INSTRUCTOR'S CORNER

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CARS WITH ADVANCED SAFETY SYSTEMS

AUTONOMOUS VEHICLES? SELF DRIVING CARS? VEHICLES WITH DRIVER AIDS?

It seems there is no consensus on what to call vehicles with some type of electronic intervention, vehicles which take some form of action/reaction without the driver being the initiator.

Car and Driver magazine in its November 2017 issue had a whole segment of the issue devoted to the general topic of "driverless cars". The magazine covers the range of issues which will be brought about by increasing levels of hardware and software which will eventually lead to cars which do not require a human to drive them.

The articles are very detailed and give examples and projections of things to come. Essentially, there are 6 levels of "automation" defined by an SAE standard.

Level 0-No automation-humans do everything-(the cars we all love).

Level 1-Driver Assistance-Under certain circumstances the car controls either speed or steering, but not both at the same time, Adaptive Cruise Control for example.

Level 2-Partial Automation-The car can steer, accelerate, and brake in certain conditions. The driver is still responsible for scanning the road and making decisions. Some Tesla models have some of these features.

Level 3-Conditional Automation-The car can manage many aspects of driving, including scanning the environment. If the car is in a situation that it cannot navigate, it asks the driver to take control.

Level 4-High Automation-The car can operate independently with human involvement, but only in conditions which are within its limitations. Roads that have not been scanned or situations which have not been programmed will require a driver to operate the car.

Level 5-Full Automation-The car can operate on any road or condition which a driver could successfully navigate.

So, at some point we will have a student who gets into his or her chair, enters a desired lap time on the Full Course at VIR, and we can sit in the paddock and drink beer/ or eat lunch.

But, that is (fortunately) still a ways off in the future. Right now we are in the Level 1/Level 2 worlds with some vehicles. A few vehicles may have some Level 3 features. There is a movement by some to skip Level 3 altogether, as it has a high risk/reward ratio, mostly because humans may just assume too much and forget they have some responsibilities.

As Instructors we now have to face the fact that we have to ask even more questions of our students. It is unlikely that we will know the capabilities of every car we enter, made more challenging by the fact that right now, some of the enhancements are still options. Unless the student knows what capabilities are present, most of us just won't know; which is kind of scary.

Fortunately the Tarheel Chapter does give us our student pairings several days in advance of an HPDS. This gives us an opportunity to communicate with the student, which could include getting more information about their vehicle, especially in the future as driver aids become more common.

The next page is a summary from Consumer Reports, showing which vehicles have/don't have some form of automation present. I am including BMW vehicles only, but you can look up most manufacturers here:

https://www.consumerreports.org/car-safety/cars-with-advanced-safety-systems/

Year	Model	Forward-Collision Warning	Autobraking City Speed/ Highway Speed	Lane Departure Warning	Lane Keeping Assist	Blind-Spot Warning	Rear Cross Traffic	Rearview Camera
16/17	2 Series	Opt.	Opt.	Opt.	NA	NA	NA	Opt.
16/17	3 Series	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	4 Series	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	5 Series	Opt.	Opt.	Opt.	Opt.	Opt.	NA	Opt.
16/17	5 Series GranTurismo	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	6 Series	Opt.	Opt.	Opt.	NA	Opt.	Opt.	Std.
16/17	7 Series !	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Std.
16/17	i3	Opt.	Opt.	NA	NA	NA	NA	Opt.
16/17	i8	Std.	Std./Opt.	NA	NA	NA	NA	NA
16/17	M3	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	X1	Opt.	Opt.	Opt.	NA	NA	NA	Opt.
16/17	X3	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	X4	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	X5	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	X6	Opt.	Opt.	Opt.	NA	Opt.	NA	Opt.
16/17	Z4	NA	NA	NA	NA	NA	NA	NA

- **Please note the! Next to the 7 Series. This vehicle can be outfitted with a semi-autonomous driving package.**
- **Automatic emergency braking (AEB):** Brakes are automatically applied to prevent a collision or reduce collision speed.
- **Forward-collision warning (FCW):** Visual and/or audible warning intended alert the driver and prevent a collision.
- **Blind-spot warning (BSW):** Visual and/or audible notification of vehicle in blind spot. The system may provide an additional warning if you use your turn signal when there is a car next to you in another lane.
- **Rear cross-traffic warning:** Visual, audible, or haptic notification of object or vehicle out of rear camera range, but could be moving into it.
- **Rear automatic emergency braking (Rear AEB):** Brakes are automatically applied to prevent backing into something behind the vehicle. This could be triggered by the rear cross-traffic system, or other sensors on the vehicle.

- **Lane-departure warning (LDW):** Visual, audible, or haptic warning to alert the driver when they are crossing lane markings.
- **Lane-keeping assist (LKA):** Automatic corrective steering input or braking provided by the vehicle when crossing lane markings.
- **Lane-centering assist:** Continuous active steering to stay in between lanes (active steer, autosteer, etc.)
- **Adaptive cruise control:** Adaptive cruise uses lasers, radar, cameras, or a combination of these systems to keep a constant distance between you and the car ahead, automatically maintaining a safe following distance. If highway traffic slows, some systems will bring the car to a complete stop and automatically come back to speed when traffic gets going again, allowing the driver to do little more than pay attention and steer.

Where does all this leave us?

It seems that "progress" will continue, eventually leading to "cars" that don't need us to function. In the meantime, there will be a very long period of overlap between cars driven by people, cars driven by both people and electronics, and cars which will eventually be driverless.

With respect to the cars that present themselves at our HPDS events, we really need to work at understanding the options and the actions that the options can take. Hopefully the car owner has some understanding of what they bring, and if the driver aids can be disabled for a specific purpose.

But, as is emphasized in our ITS program-"You cannot ask too many questions". It is the one you don't ask that may bite you.

There is a very good article by Tom Plucinsky in the September Roundel which describes more about what these vehicles are like to drive. You can find it at:

https://view.imirus.com/290/document/12689/page/89

As always, comments, suggestions and rants are welcome. You can do so at: instructordevelopment@tarheelbmwcca.org

Thanks

Scott