A Guardian Angel for Your Car

Panasonic's cloud analytics will give drivers individualized warnings

By TEKLA S. PERRY

Vehicle-to-everything (V2X) technology– "everything" meaning other vehicles and road infrastructure–has long promised that a digital seatbelt would make cars safer. This year Panasonic expects to keep that promise by taking data to the cloud.

Car seatbelts, made mandatory in the United States in 1968, dramatically reduced the likelihood of death and serious injury. Airbags, becoming standard equipment some 20 years later, gave added protection. Roadway innovations– like rumble strips, better guardrail designs, and breakaway signposts– have also done their part.

In the past few years, however, the number of fatalities in U.S. car crashes has been creeping up–possibly (but not provably) because people are increasingly being distracted by their mobile devices. What's to be done, given how difficult it has been to get people off their cellphones?

Panasonic engineers, working with the departments of transportation in Colorado and Utah,

think they can help turn the trend around. They are starting with what some call a digital seatbelt. This technology allows cars to talk to the transportation infrastructure, sending key information like speed and direction, and enables the infrastructure to talk back, alerting drivers about trouble ahead–a construction zone, perhaps, or a traffic jam.

This back-and-forth conversation is already happening on stretches of highway around the world, most notably in Europe. But these efforts use limited informa-

tion–typically, speed, heading, and sometimes brake status–in limited areas. Panasonic thinks the digital seatbelt could do more for more drivers if it looked at a lot more data and processed it all centrally, no matter where it originates.

So, in the second half of this year, the company is launching Cirrus by Panasonic, a cloud-based system designed to make car travel a lot safer.

The Cirrus system takes the standard set of safety data that today's cars transmit along the controller-
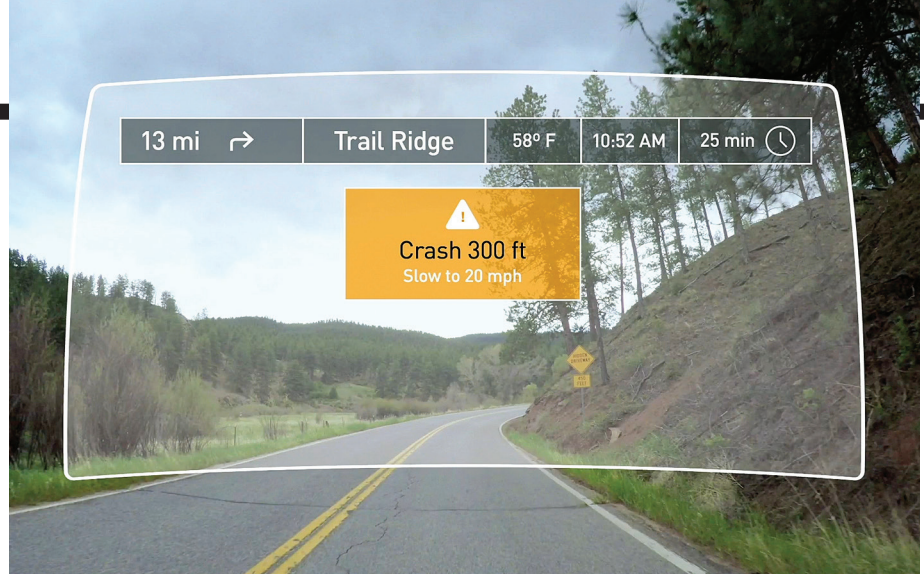
⚠
Crash 300 ft
Slow to 20 mph

area network (CAN) bus—including antilock brake status, stability control status, wiper status, fog light and headlight status, ambient air temperature, and other details and transmits it to receivers along the roadway. The receivers send the data to a cloud-based platform for analysis, where it can be used to generate personalized safety warnings for drivers.

This data is already being used in a number of ways by auto companies and researchers, but Chris Armstrong, vice president for V2X technology at Panasonic Corp. of North America, says Panasonic is the first company to use so much of it in a commercially available safety system.

"We are building a central nervous system for connected cars," he says.

Blaine Leonard, transportation technology engineer for the Utah Department of Transportation, says, "Right now, when you are driving down a road, you might see a static road sign that says, 'Bridge ices before road does,' or an electronic sign that says 'Ice ahead, beware.'" Drivers generally don't pay much attention to these very imprecise warnings, he notes. But with Cirrus, Leonard says, "the temperature gauge of a vehicle passing through the area, along with the slippage of its wheels, will give us the exact location of the ice, so we can send that as a message to be displayed on the dashboard of a subsequent vehicle: 'Ice ahead, 325 feet.' A driver will be more likely to pay attention to a message that really is just for him. And if he passes through the area and the ice is no longer there, his vehicle will report that back, so the next driver won't get the alert."

Or consider an airbag deployment. "With this system," Leonard says, "we will know within sec-

onds if an airbag deployed, how fast the vehicle was traveling, and how many other cars in that area had airbag deployments. That information can allow us to get an emergency response out minutes faster than if the accident had been reported by a 911 call, and two to three minutes can save a life."

The Utah Department of Transportation, along with its counterpart in Colorado, is acting as a test bed for the technology. The Utah people expect the data-gathering side of their system to be operational in May. It will start with 30 state-owned vehicles and 40 roadside receivers this year, with each receiver designed to transmit for 300 meters in all directions. (Receivers don't have to be placed so that their individual ranges always meet; the system will also be able to briefly store data locally and share it with the cloud moments later.)

In the next few years, Utah plans to roll out 220 roadside sensors and equip thousands of vehicles to talk to them; although the department has a five-year plan to work with Panasonic, the exact pace of installation hasn't been set. Last year, Colorado installed 100 receivers and equipped 94 vehicles; plans to go further are currently on hold pending evaluation by the state's new administration.

Panasonic will feed data collected from these two implementations into machine-learning

▲ **HEADS UP:** Precise warnings of problems ahead can be targeted to individual drivers, as in this mock-up of a display.

programs, which will make the algorithms better at predicting changing or hazardous road and traffic conditions. "For example, if we can build up historical data about weather events—ambient air temperature, status of control systems, windshield wipers—our systems will learn which data elements matter, understand the conditions as they develop, and potentially send out alerts proactively," Panasonic's Armstrong says.

Using the system today requires adding a module that collects the data from the CAN bus and sends it to the receivers, receives alerts, and displays the alerts to the driver. Panasonic's engineers expect that its system will soon have the capability to collect the data and send it out either via dedicated short-range communications (DSRC), a variant of Wi-Fi, or by cellular-based vehicle-to-everything (C-V2X). One or the other method of wireless communication will eventually be built into all cars. Volkswagen is incorporating DSRC in its latest Golf model, and Cadillac has announced plans to start offering it in its crossover vehicles.

And then Panasonic will be free to focus on running the cloud-based platform and making the system available to app developers. The company expects that those developers will find ways to enhance safety even further. ∎

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