New car tech: Not just crash protection, but prevention

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A car that can brake itself to avoid a fender-bender during the morning commute might seem far into the future. Except it goes on sale in March. That's when City Safety, a low-speed collision-avoidance technology becomes available on the new 2010 Volvo XC60, a crossover utility.

City Safety is just one of several new technologies designed to prevent car crashes and save lives. Auto sales are at a nearly two-decade low, but the pace of safety innovations continues unabated. Whereas air bags, anti-lock brakes and electronic stability control were the standard for a safe car until very recently, automakers continue to raise the stakes.

Radar, lasers and cameras work with computers and sophisticated software to do tasks unheard of just a few years ago. They tell you if you're falling asleep at the wheel, or if a car is in your blind spot. If you drift from your lane, they warn you, and in some instances, nudge you back into your lane. And modern cruise control doesn't just keep a steady speed, but can help your car keep a steady distance with the car in front of you.

"There's no question the vehicle itself has played a role in the decline of fatalities," said Rae Tyson, a spokesman for the National Highway Traffic Safety Administration (NHTSA). "But we're pretty much convinced there aren't that many safety benefits to be gained based on the crash-worthiness of passenger vehicles. The next frontier would be to help the driver avoid the crash in the first place."

All consumers should eventually benefit. Although most of the new systems first arrive in luxury vehicles, the most successful technologies usually show up in mainstream sedans and minivans within a few years. And prices fall as the rate of implementation increases.

There's evidence these new safety systems already are saving lives. NHTSA recently reported that the number of Americans killed in traffic accidents reached a 14-year low in 2008, and that the fatality rate per 100 million miles driven fell to 1.28, down from 1.37 in 2007.

The federal agency says electronic stability control and other "innovative technologies" have contributed to the decrease.

For many buyers, Volvo and safety are synonymous. Volvo has long marketed itself as the maker of the safest cars, and although the company still projects a Nordic reserve, it's unabashed about the new XC60, which will sell for under $40,000.

"We probably created the safest car in the world," said Thomas Broberg, a senior engineer at the Volvo Cars Safety Center in Gothenburg, Sweden.

The automaker, which is owned by Ford Motor, characterized City Safety as a world first. It demonstrated the technology at a media introduction of the XC60 in Sausalito last week.

Here's how it works: A windshield-mounted laser sends infrared rays out as far as 18 feet ahead of the vehicle. A computer analyzes the rays reflected back from any object ahead of the car, and if it concludes a collision is imminent, it automatically brakes the vehicle.

The system is designed to prevent the low-speed collisions often seen during bumper-to-bumper conditions when a driver fails to notice that

the car ahead has slowed down or stopped, Broberg said. Nearly 75 percent of all collisions take place at speeds below 19 miles per hour, data shows.

In half of those accidents, a driver never hits his or her brake pedal, Volvo research shows. City Safety can intervene and prevent a collision when a vehicle is traveling at 9 mph or less. At speeds between 10 and 19 mph, the impact of a collision will be mitigated.

The system requires no driver input. But once it has been engaged, a dashboard message tells the driver what has happened.

Broberg said Volvo's engineers purposely made the braking action very late and quite harsh. Why? Volvo worried that if the system responded gently, drivers would pay attention even less and just let the car stop itself.

"It brakes well outside your comfort zone," he said.

While the system might prevent collisions with pedestrians, bicyclists and animals, it's designed to use the reflective surfaces on the back of a car, such as a license plate and its lights.

Getting the car to stop isn't complicated. "That's the easy part," Broberg said. "To make sure it doesn't brake when it's not supposed to brake, that's the tricky part."

Volvo forecasts that City Safety might reduce the number of low-speed collisions by half. Already, he said, insurance companies in some European countries have said drivers of cars with the technology will see a reduction in insurance premiums.

City Safety is akin to another technology that has been on the market for

several years - adaptive cruise control.

