

# Volvo's Work within Active Safety

**”The guiding principle behind everything we make at Volvo is and must remain – safety.”**

Assar Gabrielsson  
Gustaf Larson



# Vehicle safety

- Passive safety - how well the vehicle protects both its passengers and other road users from injuries.
- Active safety - how well the vehicle helps the driver to avoid as well as escape from dangerous situations;

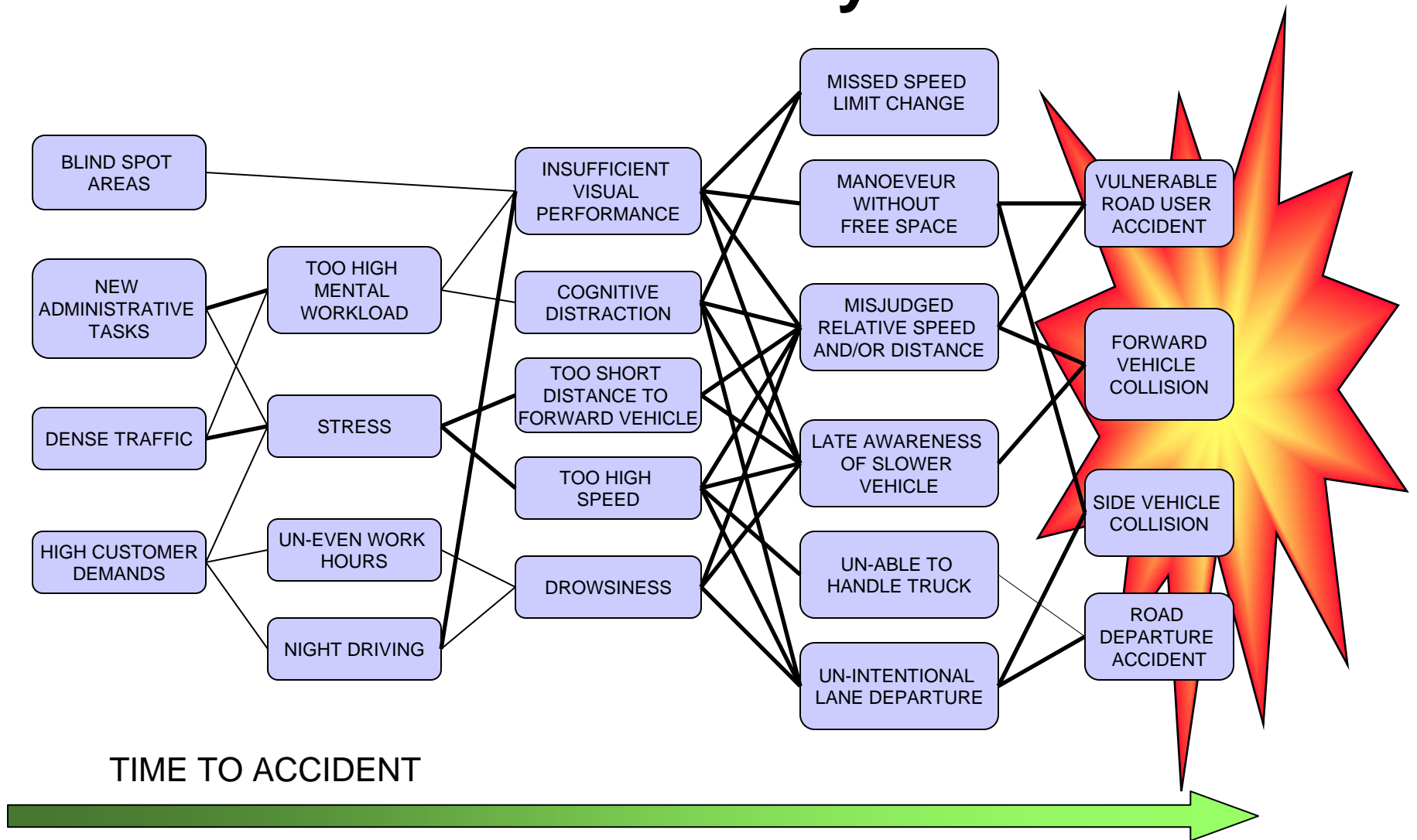


# Passive safety

- Passive safety systems in Volvo Trucks:
  - ✓ Energy-absorbing steering wheel
  - ✓ Three-point safety belt with electronic lock
  - ✓ Airbag in heavy trucks
  - ✓ Front Underrun Protection System
  - ✓ Bunknet
  - ✓ Energi absorbing instrument panel



