

# INTELLIGENT TRANSPORTS

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# INTELLIGENT TRANSPORT SYSTEMS (ITS)

- ◉ ITS include teleinformatics and all types of communication in vehicles, between them and fixed locations.
- ◉ ITS refer to all kinds of transport , and is defined as a system in which information and communication technologies are applied in the field of transport.

# THE BASIC PARTICIPANTS OF ITS

- ◉ Transport infrastructure;
- ◉ Vehicles;
- ◉ Telematic equipments for transport infrastructure and vehicles;
- ◉ Information desks, highway markings, and traffic lights with remote control;
- ◉ Data collection and data processing centers;
- ◉ Traffic movement controlling centers.

SATELLITE COMMUNICATIONS

TERRESTRIAL BROADCAST

MOBILE

Intermodal Communications

Passenger Information

ITS-G5  
Crash Avoidance

MAN

Navigation

Safety Systems

WLAN

Trip Planning

Vehicle to Vehicle

Adaptive Cruise Control

Travel Assistance

Toll Collection

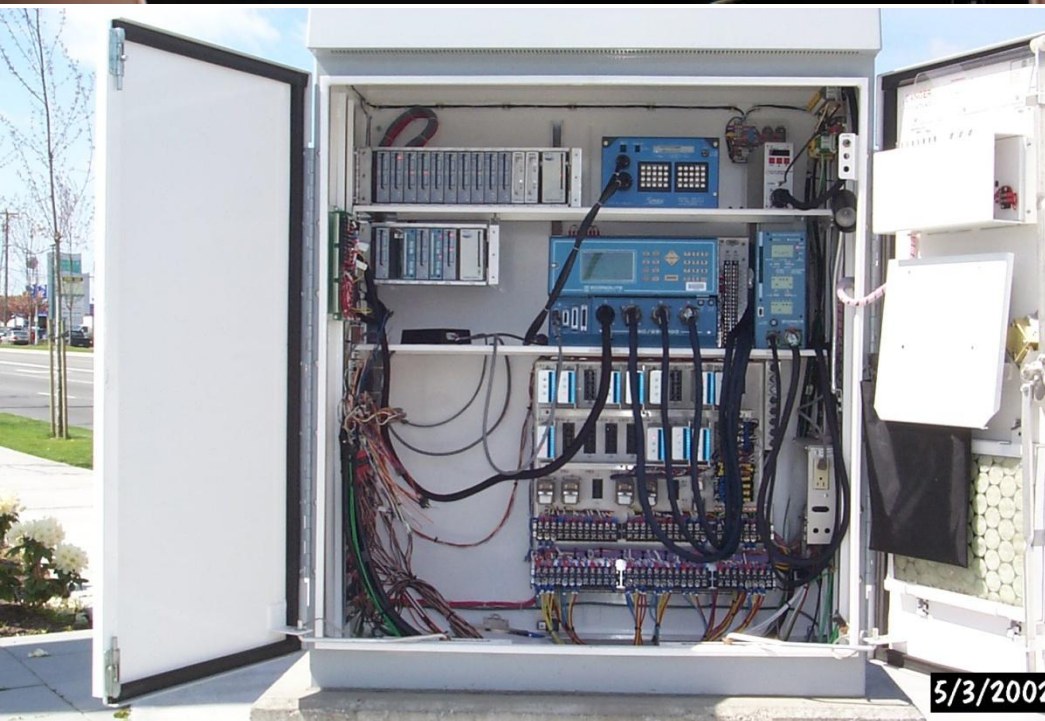
Traffic Signs

Fleet Management



# INTELLIGENT TRANSPORT TECHNOLOGIES

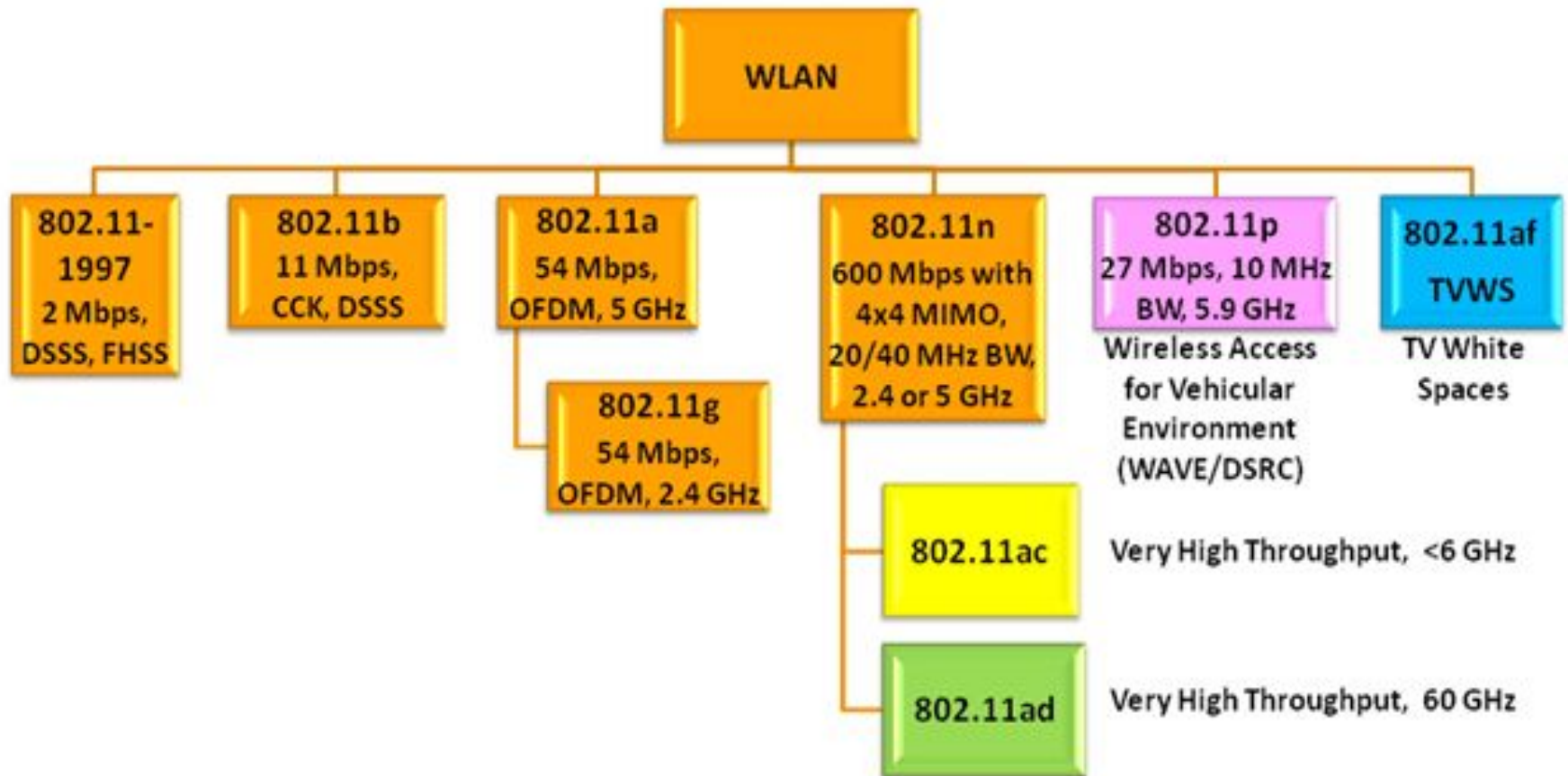
- 1) Car navigation;
- 2) Traffic signal control;
- 3) Container management.
- 4) Closed-circuit television;
- 5) Automatic number plate recognition;
- 6) Speed cameras.
- 7) Parking guidance and information;
- 8) De-icing systems;
- 9) Weather information.



