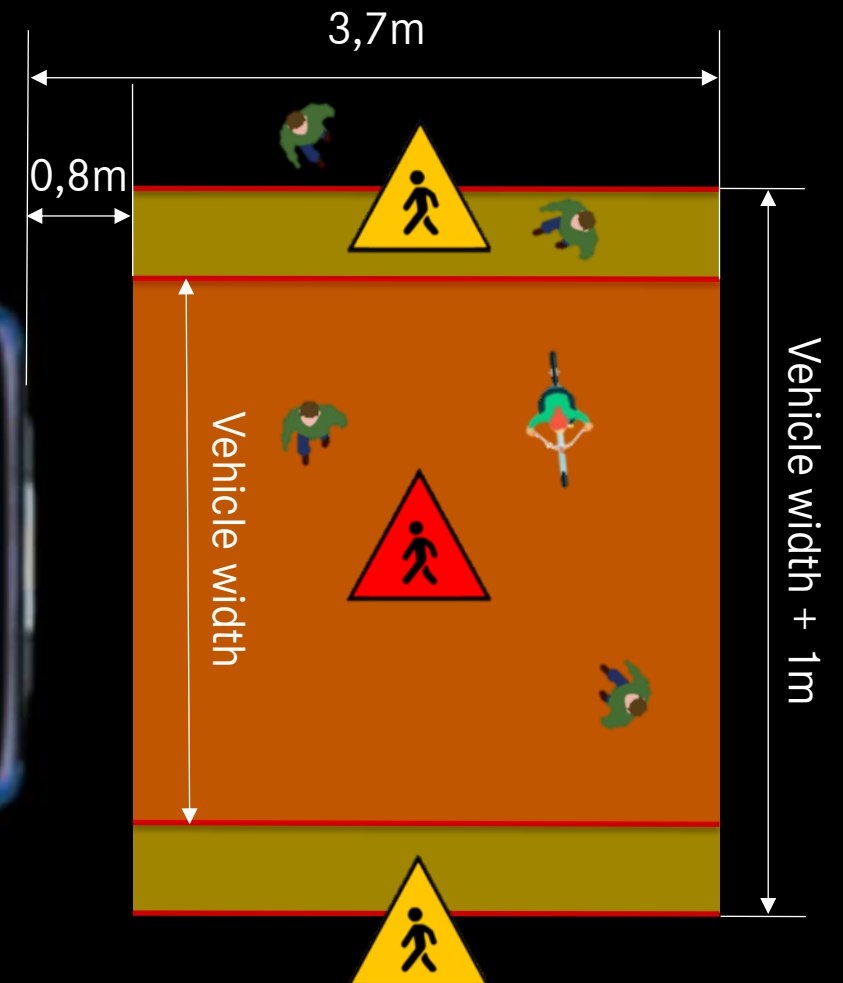
3.

