**Intelligent Traffic Systems**

An intelligent transportation system (ITS) is a technology, application or platform, that improves the quality of transportation or achieves other outcomes based on applications that monitor, manage or enhance transportation systems.

**Benefits**

Reduce traffic congestion, Reduced crashes and fatalities, Energy & environmental benefits, Time savings, better emergency response time services

**Applications**

eCall: system used in vehicles across the EU which automatically makes a free 112 emergency call if your vehicle is involved in a serious road accident.

Electronic toll detection

Real time parking management

Automated road speed enforcement

Speed alert adaptation

RFID in freight transportation

Smart roads

**GPS Tracking**

**Benefits**

Gas efficiency, Emergency locations, Apps uber and lift become available

**Primary development**

GPS possible due to measure the doppler distortion

New satellites with atomic clocks and measure signal phase comparison

**Applications**

Navigation: gps module, routing algorithm, network system, display

Remote tracking

Shipping

**Future**

Geofencing, Vehicle sharing, Automotive driving, Pre-crash sensing (PCS), Human factor in 90% of cases

**PRE CRASH SENSING**

**Basic protection**

Non-deformable passenger compartment, Seat belt, Headrest, Airbag, ABS, ESP, PCS System, Judge probability of collision, Help to avoid collision/ mitigate collision

System elements

SENSORS: a sensor is an electronic device capable of detecting or/and measuring a physical parameter of interest or an event and converting it into an electrical signal to be used in an electronic system.​

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COMMS/BUSES: multiple interconnections for big data transfers in components, that happen in a system.​

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ACTUATORS: Actuators are the components in charge of the final stage in electronic controls of this kind. They are tasked with transforming a control signal into mechanical movement or physical actuation.​

PROCESSING UNIT: executes instructions according to the program the system has. Manages the intercommunication of the components

**NIGHTVISION**

Night Vision with pedestrian detection is a sensor that, when activated, will help you stay aware of persons, vehicles, or animals that are out of reach of your headlights.

**Components**

Infrared camera: Sensitive to wavelengths from about 1,000 nm to about 14,000 nm

Lidar

Radar: radio detection and raging, determine 🡪 distance, angle, velocity and direction

**Passive**

Far-Infrarred Imaging (FIR)​

Only measures. No extra operations are performed

**Active**

Near-Infrarred Imaging (NIR)​

Needs an infrarred irradiator

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| --- | --- | --- | --- |
| **SystemTypes:​** | **Actuation:​** | **Sensor:​** | **Bus/Comms:​** |
| AEBS​ | Emergency Sound  Independent BrakingSystem​ | Obstacle detection and identification​ | Class C+​ |
| EmergencySteering​ | Short-time SteeringTakeover​ | Obstacle detection and identification​ | Class C+​ |
| AutomatedLane-Keeping​ | Steering Control  Speed Control  Braking Control. ​ | Obstacle detection and identification​  Car behaviour analysis.  ​ | Class C​ |