# INTELLIGENT TRANSPORT TECHNOLOGIES

- 1) Wireless communications;
- 2) Computational technologies;
- 3) Floating car data;
- 4) Sensing technologies;
- 5) Emergency vehicle notifications system;
- 6) Automatic road enforcement;
- 7) Speed limits;
- 8) Collision avoidance system;

# IEEE 802.11



DSRC = Dedicated Short-Range Communications



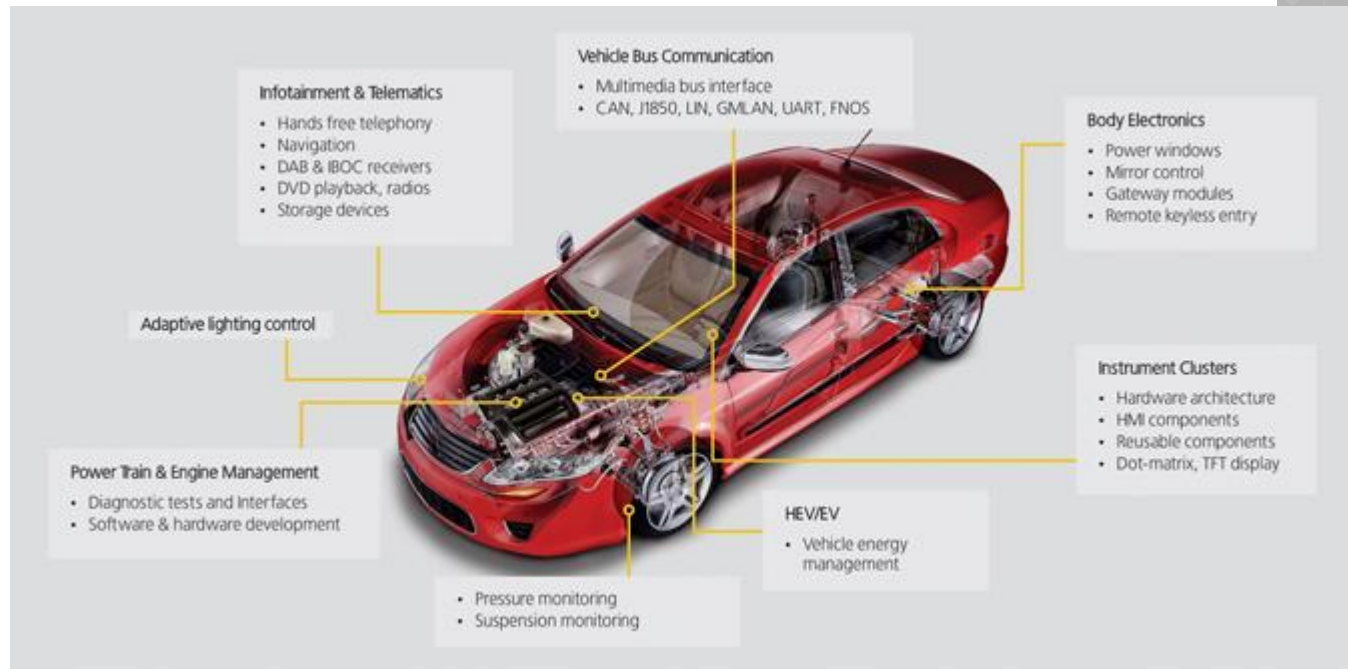
# WIRELESS COMMUNICATIONS

- ◉ Radio modem communications are widely used for short and long range communication within ITS
- ◉ Short range communications can be accomplished using IEEE 802.11, which can be extended with mobile ad hoc networks or mesh networking
- ◉ Long range communications use WiMAX, GSM, or 3G



# COMPUTATIONAL TECHNOLOGIES

- Artificial intelligence;
- Computer processors on vehicles;
- Networked microcontrollers;
- Programmable logic controllers with an operating system;



# CAR NAVIGATION

- Radio receiving equipment for determining geographical coordinates of current location of receiver antenna



