

Bring on driverless cars

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Many baby boomers might want a driverless car to maintain their independence, and it would be a boon for the disabled, says William Messner. Photo: Alonso Nichols

Imagine no more gridlock, road rage and drunk driving—and 90 percent fewer car accidents. You could well be able to sit back and enjoy the ride sooner than you think, according to the engineers who are designing our cars of the future.

"It may only be as little as a decade away," says William Messner, the John R. Beaver Professor of Mechanical Engineering, who edited *Autonomous Technologies* (SAE International, 2014), with chapters written by scientists and engineers about how quickly technology is bringing us an altered transportation reality.

Plenty is happening already. In early January, NASA and Nissan announced a five-year R&D partnership to develop driverless cars that can not only navigate roadways on Earth, but also the surface of Mars. Several major auto manufacturers have said they will bring self-driving cars to market in the next few years. And last September, Audi became the first company to receive California's new autonomous driving permit, which will allow the company to test its self-driving vehicle on state roads.

Driverless vehicles have the potential to save thousands of lives, Messner says. "Most car [accidents](#) are caused by drivers themselves. Those deaths and terrible injuries would be eliminated, and [drunk driving](#) would be a thing of the past—you just tell your car to drive you home."

It's probably too early to start saving up for a down payment, though. "What we are seeing is new technology being introduced little by little, and so we are getting used to having cars do more things for us," he says.

Most current car models have some automated systems, such as antilock brakes and cruise control. More advanced models warn a driver when a car is passing, or they have onboard cameras that let drivers see the ground behind them as they back up. Many luxury vehicles can even park themselves.

While existing smart cars use radar and sonar sensors, the demonstration cars that actually drive themselves also use the sensing technology known as lidar, which calculates distance by measuring the time it takes for light to travel to a surface like the curb and back.

"These features are paving the way for the next phase," when you can take your hands off the wheel and let the car maneuver itself down the highway or in stop-and-go city traffic, Messner says.

Obstacles on the Road

Before that comes along, though, cars with limited autonomous features will be available, such as those that employ a combination of cameras, lasers, sensors and computers to stay within highway lane markers while the driver's hands are off the steering wheel.

An advanced form of cruise control could potentially adjust a car's speed to match the flow of traffic and maintain a safe distance from the car in front of you—without your having to hit the gas or brake.

Companies are developing driverless cars partly in response to changing demographics, Messner says. With baby boomers reaching the age when they should no longer be driving, automakers don't want to lose them as customers. Many might want a [driverless car](#) to maintain their independence, he says, and it would be a boon for the disabled. Another potential market is young people who have little interest in learning to drive. And even why wait until you're 16 years old to drive—why not drive at age 10, he asks.

Messner envisions a not-too-distant future when you would summon your car with your cell phone. It would pick you up, and you would program it to take you where you choose.

Some vehicles now being tested can determine when a driver's eyes are closed to sense a drowsy driver. Down the road, cars might also monitor a driver's blood pressure and body temperature, which would allow the car to report a medical emergency.

A number of technological problems remain as roadblocks, he says. There are problems with interpreting the data gathered by the lidar remote-sensing technology, for example.

Lidar also can't distinguish between hard and soft things, and can't tell what's behind a façade. "While humans also make models of the world, ours are based on rules of visual perception that we have learned," says Messner. "How we judge distances is based on how we understand the way the world operates, so our picture is fuller."

There are other complications, too. We'll need laws and regulations to safely accommodate driverless cars on our roadways. And what about the transition period, when driverless cars share the road with traditional vehicles? Things are bound to go wrong. California, Nevada, Florida and Michigan are the only states that now allow autonomous cars.

But the technology is on a fast track, and many are ready to leave the driving to someone (or something) else. "Ten years ago, people said it couldn't be done and that they didn't want driverless cars," Messner says. "But now it is being done, and people are changing their minds."

Provided by Tufts University

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