# Active safety



# Active safety

- Active safety systems in Volvo Trucks
  - ✓ Forward Collision Warning, part of the Adaptive Cruise Control system
  - ✓ Electronic Stability Program (ESP)
  - ✓ Tire Pressure Monitoring



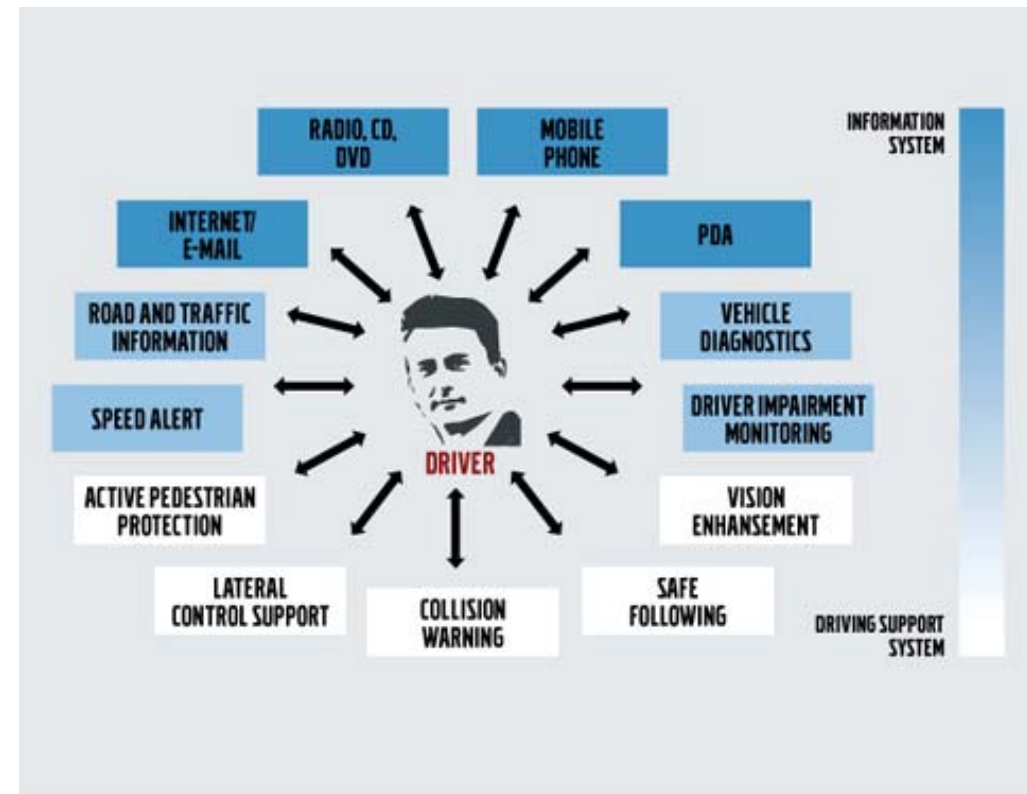
# Safety Concept Truck

- Driver Interaction Support Driver Awareness Support
- Lane keeping support
- Lane Change Support
- Blind Spot support
- ACC and Forward Collision Warning



# Driver Interaction Support

- The central function of the vehicle, decides **what, when** and **how** information shall be shown.
- Reduces the driver's stress level by managing all vehicle-driver-interaction.
  - ✓ detects the driver's workload in real-time
  - ✓ suppresses less important information back when the workload is high
  - ✓ avoids conflicts between the increasing number of systems