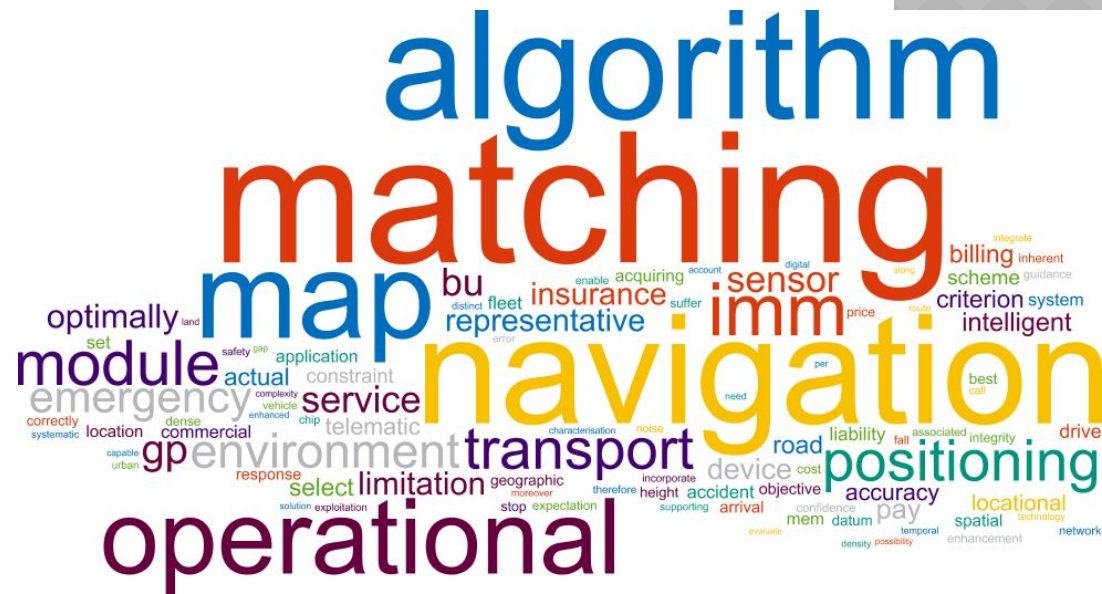
# TRAFFIC LIGHT CONTROL SYSTEMS

- It coordinates traffic signals network-wide traffic operations objectives. It consists of intersection traffic signals, communications network and central computer.



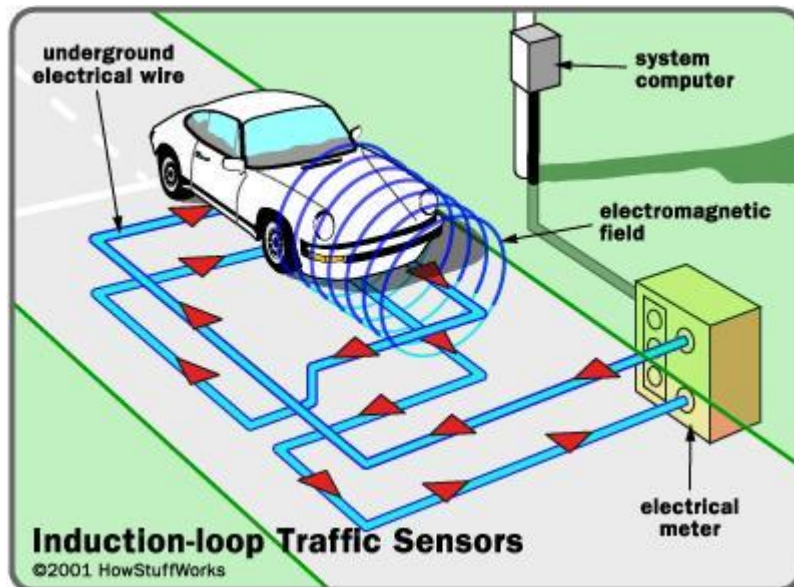
# TELEMATICS IN TRAFFIC CONTROL

- ◉ Interdisciplinary field which includes telecommunications, vehicular technologies, road transportation, road safety, electrical engineering and computer science.
- ◉ It includes technology of sending, receiving, storing information via telecommunication devices;
- ◉ The integrated use of telecommunications and informatics for application in vehicles;
- ◉ GNSS technology integrated with computers and mobiles communication technology.



