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TECHNOLOGY

Windshield Devices Bring Distracted Driving Debate to Eye Level

By **MATT RICHTEL** MAY 29, 2015

In a widely watched YouTube video, a man is driving around Los Angeles when his phone rings. On a small screen mounted on the dashboard, an image of the caller, the man's mother, appears.

But there's an optical twist: The image actually looks to the driver as if it's floating just at the front edge of the car, right above the roadway. The man answers the call with a gesture of his hand.

"Hi," his mother says over the car speakers. "I just wanted to say I love you."

"I love you," the man responds, and then, before signing off, "I'm making a video right now."

That video — the one posted on YouTube — was a promotion commissioned by Navdy, one of a handful of start-up companies bringing a futuristic spin to the debate over distracted driving, and how to curb it. The devices project driving information and data streamed from a smartphone into a driver's field of view. There are several versions of this nascent technology, but they generally work by using a projection device that wirelessly picks up information from the phone and uses sophisticated optics

to allow the information — maps, speed, incoming texts, caller identification and even social media notifications — to hover above the dashboard. Hand gestures or voice commands allow drivers to answer a call or hang up.

This technology is in its infancy. Navdy's device isn't shipping until later this year, and it's not clear if it will work as seamlessly as presented in the video when used in less perfect real-life conditions. But, broadly speaking, the Navdy device falls into a booming category of in-car gadgetry that might be fairly categorized as "you can have your cake and eat it too." Drive, get texts, talk on the phone, even interact on social media, and do it all without compromising safety, according to various makers of the so-called head-up displays, repeating a position taken by a growing number of automakers who sell monitors set into the dashboard or mounted on it. Some carmakers also display basic driving information, like speed and turn-by-turn directions, within a specialized windshield so a driver can remain looking ahead and not down at the instrument panel.

Google with Android Auto and Apple, with CarPlay, have also leapt into the evolving business. Each allows phones to be plugged into a car's USB port so that information streams to a monitor set into the dashboard. IHS Automotive, a company that analyzes car industry trends, expects many automakers to integrate these systems. IHS consumer surveys indicate drivers want systems that provide maps, music, news and social connection.

These emerging display devices have become part of a debate over whether technology can provide safer ways for people to multitask while driving. Safety advocates argue that technologies that try to minimize the dangers of multitasking are based on the false premise that drivers can safely attend to the road while juggling social communication — and are, in turn, encouraging a risky behavior.

The argument on the other side boils down to a simple notion: Drivers are going to do it anyway, so why not minimize the riskiest kinds of multitasking,

like looking down at the phone or handling it?

People use their phones too compulsively to expect them to stop, said Nagraj Kashyap, senior vice president for ventures and innovation at Qualcomm Ventures, an investing arm of the telecom giant, which recently injected $3 million into Navdy. “To completely eliminate it is a pipe dream,” Mr. Kashyap said of motorist multitasking. “The best way to handle it is to make it as safe as you can.”

The federal government has issued nonbinding guidelines that govern car “infotainment systems,” and one of its main messages is that performing certain nondriving tasks interferes inherently with a driver’s safety. Experts in the science of attention say that some of the new head-up displays may be raising risks that are so plain that you don’t need to be a driver’s mother to appreciate them.

“It’s a horrible idea,” said Paul Atchley, a psychologist at the University of Kansas who studies driver distraction. Attending to the road is much more complex than having your head turned toward it, he said. “The technology is driven by a false assumption that seeing requires nothing more than having the eyes fixed on the right spot.”

Navdy, which is based in San Francisco, has raised $26.8 million, said Doug Simpson, the company’s founder and chief executive. Mr. Simpson is a computer scientist who spent 10 years at Hewlett-Packard. Even though the company’s $299 device isn’t shipping until later this year, it has already received $6 million in preorders, Mr. Simpson said.

Mr. Simpson said he got the idea for the device during a trip to Bangkok. Like many visitors, he was trying to figure out a map on his phone while driving on unfamiliar streets. He narrowly escaped rear-ending another car.