Fully automated emergency braking to a **standstill**

Frontguard Assist

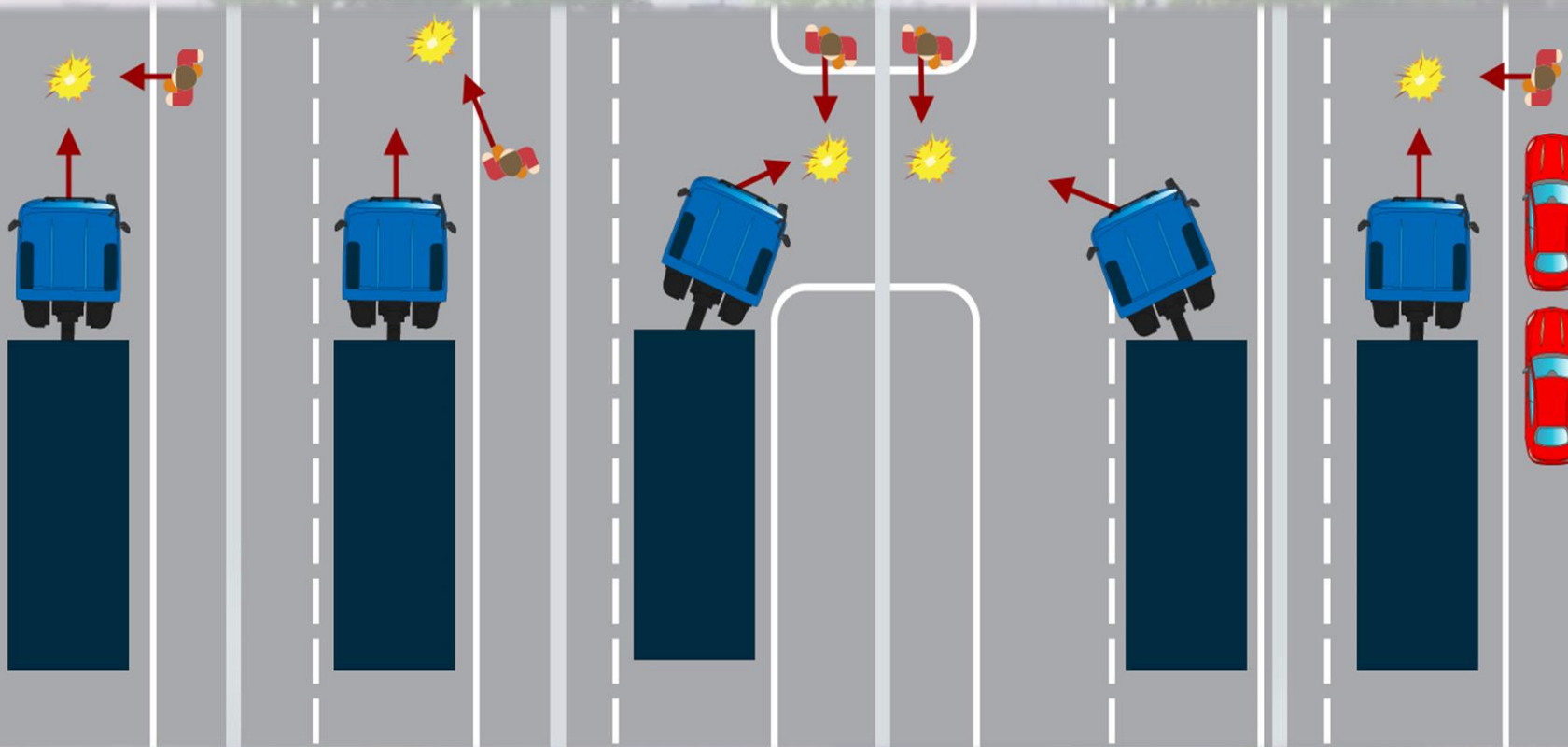
Frontguard Assist monitored area

The system reacts to stationary, crossing or moving objects up to **15 km/h**.



Active Brake Assist

Pedestrian detection in urban traffic conditions



- Detects pedestrians crossing in front of the vehicle and where the vehicle is turning off
- Active in a speed range up to **50 km/h**
- Partial braking and audible/visual warning at same time
- Full brake application
- Ultimate responsibility lies with the driver every time.

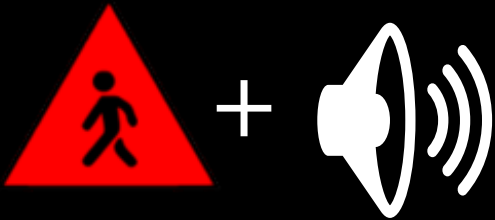
Frontguard Assist

Frontguard Assist Messages



Information:

A yellow visual information message is displayed to the driver in the instrument cluster if an object is located in the detection field in front of the cab.