# FLOATING CAR DATA

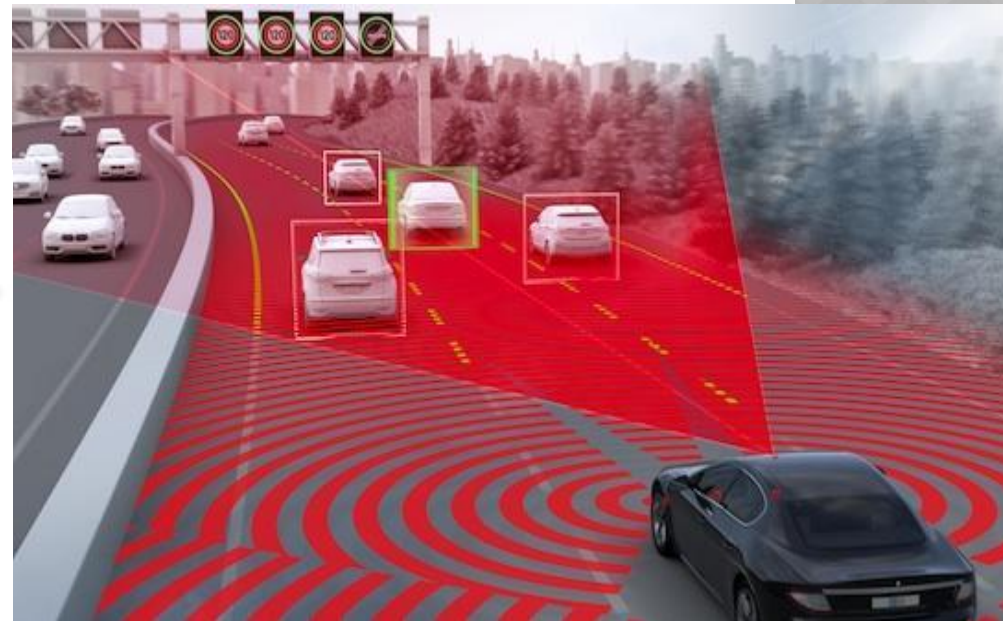
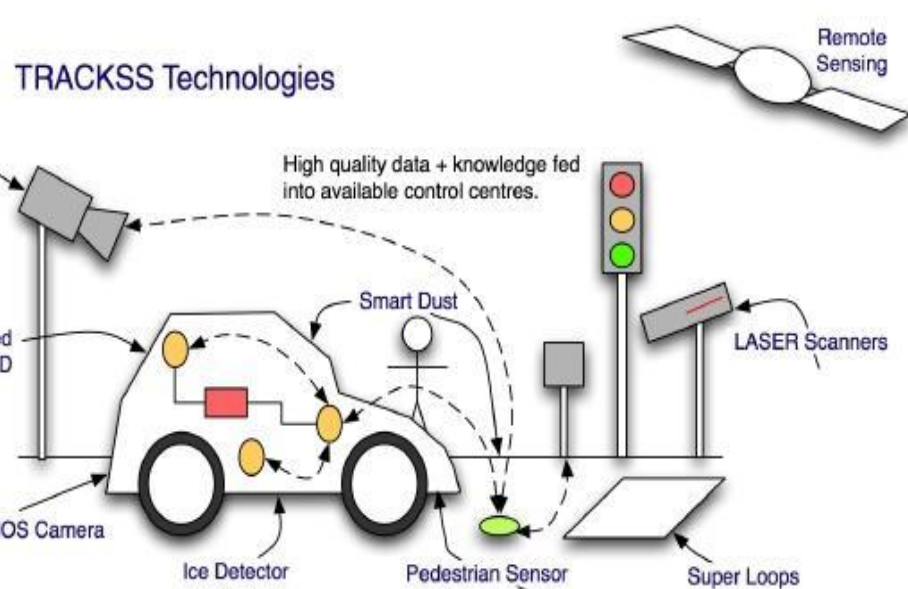
Known as a method to determine the traffic speed on the road network. It is based on collection of localization data, speed, direction and travel time information from mobile phones in vehicles that are being driven.



