SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF AUTOMOBILE ENGINEERING

19AUE302 – AUTOMOTIVE SAFETY & INFOTRONICS

III- YEAR V- SEM

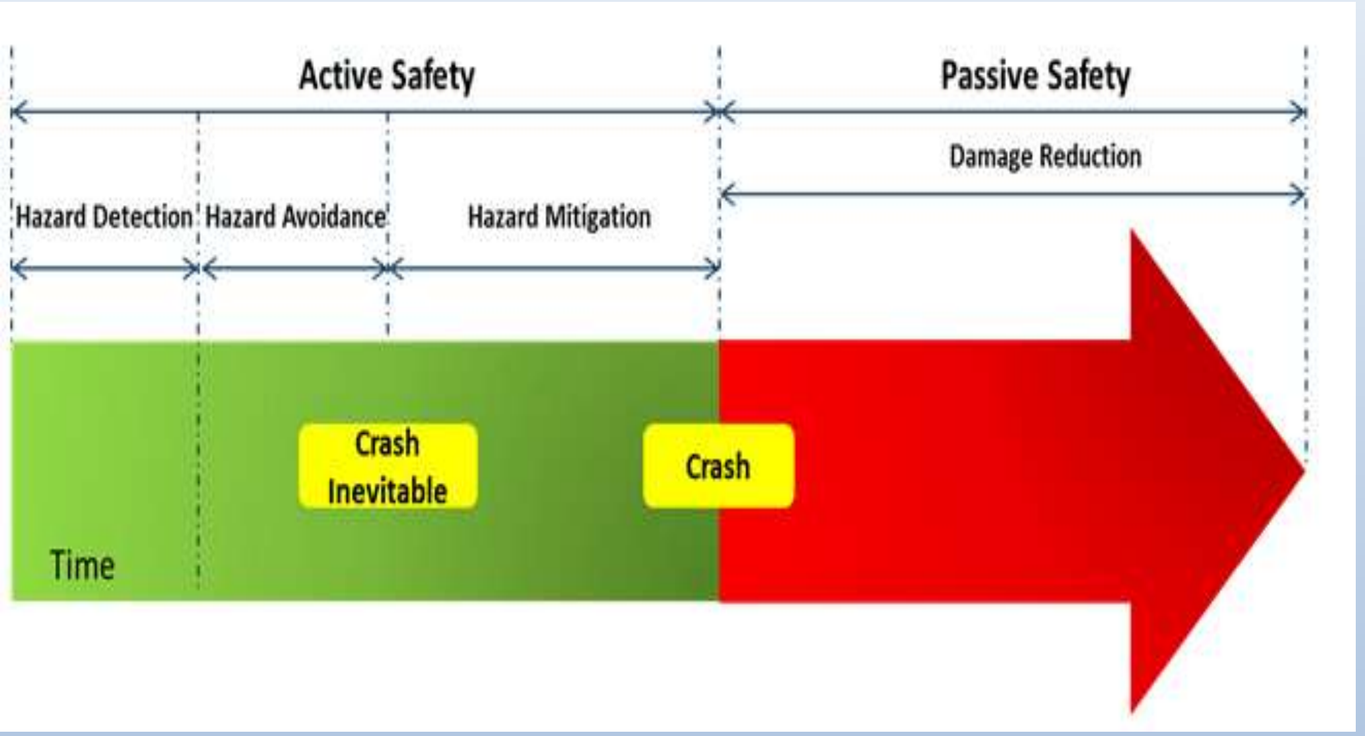
UNIT II – SAFETY CONCEPTS

TOPIC 1– ACTIVE SAFETY

PRESENTATION OUTLINE

- Automobile Safety
- Examples of Active Safety
- First Wave of Active Safety
- Second Wave of Active Safety