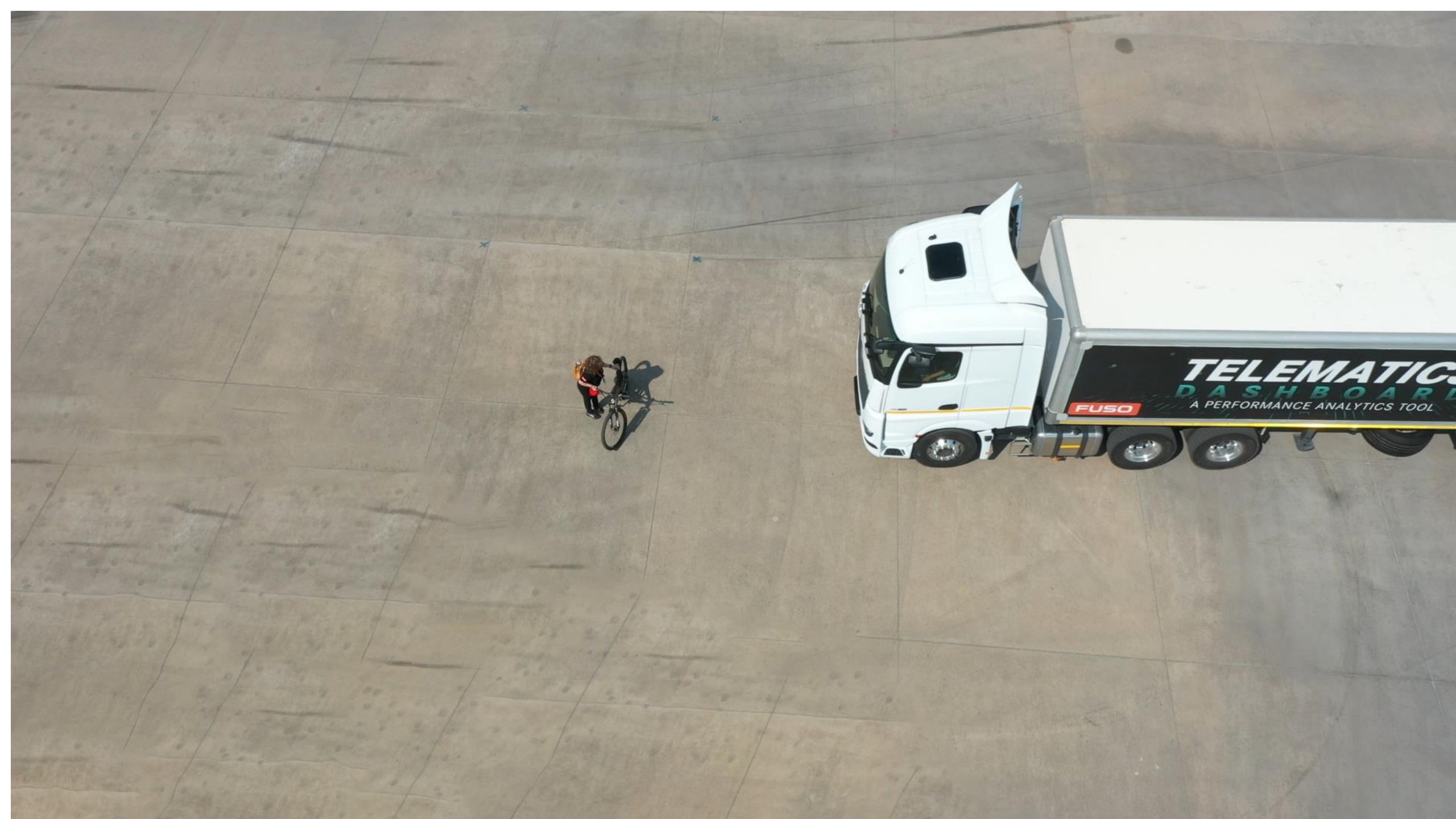
Warning:

A warning message is triggered if the system locates an object in the detection field that is on a collision course. The warning message is terminated by positive driver activity. This can be achieved by braking or swerving to avoid the detected object.



System switched off manually or error:

If the system is switched off due to a malfunction or manual operation, a visual error message is displayed.



