

## More-advanced adaptive cruise control systems will help drivers safely deal with stop-and-go traffic, adjusting to the rapid changes in speed while maintaining reasonable distances.

not paying attention, their car will maintain that speed and possibly veer off the road or run into something straight ahead.

Around eight years ago, Mercedes began to offer an intelligent DA system called adaptive cruise control in its S-class automobiles. A forward-facing radar measures the distance to the vehicle ahead. Drivers push a button to determine whether they want their automobile to maintain a headway of two, three or more seconds behind that car in front. The system will then adjust the car's accelerator to maintain the user-specified gap.

Barnden said that recently introduced second-generation adaptive cruise control systems actually control braking as well. "If another driver cuts in front of you too close, the system will apply a small amount of braking power to maintain that two- or three-second gap, keeping a safe distance behind that car," he said.

Likewise, if traffic grinds to a halt, the adaptive cruise control system will slow or stop the vehicle, still maintaining that same driver-specified distance from the car ahead.

While admittedly more sophisticated than traditional cruise control, by DA standards adaptive cruise control is "one of the more basic advanced systems," Barnden said. Even more-advanced adaptive cruise control systems will help drivers safely deal with stop-and-go traffic, adjusting to the rapid changes in speed while maintaining reasonable distances. "Some can do that now," said Barnden.

In 2007, he said, OEMs sold 1 million cars with adaptive cruise control systems. Barnden expects that number to grow substantially, especially in Europe and Japan, as the technology makes its way into mass deployment and becomes even more sophisticated.

Indeed, OEMs and their suppliers are already revving up third-generation adap-

tive cruise control that combines a camera with the radar system to ensure that the car is actually matching the speed of the vehicle in its lane, and to anticipate threats such as other drivers pulling into the driver's lane, perhaps too closely.

"Third-generation systems add more intelligence to better estimate what's ahead and how much of a threat it is to you," said Barnden. "And based on that, what is the probability that you can simply ignore it or sound a warning to take preventative action to avoid a crash."

### Night Vision and Threat Assessment

Another segment of DA systems aims to give drivers a clearer view of the road ahead.

A prime example is night vision. Typically, these systems employ a camera with infrared illumination or thermal-imaging technology and use the navigation system display of the automobile to show heat-sensitive or IR images to drivers. The systems are very useful for spotting people and animals in the road that you might not otherwise see in time to avoid a collision. Due to the current cost of night vision technology, OEMs typically offer systems only on their highest-end vehicles, such as the Mercedes S-class and BMW 7 series. However, as the technology evolves, the industry expects night vision systems to migrate to mainstream vehicles.

OEMs sold 800,000 units with night vision technology worldwide in 2007, said Barnden, who expects that number will grow to 3 million units by 2015.

### Evolution of Lane Changing with DA Systems

Yet another segment of DA that companies are rapidly innovating involves assisting drivers in changing lanes.

OEMs have just started offering blind-spot detection systems that use radar sensors or, in some cases, cameras located on



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