- 1) Triangulation method;
- 2) Vehicle re-identification;
- 3) GPS based method;
- 4) Smartphone – based monitoring

# SENSING TECHNOLOGIES

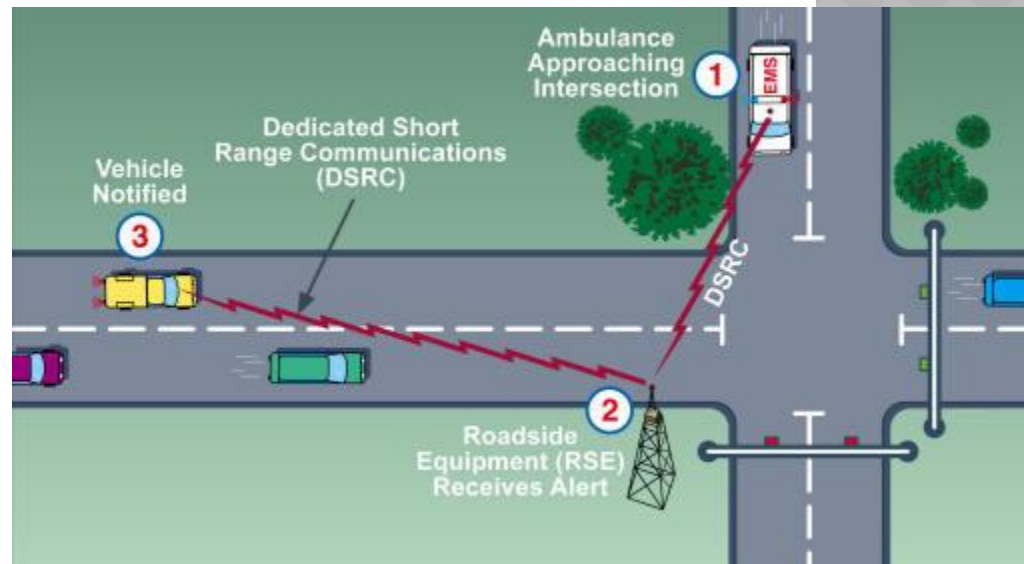
- ◉ Inductive loop detection
- ◉ Video vehicle detection
- ◉ Bluetooth detection
- ◉ Audio detection



Open, knowledge sharing sensors working together to get improved knowledge on the vehicle, the flow and the infrastructure.

# EMERGENCY VEHICLE NOTIFICATION SYSTEM

- ◉ Enables drivers to communicate with eCall operators
- ◉ Establishes emergency call automatically with the help of built-in sensors after an accident or it can be done manually