AUTOMOTIVE SAFETY

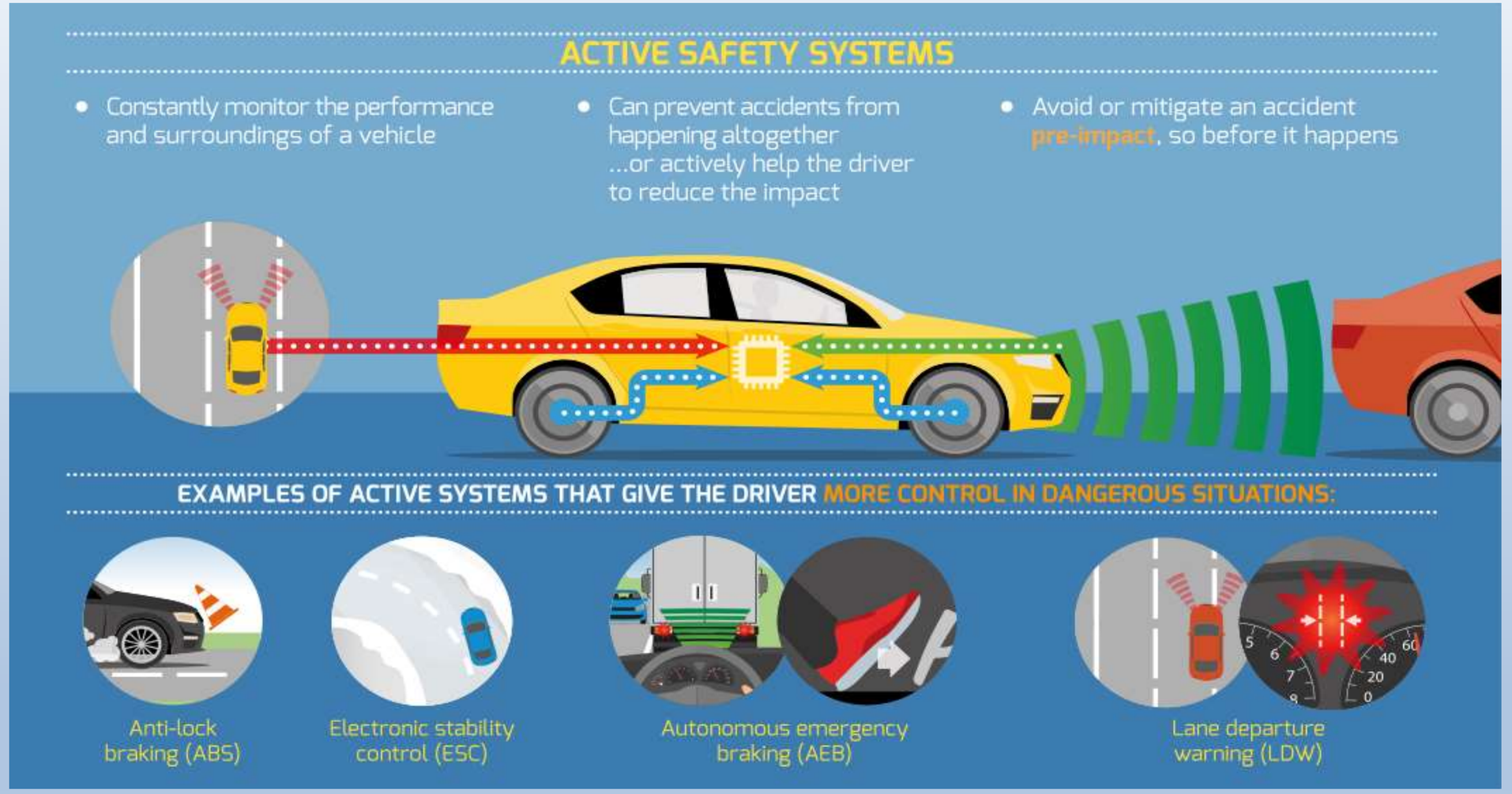


- Scientific domain that is related to the study, design, construction and regulation of technology to minimize the occurrence and consequences of road traffic accidents

