Will Americans accept self-driving cars?

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Credit: AI-generated image (disclaimer)

Just before the turn of the 20th century, a new and frightening technology was introduced to the American public. These "horseless carriages"—as the first motorized vehicles were called—were deemed loud, dirty, and dangerous, and a nervous public was slow to embrace them. An 1897 magazine article described a first car ride in this way:

"There is a sense of incompleteness about it. You seemed to be sitting on

the end of a huge pushcart, propelled by an invisible force and guided by a hidden hand…Gradually I felt that I did not need the protection of a horse in front of me."

Today, we are at the brink of another radical shift in our transportation technology. Will Americans—famous for our car culture—accept a more passive role as passengers in largely self-driving cars?

"Absolutely," says Sean Brennan, associate professor of mechanical engineering at Penn State and director of the university's Intelligent Vehicles and Systems Group.

"Drivers today are already quite willing to give up their driving tasks, as long as it is to someone that they implicitly trust. We see this every time someone hails a taxi, hires a chauffeur, or hands the keys over to a friend on a long drive."

The psychological hurdles are more ones related to ownership and responsibility, explains Brennan. "We don't have a culture, outside of multi-millionaires, where we hire or trust strangers to drive vehicles we own ourselves. Many of these hurdles are related to trust and assumption of reliability. But given that the richest people in the country are happiest letting others regularly assume their driving burdens, there's no reason to believe that the general public wouldn't be similarly interested."

Thanks to recent advances in GPS, radar and laser technologies, autonomous vehicles, aka driverless cars, are no longer the stuff of science fiction. Several states have already legalized their use, and some predict that self-driving cars will be a routine part of life within a decade or less. In fact, General Motors has announced that its first self-driving car—a Cadillac—will hit the market in 2017.
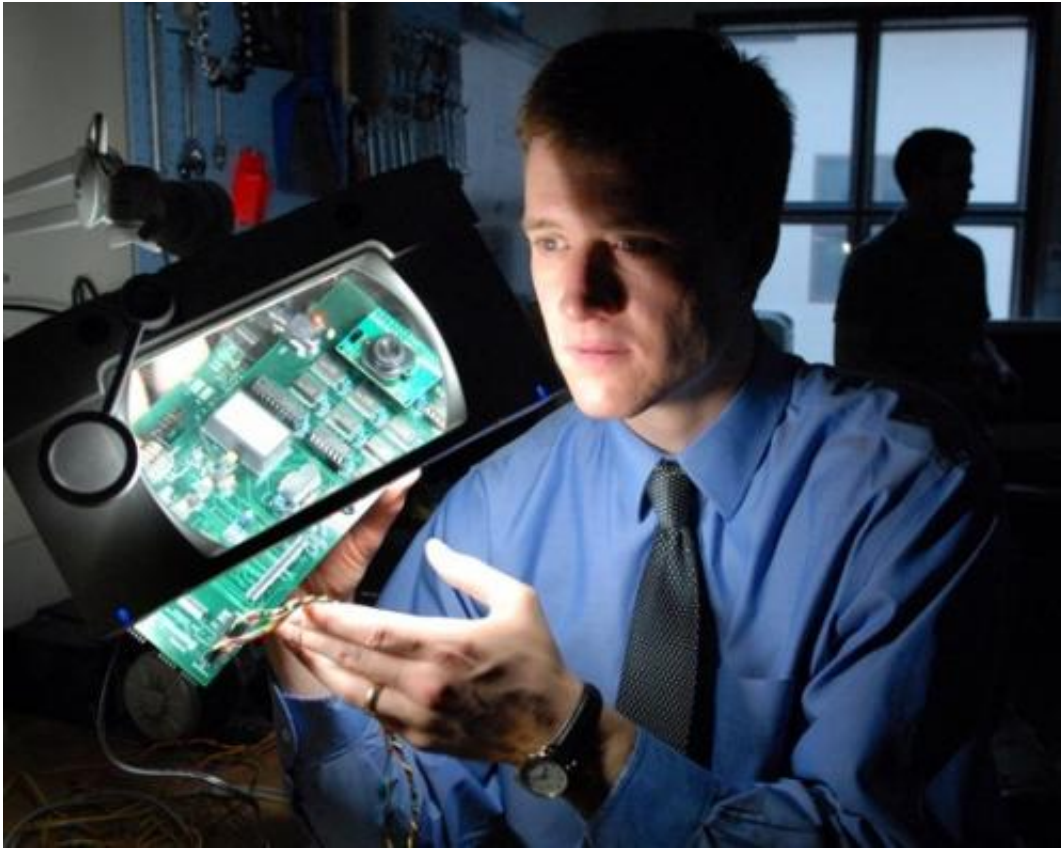
Sean Brennan, associate professor of mechanical engineering at Penn State and director of Intelligent Vehicles and Systems Group. Credit: Penn State

Although the technology is exciting, "real challenges exist," Brennan explains. Even highly unlikely scenarios for one vehicle can become daily events nationwide, considering the hundreds of millions of vehicles on the road every day."

If and when something goes wrong, it's not clear who would be responsible, notes Brennan. "Who is going to be held liable when a self-driving car causes injury to others?" he asks. "The engineers who programmed the car's computer? The manufacturer? The owner?" And when a self-driving car gets pulled over for a traffic violation, who gets

the ticket? On roads shared by human-operated and robotic vehicles, the number of possible legal, ethical and insurance conflicts seems infinite.

As far as infrastructure, Brennan says, "there is a growing need for vehicle-to-vehicle to and vehicle-to-infrastructure communication systems." For example, he adds, "We do not want a thousand automated vehicles driving at a three-foot spacing interval on an interstate exchange to suddenly decide to put the driving into human hands right at the exchange, thereby causing an instant traffic jam—or accident!" The infrastructure and surrounding vehicles will be required to communicate very important data about such things as congestion, accidents, collision hazards, and road conditions, Brennan expects.

Although increased safety on the road is expected to eventually become one of the main benefits of autonomous cars, we are not there yet, says Brennan. Google's self-driving car project, launched in 2009, has now logged over 700,000 miles.

There have been two reported crashes, he explains, and "multiple crashes of autonomous vehicles" in the DARPA Grand Challenge, the Defense Department's annual driverless car competition.

What's more, says Brennan, "The testing is not a fair representation of autonomous driving, as there are still humans in nearly all of these vehicles who are intervening when they perceive dangerous situations."

"In terms of improving safety," says Brennan, "one long-term advantage is that crashes in self-driving cars can be carefully documented and explored with as much care as a plane crash." This will enable companies to continue refining the technology to address specific problems.

Perhaps the biggest benefit of self-driving cars? Saving time and improving quality of life, says Brennan. "There is a time-obsessed

segment of American culture that is pushing toward autonomous driving," he explains. Brennan.

"We are one of the most work- and time-focused societies in the world. Millions of people have commutes to work of an hour or more each way, and these are often considered wasted hours in our lives."

If we can improve our productivity by getting work done while the vehicle drives for us, he adds, "I have little doubt that people will embrace it. Indeed, most would pay a great deal of money for a few extra hours a day."

In time, we may need to decide if humans are even required to be in the vehicle, Brennan adds. "Wouldn't it be nice to just send the car to pick up the kids at soccer practice?" he asks, with a grin.

Provided by Pennsylvania State University

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