RUDNY & SALLMANN FORENSICS NEWS

Fall 2020 Newsletter

BICYCLE ACCIDENTS

Data from the National Highway Traffic Safety Administration indicate that nearly 4000 bicycle fatalities occurred in the last five years. An interesting fact is that only 7% of the bicycle fatalities in 2016 involved children under 15. The majority of bicycle fatalities did not occur in intersections. Approximately one third of all bicycle fatalities occurred when the rear of the bicycle was struck by the front of the motor vehicle. Bicycle rear impacts could be reduced with minor improvements to currently available motor vehicle front crash prevention systems. Some automobile manufacturers are already including bicyclist detection to their crash avoidance systems. However, with an increased number of bicyclists on the road, a greater demand for motor vehicle/bicycle accident analyses is expected.

Bicycle accident reconstruction can be based on evidence from many sources including bike damage, motor vehicle damage, distance the bicyclist travels from impact to rest, and injuries to the bicyclist. Event data recorded by the motor vehicle Electronic Control Module (ECM) or Airbag Control Module (ACM), and GPS data recorded by a device on the bicycle or the cyclist's smart phone can also aid in reconstructing the crash. Marks from the accident found on the roadway and debris from the crash can be useful in crash analyses. Issues to be considered in accident causation include bicycle and cyclist conspicuity and reaction time analyses. Frequently the cyclist has less time to perceive and react than the motorist.

AUTONOMOUS VEHICLE INTRODUCTION

Autonomous vehicles have been getting a lot of press recently, some of it good and some showing 'learning opportunities' for the car manufacturers. Suffice it to say autonomous vehicles are coming and many of the essential features necessary for vehicle autonomy may already be incorporated in your car today. The National Highway Traffic Safety Administration's (NHTSA) focus on improving road safety has helped to incorporate many systems which lay a foundation for autonomous vehicles. There are technologies found in many modern vehicles that warn drivers of vehicles, objects, or pedestrians around them, help drivers from making unsafe lane changes, and apply braking and traction control in certain situations. These systems utilize software coupled with sensors, cameras, and radar to detect and notify the driver of an imminent hazard. A download of a vehicle's Event Data Recorder (EDR), after an accident, typically shows which systems were active and engaged in the seconds leading up to a recorded event. This data can be useful in an accident reconstruction to help understand driver actions leading up to an accident.

There is a long-term strategy for integrating autonomous vehicles onto our roads which follows a staged progression of vehicle automation. The six (6) levels of automation as defined by the Society of Automotive Engineers (SAE) are:

Level 0 – ***No Automation***, human driver has full-time control of the driving task

Level 1 – ***Driver Assistance***, human driver has full-time control of the driving task, but vehicle may provide driving assistance with either steering or braking/acceleration, but not simultaneously

Level 2 – ***Partial Automation***, human driver MUST "monitor the driving environment", but in certain situations the vehicle itself can control both braking/acceleration and steering simultaneously

Level 3 – ***Conditional Automation***, human driver MUST be ready to take control of the driving task, but in certain situations the vehicle itself can control all requirements of the driving task

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Level 4 – ***High Automation***, the vehicle handles all driving requirements under certain situations, the driver may take control of the vehicle if necessary

Level 5 – ***Full Automation***, the vehicle handles all driving requirements under all situations, occupants are just passengers (with the ability to take control of the vehicle if necessary)