- **Active Safety Systems**
- Helps preventing accidents
- They control the dynamics of the vehicle

- **Passive Safety Systems**
- Help mitigating the consequences of accidents
- They protect occupants and pedestrians

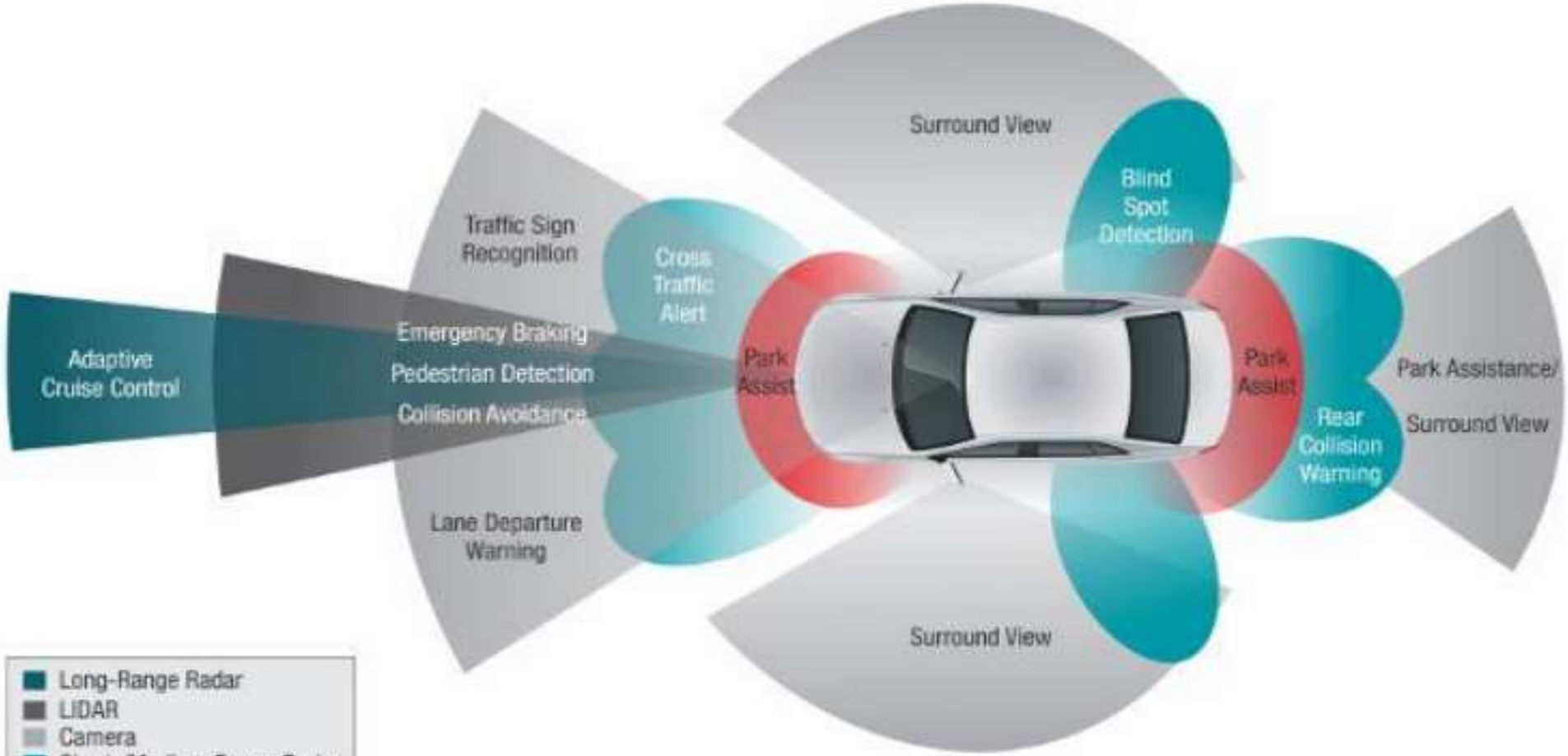
ACTIVE SAFETY



EXAMPLES OF ACTIVE SAFETY

- Typical Active Safety Systems
  - Anti-lock Braking System (ABS)
  - Traction Control System (TCS)
  - Stability Control System (ESP)
- Emerging Active Safety Systems
  - Cruise Control (ACC)
  - Steering Control
  - Suspension Control
  - Road Sign Detection
  - Intelligent Speed Assistance (ISA)
  - Autonomous Emergency Braking (AEB)
  - Blind Spot Detection
  - Lane Departure Warning
  - Pedestrian Detection
  - Vision Engagement (Night/Augmented Vision, Adaptive Headlights)

EXAMPLES OF ACTIVE SAFETY SYSTEMS (SENSOR TECHNOLOGY)

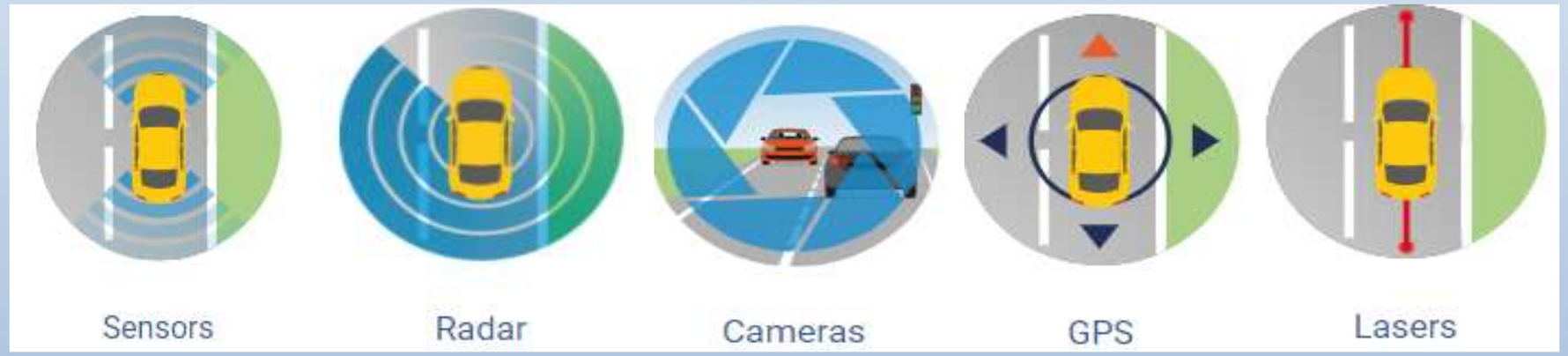


FIRST WAVE OF ACTIVE SAFETY SYSTEMS

- The first wave of active safety technology is already widely fitted to today's passenger cars and commercial vehicles
- **Anti-lock braking systems (ABS)**
- ABS systems help to prevent the wheels of a vehicle from locking when braking heavily, and enable the driver to keep steering
- **Electronic stability control (ESC)**
- ESC helps to prevent a vehicle from skidding, and the driver from losing control while turning a corner. ESC technology can automatically activate the brakes to help steer the vehicle in the right direction

SECOND WAVE OF ACTIVE SAFETY

- A second wave of active safety measures is being introduced, using cutting-edge technology such as on-board sensors, radar, cameras, GPS and lasers



AUTONOMOUS EMERGENCY BRAKING (AEB)

- AEB systems start braking automatically if a collision is imminent and the driver is not taking any action (or not fast enough)
- AEB can detect a potential collision and activate the brakes to avoid it, or at least mitigate its impact

LANE DEPARTURE WARNING (LDW)