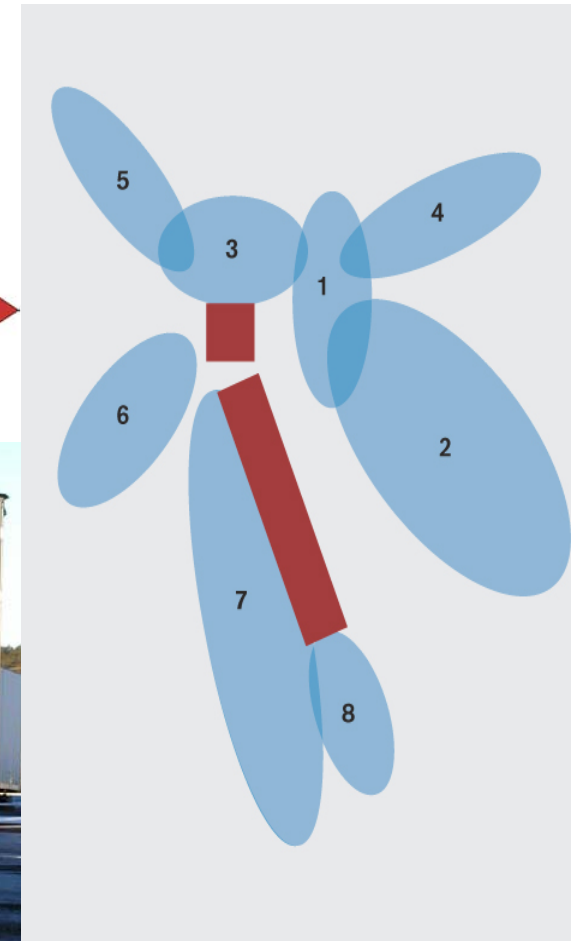
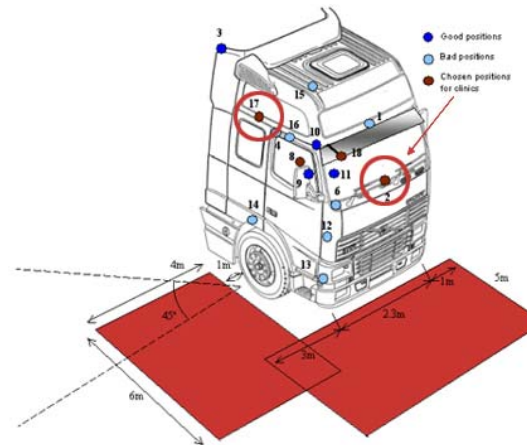
# Driver Interaction Support

- Drowsy driver alert
  - ✓ A drowsy driver is detected as a combination between:
    - Driver's eye and head movements, the trucks lane position, steering wheel movement
  - ✓ Warns a drowsy driver
    - acoustic warning, message in the instrument display (CIC), seat vibrations
- Distraction alert
  - ✓ Head and eye movement camera are detected
  - ✓ If the driver looks away for too long or too often
    - flashes of light along the dashboard intuitively lead the eyes back to the road
  - ✓ If the driver is distracted by thoughts or a telephone conversation
    - flashes of light in the sides of the windscreen reminds the driver to look around



# Visibility Support

- Risk of accident due to limited visibility in the following situations:
  - ✓ Lane change
  - ✓ Turning right
  - ✓ Starting from stand still
  - ✓ Reversing
- 3 cameras mounted
  - ✓ Front close up camera – area 3
  - ✓ On passenger side – area 1
  - ✓ Rear close up camera – area 8



