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IN THE PIPELINE: A Car With Its Own Eyes

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NEW YORK -- One of the first rules taught to new drivers is to "keep your eyes on the road."

But the human eye has its limitations, which can have deadly consequences. So DaimlerChrysler AG (DCX) is exploring ways to give cars their own eyes that could help prevent car crashes.

The German automaker is developing a system that would use car-mounted video cameras to alert drivers when pedestrians or other cars cross their paths. The system could also be designed to automatically apply the car's brakes to avoid hitting the obstacle.

"We have suggested that with the use of all of the kinds of new systems we're talking about, we could cut the number of accidents in half in 10 to 15 years," said Bernard Robertson, senior vice president of engineering technologies and regulatory affairs. He cautioned that this goal was a "vision" and not based on a hard statistical analysis.

Drivers are most likely to encounter pedestrians in urban areas, so DaimlerChrysler is tentatively calling the system "urban traffic assistant," or UTA. Originating from research laboratories in Germany, UTA is also being studied at DaimlerChrysler facilities in Palo Alto, Calif., and in Michigan.

DaimlerChrysler is testing UTA in Mercedes-Benz E-Class vehicles, which are luxury sedans and wagons that currently sell at retail for about \$49,000 and above. The automaker declined to say how much extra UTA could cost. An existing radar-based system on some Mercedes-Benz cars costs about \$2,900 extra. That system, however, isn't designed to respond to pedestrians.

It's too soon to say when DaimlerChrysler will begin selling cars equipped with UTA, Robertson said. But the company envisions "significant deployment" of such systems within 10 years, according to the company's Web site.

One issue to be resolved is whether UTA will intervene in the vehicle's operation. That could irk drivers who like to be in control. So it's possible DaimlerChrysler would simply make UTA an alert system, or give the driver the option of switching off automatic intervention, Robertson said.

Eyes That Never Blink

Here's how it might work: Each vehicle has a box mounted behind the rear-view mirror. It contains two miniature video cameras, mounted about 12 inches apart from each other and pointed at the road.

The cameras are designed to be more perceptive than the human eye, able to determine the precise distance, speed and direction of objects up to 55 yards away. The human eye can only estimate these measurements.

When a pedestrian crosses a street in a car's path, the cameras detect the person, then if UTA determines that a collision may be imminent, it immediately sounds an alert. The alert could be a computerized voice or some other audio or visual signal.

If the driver hadn't already seen the pedestrian, the alert could theoretically provide enough time to swerve or

slow down to avoid hitting the person. DaimlerChrysler says UTA can identify most pedestrians in or near a car's path within a thousandth of a second.

In testing, UTA can record up to 25 images per second and detect any object that stands out from the road surface. It distinguishes between important and unimportant objects by matching the live images with previously stored images of standard roadway objects. It could detect stop signs, for example, and alert the driver.

To Intervene, Or Not To Intervene

If UTA is designed to include intervention, the detection of a crossing pedestrian could prompt the car to automatically slow down, no matter what action the driver takes.

But such intervention might not be popular with drivers, which DaimlerChrysler acknowledges. "We anticipate there would be a certain amount of resistance from people to have overt intervention," Robertson said.

One driver in suburban Philadelphia said he would have "strong reservations" about a system that takes control of his car. Terry Shea, a pharmaceutical market researcher living in Wyndmoor, Pa., said he would "tend not to trust" such a system, for fear of false alarms.

Even an advisory-only system, without intervention, might not appeal to Shea. "If it's ringing at everything, it's like the boy who cried wolf," he said. "You would end up ignoring it because it's just annoying."

Some people question whether it would be safe to have cars constantly hitting the brakes in congested urban environments.

"You don't want a system in New York City that's slamming on brakes all the time when someone's in front of you, because someone will slam into the back of you," said Francis Memole, vice president of sales and marketing at Iteris Inc., an Anaheim, Calif., developer of vehicle safety systems.

Iteris helped design a separate video-based system for DaimlerChrysler trucks that alerts drivers when they begin to drift across lane dividers. Iteris isn't directly involved in developing UTA, Memole said.

DaimlerChrysler hasn't decided yet whether to include intervention in UTA. "Our vision is not to seize control of the vehicle from the driver, or to somehow achieve autonomous vehicle control," Robertson said. The goal is "to improve the information available to the driver, help the driver make a decision, and in certain carefully selected cases, to have some form of intervention."

Pedestrian Deaths Already Declining

Even without cars that see, pedestrian deaths from auto collisions have generally declined in recent years. The number of pedestrians killed by vehicles in the U.S. fell by 11% to 4,882 in 2001 from 5,489 in 1994, according to the National Highway Traffic Safety Administration.

One possible reason for the decline is that fewer people are out walking. The proportion of American commuters who regularly walk to work fell to 2.9% of the work force in 2000 from 3.9% in 1990, according to the U.S. Census Bureau. The rate was as high as 10% in 1960.

Though pedestrian deaths have decreased, the importance of pedestrian safety will grow as the population ages, according to Alan Pisarski, a travel behavior consultant. Elderly drivers mingling with older pedestrians could increase the potential for collisions. This will put pressure on automakers to develop more technologies designed to help them avoid crashes, he said.

Some vehicles are already equipped with systems designed to reduce accidents of all kinds. Newer Cadillac models, which are made by General Motors Corp. (GM), offer night vision. Based on thermal-imaging technology used by the U.S. military, it uses infrared sensors to detect objects beyond the reach of a car's headlights. The images are displayed unobtrusively on the lower part of the car's windshield.

Any system designed to cut pedestrian accidents should include night vision, according to Michael Flanagan, a researcher at the University of Michigan Transportation Research Institute. About half of pedestrian deaths occur at night, he said.

Additionally, some carmakers have rolled out more advanced cruise-control features. These radar-based systems allow a driver to preset a minimum distance between his car and the car ahead. If the vehicle ahead stops abruptly, the car with adaptive cruise control begins automatically braking.

Will It Work?

But driver acceptance of these systems isn't guaranteed. "Unless these things are made very much second nature and don't need technological interaction, I think they're going to be hard to adjust to," Pisarski said.

And there is some skepticism that car-based technologies will do much to cut accident rates. In a recent report, the Insurance Institute for Highway Safety said crashes often develop too quickly for either alerts or interventions to prevent.

What's more, if drivers begin to believe their cars are accident-proof, they might drive more aggressively, which could lead to accidents, the institute said. The institute hasn't tested DaimlerChrysler's UTA because it hasn't been fully developed.

Also, too many alerts could distract motorists from the task at hand: driving. Even as the automakers develop these new technologies, they're proceeding with caution.

"A concern we have is drivers relying too much on those technologies, and not paying attention to their primary responsibility, which is eyes on the road and hands on the wheel," said GM spokesman Jim Schell.

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