- LDW systems warn the driver if he or she leaves a marked lane without using the indicator, or if the vehicle is drifting out of its travel lane

LANE KEEPING ASSISTANCE (LKA)

- LKA systems apply torque to the steering wheel or pressure to the brakes when a lane departure is about to occur

DROWSINESS AND ATTENTION DETECTION SYSTEMS

- These assess the driver's alertness (for example by monitoring how long someone has been driving or by analyzing how the steering wheel is being operated) and warn the driver to take a break when needed

SPEED LIMIT INFORMATION (SLI)

- SLI systems inform the driver of the current speed limit by displaying it on the dashboard and/or navigation system
- They use cameras to recognize road signs or use speed-limit data from the navigation system. Many SLI systems combine both

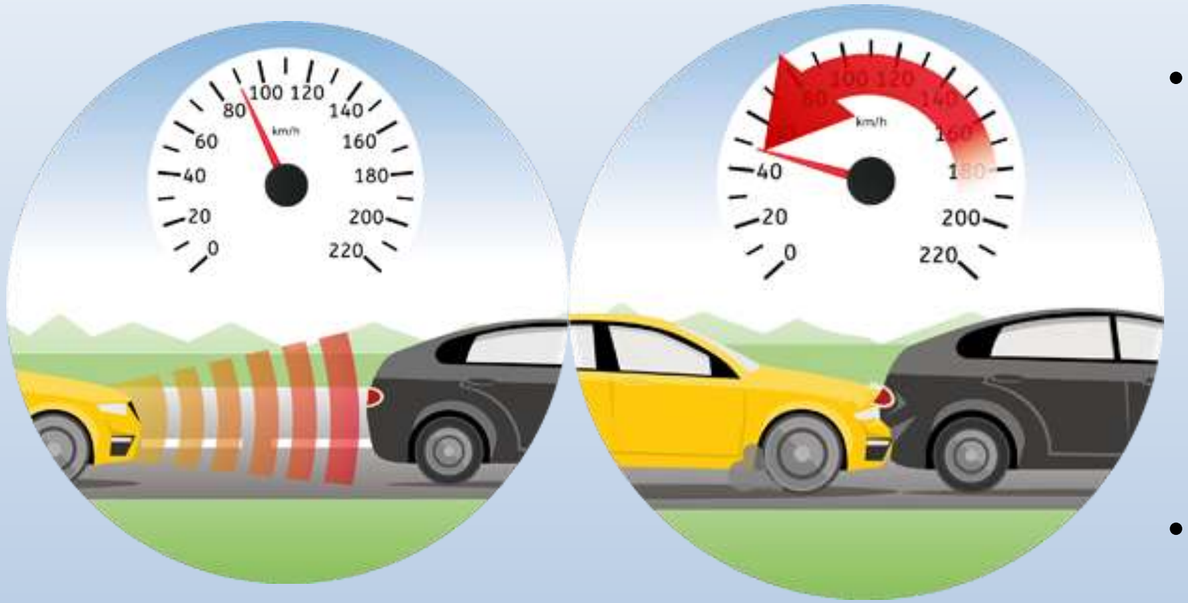
TYRE PRESSURE MONITORING SYSTEMS (TPMS)

- TPMS monitor the air pressure of a vehicle's tyres and report this information in real time to the driver, for example using a 'low pressure' warning light to indicate under-inflated tyres (which can cause accidents)

INTELLIGENT SPEED ASSISTANCE (ISA)

- ISA systems can actively prevent drivers from exceeding the speed limit using road-sign recognition cameras and GPS-linked speed-limit databases

ACTIVE SAFETY TECHNOLOGY



- **If a collision is really unavoidable**, active safety technology is also able to reduce its impact. Slowing the speed of a vehicle by a few kilometers before impact can save lives, for example

- Indeed, active safety systems have the potential to not only reduce the number of accidents, but also can **reduce the consequences of an accident if a collision cannot be avoided**