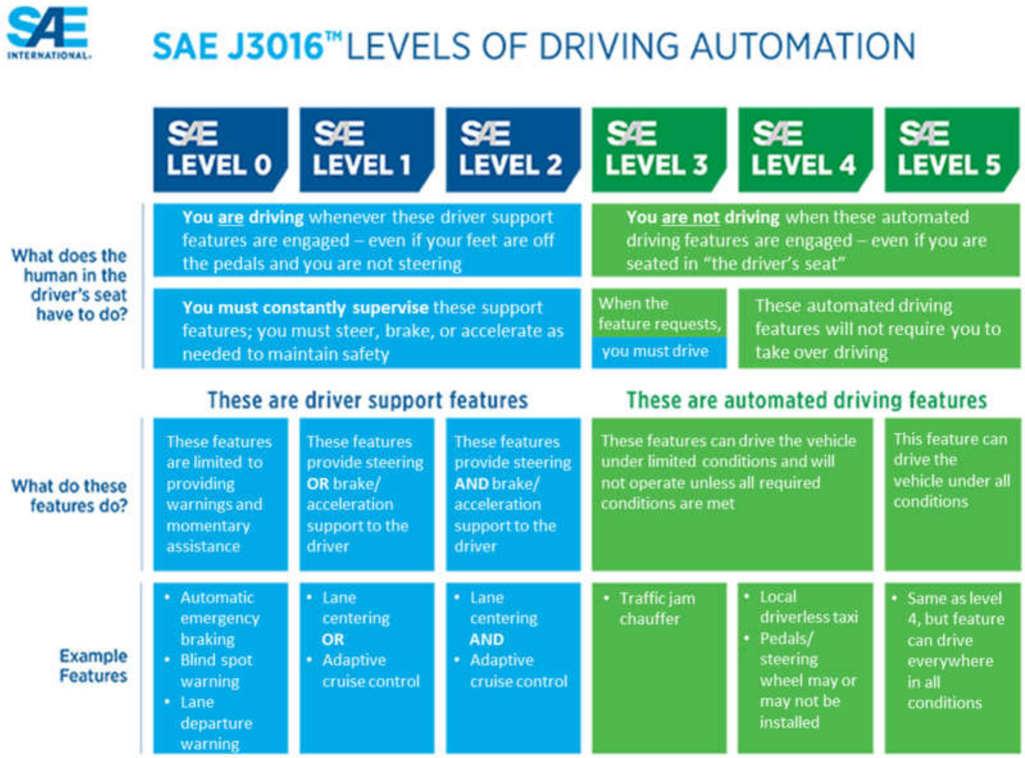

Figure 1. SAE Levels of Driving Automation (source SAE.org)

Glossary of Autonomous Systems

The following is a list of typical names for the many modern safety systems that form the basis of autonomous vehicles. This list is organized loosely by their evolution from *Cruise Control* to *Highway Autopilot* and as a whole are commonly known as ***Advanced Driver Assistance Systems*** (ADAS).

Cruise Control – speed of the vehicle is maintained at a speed set by the driver

Blind Spot Detection – uses sensors or cameras to notify driver of a vehicle in either of their side blind spots

Forward Collision Warning – notify driver of a potential forward collision when there is no braking by driver, evolved into 'Automatic Emergency Braking'

Lane Departure Warning –notify driver of an unintended (no turn signal) movement from the travel lane

Adaptive Cruise Control – has as many names as manufacturers, the evolution of 'Cruise Control' to maintain a set following distance of lead vehicles, may have the ability to intervene with 'Automatic Emergency Braking'

Automatic Emergency Braking – 'Forward Collision Warning' with brake application if the driver does not

Pedestrian Automatic Emergency Braking – 'Forward Collision Warning' with pedestrian detection and apply braking if the driver does not

Adaptive Lighting – automatically switches between high and low beam headlights in response to an oncoming vehicle

Rear Automatic Braking – detect a rear collision (when backing) and apply braking if the driver does not

Rear Cross Traffic Alert – similar to 'Rear Automatic Braking' but for potential collisions beyond the view of the backup camera, such as backing from a parking space

Lane Keeping Assist – the evolution of 'Lane Departure Warning' to automatically steer vehicle back into travel lane

Lane Centering Assist – the vehicle continually steers itself to keep vehicle centered in the travel lane

Highway Autopilot – multiple inputs continuously monitoring following distance and lane position of vehicle, applies steering, acceleration, and braking as necessary

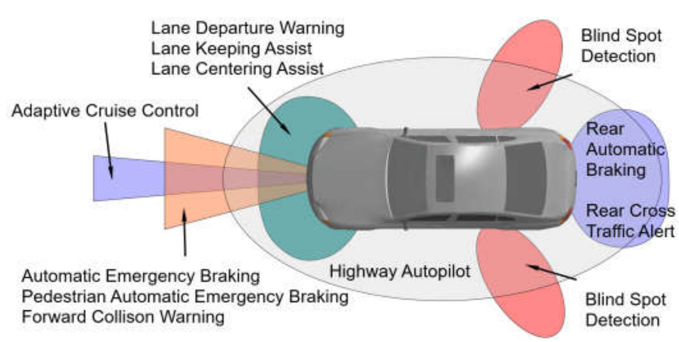

Figure 2. Typical zones for Advanced Driver Assistance Systems (ADAS)

We hope you will find this information helpful. As always, if you have any questions about any of the topics presented, we will be happy to speak to you without obligation.