It’s not surprising that Mr. Simpson’s aha moment started with navigation. Maps, driving directions and other driving-focused information

are important features of many of these products, the idea being that any task that relates to driving should be done as safely as possible. Part of what has created an opening for products like Navdy is a sentiment among many consumers that the navigation and touch-screen systems built into many cars are wonky, and research shows that voice command systems can be so inaccurate that they create distraction.

At the same time, though, the developers of head-up displays also are making a major selling point of aiding motorists with tasks that have nothing to do with driving.

The Navdy device is roughly the shape and size of a hand-held CD player and mounts on the dashboard. From its top unfolds a small transparent screen through which information streamed from the phone is projected: speed, map information and notifications of incoming calls and texts that include the identity of the sender, but not the text itself. To answer a call, the driver swipes a hand in the air, or slides it across the steering wheel, a gesture picked up by the dashboard device in somewhat the same way a Nintendo Wii console works.

The image will look to the driver a bit like a hologram floating about five and a half feet in front of the windshield, Mr. Simpson said, roughly where the front of the car meets the road. “It’s safer than looking down at the dashboard or at an image on your phone,” he added.

In the YouTube video commissioned by Navdy, the driver (who owns the company that made the video), says the technology is “just like what commercial airline pilots use when they’re landing.” He adds: “You hear that? Pilots use it. It’s safe.”

“Not true,” countered Christopher Wickens, a professor at Colorado State University and one of the leading experts in the country in safe use of head-up displays for transportation. Dr. Wickens said that the head-up displays used

by airplanes show only information critical to flying, like an outline of the runway or the horizon, and crucially, that information is often displayed as a visual overlay with the actual runway or horizon. By contrast, a head-up display in the car that gives nondriving information that is out of alignment with the road "is the worst of two worlds," Dr. Wickens said. "It is clutter, contributing to potential failure and distraction contributing to potential failure."

He said that when the information projected is related to driving and made simple — like speed or a navigation arrow — it appears from his research to provide a modest safety advantage. But the social information "counteracts, takes away" any small benefit the driver might get from driving information that is properly aligned.

Another company seeking to draw the airline parallel is WayRay, which has its headquarters in Switzerland. It plans to start selling a device that displays data that is not just in the driver's line of sight but, the company said, appears to the driver to be at a distance from 32 feet all the way to the horizon. The company has $6 million in funding, mostly from Russian investors, and it expects to close on another round from Silicon Valley venture capitalists by the end of June, said Vitaly Ponomarev, the company's founder and chief executive.

He said the emphasis was on driving information, while social media applications are available at slow speeds. "When the vehicle speed is less than 10 miles an hour, we open an additional channel, our 'infotainment' channel," Mr. Ponomarev said. "We can push information from any applications — Instagram, Facebook, Twitter."

He said the information appears slightly to the side so as not to interfere with driving and will be streamlined: "Plain information, plain text, nothing flashing that distracts."

But neuroscientists and safety advocates said any visual clutter disturbs focus by presenting a cognitive distraction, meaning that the images take the mind off the road. Such distraction makes it extremely difficult for a driver to respond to a sudden threat.

There is another concern: Head-up technology focused on social media and communication creates the risk of normalizing the behavior of multitasking, “as if we’re telling people it’s O.K. to do it,” said Deborah Hersman, the chief executive of the National Safety Council, a nonprofit.

Ms. Hersman was formerly the chairwoman of the National Transportation Safety Board, where she was involved in the regulation of head-up displays for airlines. That technology, she said, was permitted after extensive testing on the safest practices, but, she explained, “the same isn’t true for cars.”

“Tech and innovation in the auto industry are moving so much faster than the regulators can keep up with it,” she said. The Department of Transportation has sponsored research at the Virginia Tech Transportation Institute into whether the safety benefit of having head-up displays in cars outweighs the risk of distraction; that study is expected to conclude in 2016.

Another take on the fledgling technology comes from a Vancouver, British Columbia, start-up called DD Technologies — started by two entrepreneurs who said they were inspired to build a head-up display after watching an “Iron Man” movie. The company’s display, Iris, which should soon be available in limited quantities, allows drivers to read the contents of a text. But the entrepreneurs say they’re not encouraging the behavior — well, not exactly.

“We’re not saying you should be texting and driving,” said the company’s co-founder Dino Mariutti. “We’re saying you should make it safer.”

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