Cruise control didn't change much for decades after it was first introduced by Chrysler in 1958. You simply set your speed and the car maintained it. That changed a decade ago with the introduction of adaptive cruise control, something that Mercedes-Benz called Distronic.

Now improved and called Distronic Plus and available on the 2010 E-Class that arrives later this year, the system relies on short- and long-range radar sensor sweeps that look ahead up to 656 feet. It can keep a car a preset distance behind a car in front of it by adjusting the brake and throttle and reacting if a car suddenly pulls into your lane. Rob Moran, a Mercedes spokesman, compares it to a rope, which can be slackened or tightened as needed.

Jaguar, Lexus, Volkswagen, Toyota, Lincoln, Acura, Hyundai and Cadillac are among the automakers with adaptive cruise control on some of their vehicles.

It'll be a standard feature on the 2010 Ford Taurus, a car that will sell for about $26,000. The adaptive cruise control system in that car comes with a collision warning system that gives a driver a visual and audible warning that slower traffic is ahead. It also pre-charges the brakes to help a driver stop more quickly.

The Insurance Institute for Highway Safety, a leading advocate in the U.S. adoption of mandatory electronic stability control by 2012, recently endorsed two technologies as having the most potential to help avoid or mitigate crashes, including fatal ones: forward-collision warning and lane-departure warning systems.

Forward-collision warning with automatic braking is now found on some Acura, Mercedes and Volvo models. The system uses radar to tell a

driver that a crash is imminent and it applies brakes in anticipation of it.

According to the insurance institute, about 2 million frontal crashes happen each year in the United States, or about 40 percent of all reported car accidents. The new technology won't prevent all of these accidents, but even if it affects "a fraction of the frontal crashes ... it really will produce a sizable benefit," said Adrian Lund, the institute's president.

Lane-departure warning systems are found on Audi, BMW, Buick, Cadillac, Infiniti, Mercedes and Volvo models. They use cameras to detect if a vehicle has crossed a lane marker without a turn signal operating, an indication the vehicle is drifting and the driver is drowsy, impaired or distracted.

"The potential benefit is to prevent head-on collisions, sideswipes and crashes into off-road objects, which numbered 500,000 per year during 2002 to 2006," the institute said in a recent report. "More than 10,000 of these involved deaths."

Both Volvo and Mercedes have in-house teams that investigate crashes involving their vehicles. Volvo's files now number 40,000 investigations, Broberg said.

"We have a vision when it comes to safety," he said. "We're working toward a crash-free future. We have a vision of having no fatalities or injuries in our cars. The best way of achieving that is to avoid a collision in the first place."

SAFETY ON THE ROAD

Here's a look at some other automotive safety systems starting to appear in today's cars:

• Adaptive headlights. Headlights that swivel slightly to provide better illumination in curves and corners have been available for several years. Mercedes-Benz says its Adaptive High Beam Assist technology, found on the 2010 E-Class models due out later this year, uses a windshield-mounted camera to adjust the beams downward so that they don't shine into the eyes of a driver in an oncoming car.

• Drowsy warnings. Both Volvo and Mercedes-Benz use a coffee-cup icon on the dashboard to tell drivers who appear inattentive that it's time to take a break. Volvo's Driver Alert Control and Mercedes-Benz" Attention Alert work in similar ways. The Mercedes system monitors 70 different parameters, spokesman Rob Moran said, particularly steering behavior. A driver who is drifting or one who hasn't made any adjustments in a few seconds might need an aural wake-up call.

• Blind-spot sensors. Found in Volvo, Mercedes and Jaguar models as well as mainstream vehicles such as the best-selling Ford F-150 pickup, this technology relies on multi-beam radar units on each side of a vehicle. Once a vehicle in an adjacent lane enters the prescribed blind-spot zone, a light on the corresponding side-view mirrors warns a driver not to shift lanes.

SOURCES: Automakers

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