Ensuring safety through automobile electronics

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How many of us have seen cars swerving on the road because the driver is on the phone or texting? The reality is that more drivers are using mobile devices in cars and more electronics are being designed into new cars, such as smart phones, infotainment systems with large tablet-like displays, and various inputs/warning systems resulting in information overload. These gadgets dramatically increase driver distraction, causing the drivers to take their eyes off the road. With these hazards in mind, car manufacturers have embraced the Advanced Driver Assistance System (ADAS), defining various components within the vehicle to minimize collisions and possibly eliminate fatalities.

ADAS is evolving
In the first installment of this series, I referenced the use of rear cameras to reduce fatalities when vehicles reverse. This safety feature has been so successful that the National Highway Transportation Safety Administration (NHTSA) is preparing to mandate rear cameras for all new vehicles starting in 2014. This is just the beginning of ADAS's evolution and influence on automobile electronics. A slew of new features have been added to high-end cars that make driving safer, such as using radar, lasers and cameras for adaptive cruise control; collision avoidance systems and lane-departure alerts; and using an in-cabin camera facing the driver to monitor driver distractions. These features will eventually trickle down to mid-level cars in the coming years, as economies of scale makes these features more affordable and government mandates accelerate the adoption.

Fully drivable cars
As it becomes smarter, thanks to faster multi-core processors and greater range of sensors and cameras, the car will be capable of driving on its own. With the technologies discussed above, the car is capable of avoiding collisions today. The next step is to integrate those systems into the electromechanical systems of the car, such as brakes, steering and engine control. Furthermore, the adoption of machine-to-machine (M2M) technology will allow cars to interact with one another. Moreover, telematic and built-in GPS systems used to communicate with central traffic stations will allow pin-point accuracy of each car's position, speed and traveling direction.

The primary benefit of these efforts, of course, is driver and passenger safety but such a system will also improve traffic efficiency and reduce fuel costs. To get to this point, standards for safety and quality are moving forward to ensure automotive electronic suppliers can meet the stringent requirements set by standards such as ISO/TS16949, AEC Qualification, ISO26262 and ASIL ratings.

In the next installment of this series, we'll look at what's needed for electronics to be automotive-grade and meet stringent quality requirements, and how the right supplier of those electronics is critical.

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