TELEMATIC
DASHBOARD
A PERFORMANCE ANALYTICS TOOL

FUSO

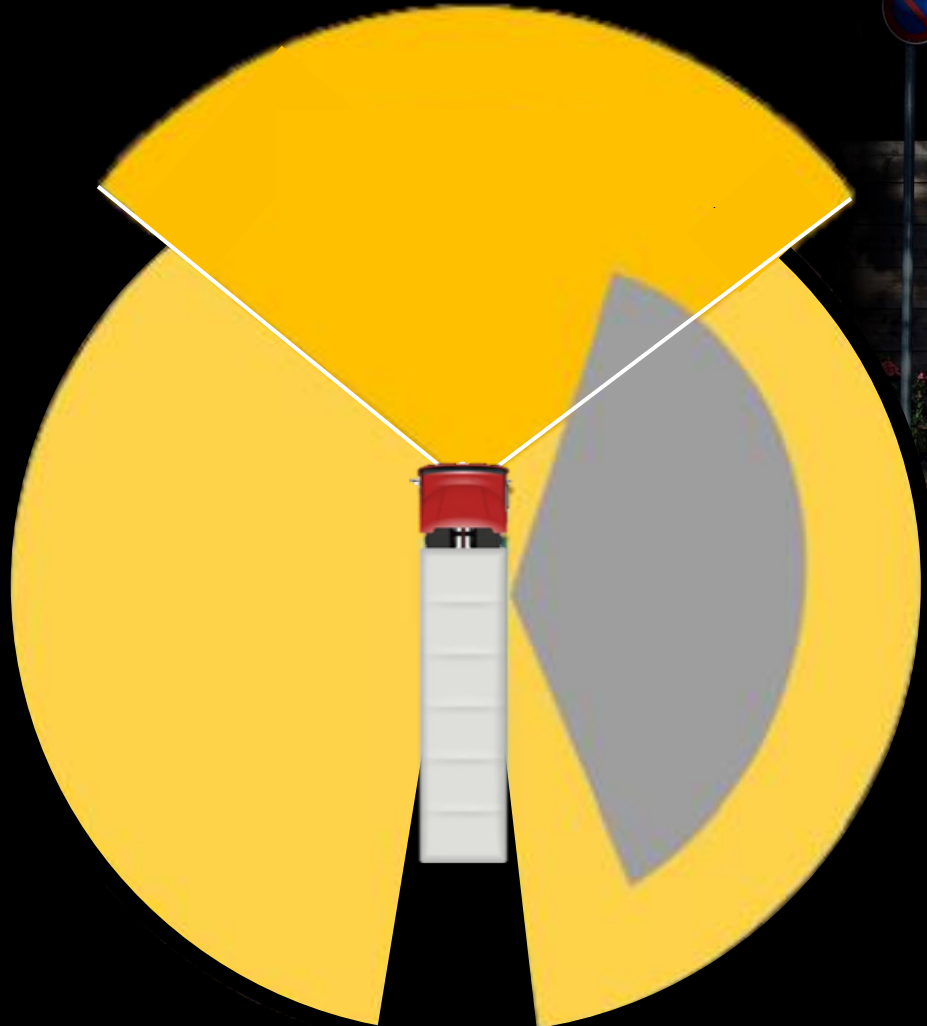
Active Sideguard Assist 2

A new chapter of safety –
the Active Sideguard Assist 2 (ASGA2)



Active Sideguard Assist 2

ASGA 1 vs. ASGA 2 – Sensor monitored areas



Sensor monitored areas
ASGA 2

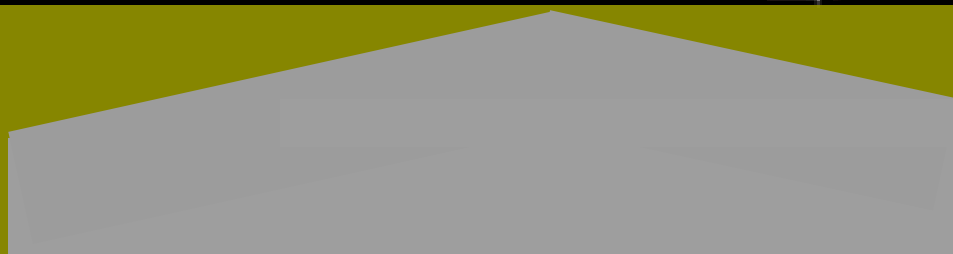


Sensor monitored area
ASGA 1



Active Sideguard Assist 2

ASGA 1 vs. ASGA 2 – Detection area



Detection area
ASGA 2



Detection area
ASGA 1



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Thank you for your attention.