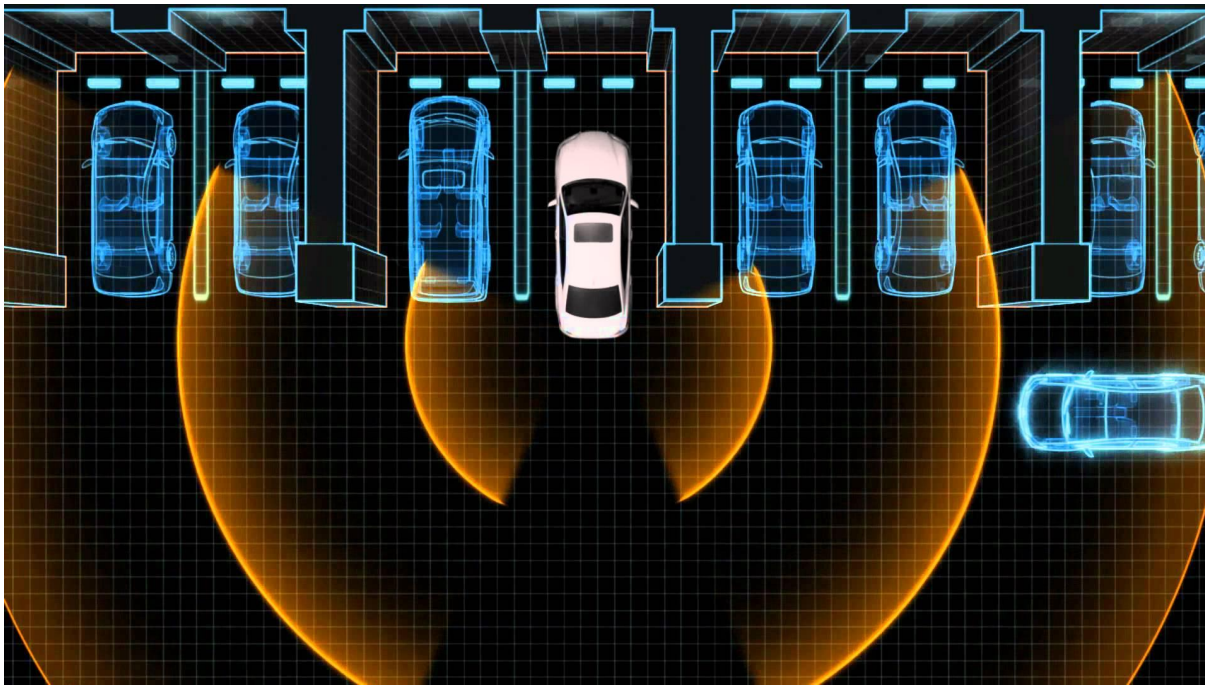
# AUTOMATIC ROAD ENFORCEMENT

- A traffic enforcement camera system, consisting of a camera and a vehicle-monitoring device, is used to detect and identify vehicles disobeying a speed limit or some other road legal requirement and automatically ticket offenders based on the license plate number. Traffic tickets are sent by mail.
- Speed cameras
- Red light cameras
- Bas lane cameras
- Level crossing cameras
- Double white line cameras
- High-occupancy vehicle lane cameras



# COLLISION AVOIDANCE SYSTEM

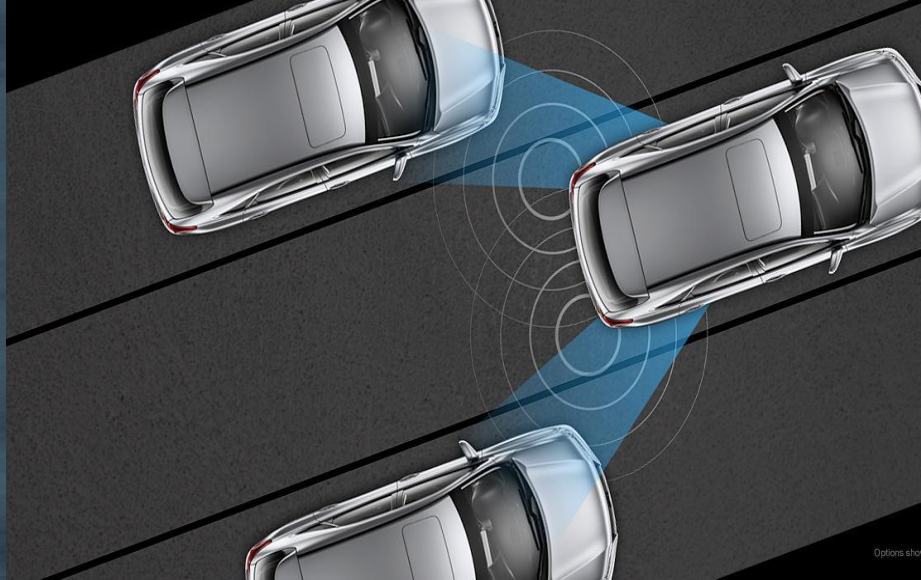
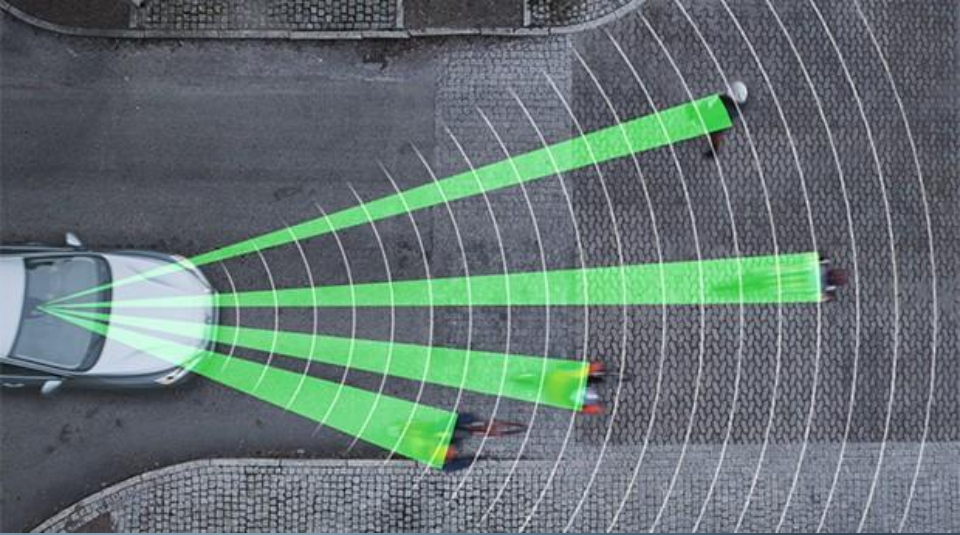
- Automobile safety system designed to reduce the severity of a collision. Also known as precrash system
- 1) Rear cross-traffic alert