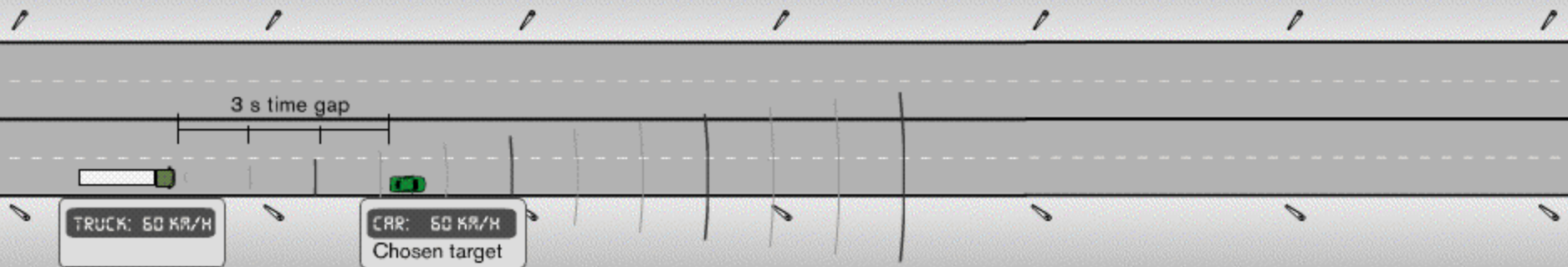
# Lane Change Support

- Two radar sensors
- Warns the driver of unsafe lane change attempt by flashing red LED ramp on the passenger side A-pillar and an acoustic signal
- Warns for...
  - ... a vehicle beside the full length of the truck
  - ... a vehicle closing in from behind
  - ... a vehicle cutting in close to the front corner



# Adaptive Cruise Control

- An advanced radar detects slow or stationary objects in the truck's direction of travel
- The truck itself controls the distance to the vehicle in front in real-time.
  - ✓ by reducing the throttle
  - ✓ by activating auxiliary braking systems; Exhaust Pressure Governor, Volvo Engine Brake, Volvo Compression Brake and hydraulic retarder

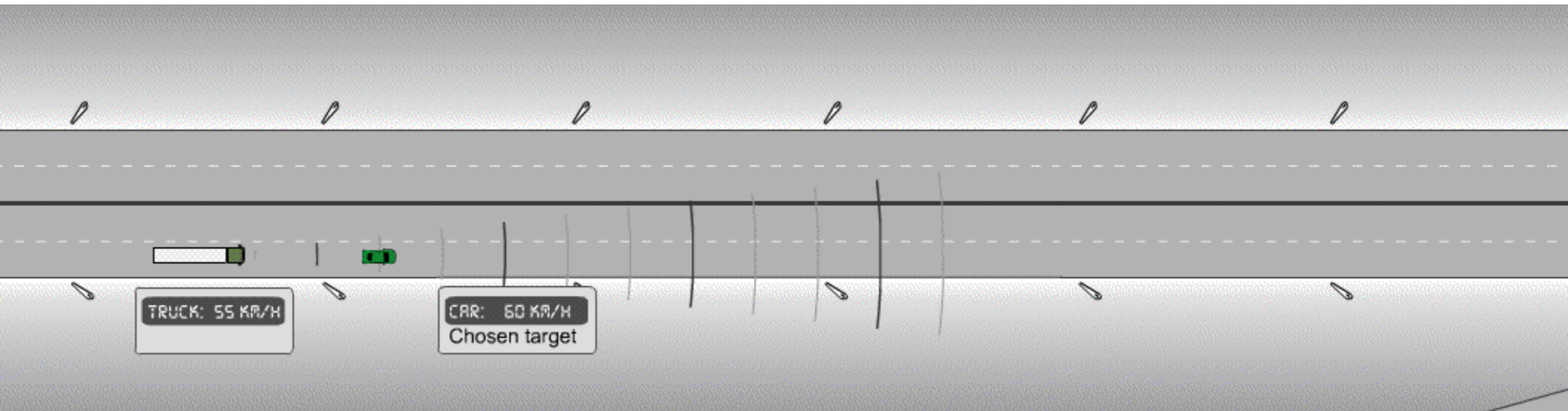


# Forward Collision Warning



# Forward Collision Warning

- Part of ACC.
- A considerably slower vehicle is detected in front of the truck by the radar
- If more braking power is needed, the driver receives a warning and acts independently.



## Future within active safety

- Develop ACC and forward Collision Warning further
  - => Emergency Brake Assistance
  - => Queue Support
- Lane Keeping Support
- Lane Change Support
- Drowsiness system
- Alcolock system
- E-call