# COLLISION AVOIDANCE SYSTEMS

- ◉ Rear cross-traffic alert;
- ◉ Forward collision warning;
- ◉ Blind-spot monitoring;
- ◉ Pedestrian detection and braking;
- ◉ Adaptive headlights;
- ◉ Lane departure warning;
- ◉ Drowsiness detection.

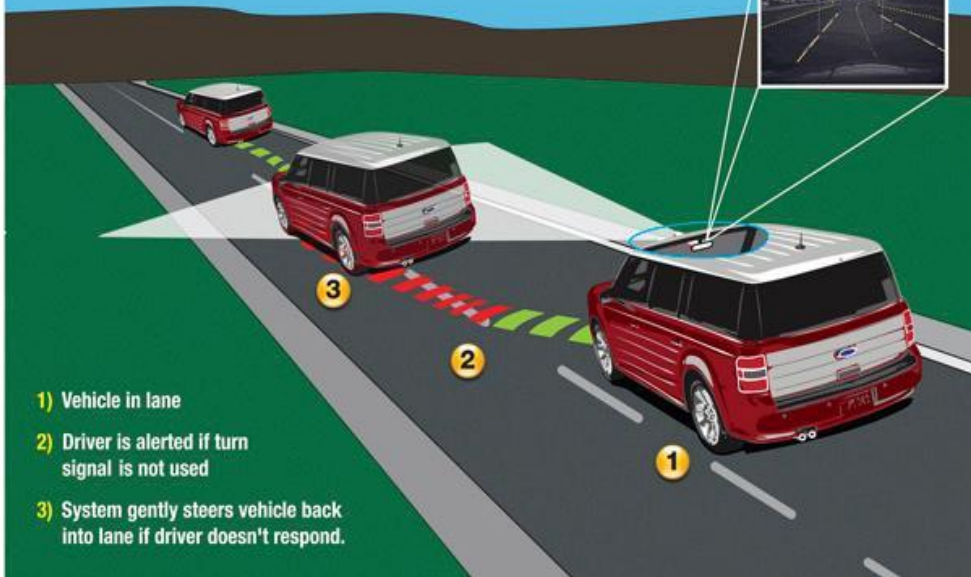
# COLLISION AVOIDANCE SYSTEM





Drive safe.

# Lane Keeping Assist



- 1) Vehicle in lane
- 2) Driver is alerted if turn signal is not used
- 3) System gently steers vehicle back into lane if driver doesn't respond.



Camera in the rear-view mirror tracks the driver's eyes



Camera can track blink rate and eye alignment



Aswell as head position



If it detects 'abnormal' movement the steering wheel vibrates and sounds an alarm

# BENEFITS OF ITS

- They can make transport safer, more efficient;
- The integration such technologies can create new services;
- They are key to support jobs and growth in transport sector;
- Enable users to be better informed;

THANK YOU