

When Will Driverless Cars Rule the highways?

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Experts predict widespread adoption of fully autonomous vehicles within the next 10 years, but significant barriers remain between driverless cars and public roads.

Has the future arrived yet? For the better part of the past century, most visions of the world of tomorrow have included motorways filled with fully autonomous vehicles speeding passengers from place to place, following the rules of the road and communicating with each other to avoid collisions and minimise or eliminate congestion.

We may not be there yet, but thanks to rather sizable investments in research and development on the part of vehicle manufacturers and technology firms, driverless vehicles do exist. In fact, a multitude of new vehicles include some form of autonomous control, chiefly in the form of systems designed to help drivers avoid forward collisions and unintended lane departures.

Levels of Control

The Society of Automotive Engineers (SAE) has classified vehicle automation in six distinct levels (to be verified...):

- Level 0: **No Automation** - The driver controls all aspects of operation.
- Level 1: **Driver Assistance** - One or more "semi-autonomous" systems may be in place to assist the driver, such as emergency braking.

- Level 2: **Partial Automation** - The driver must be prepared at all times to take command, but systems to control steering, braking and acceleration allow the vehicle to navigate the road.
- Level 3: **Conditional Automation** - The vehicle is able to navigate the road and the driver need only respond to requests to intervene.
- Level 4: **High Automation** - The vehicle can start and complete an entire trip on its own without human intervention.
- Level 5: **Full Automation** - The vehicle only operates autonomously and is not equipped with manual controls.

Vehicles boasting Level 2 control are commercially available now. Perhaps the best-known among them are Tesla models equipped with "Autopilot," the electric vehicle manufacturer's proprietary autonomous control system, which allows drivers to take their hands off the wheel and their feet off the pedals while their vehicle scans the road ahead for lane markings, street signs, other vehicles and pedestrians.

Benefits and Concerns

A fully functional, Level 4 or 5 autonomous vehicle should be far safer than a manually operated vehicle. The vast majority of collisions are preventable, and most can be chalked up to human error. Eliminating that factor should, in theory, reduce the rate.

Further benefits could include reduced gridlock (and emissions) and improved accessibility for those who require transportation but are unable to drive. Driver productivity should be enhanced as commuters gain the opportunity to complete paperwork, check emails and text messages and make phone calls while in transit.

Of course, there are also concerns, and regulatory concerns are chief among them. Driverless vehicles are a new addition to an existing and rather complex transportation system. As it stands, there is no clear framework for regulating the sale and operation of fully autonomous vehicles.

It is a complex issue. Questions about legal liability, privacy issues and insurance costs abound. There is also an ethical dilemma at play: Will an autonomous vehicle act first to protect itself, its occupants or the vehicles and pedestrians in its path?

Concerns aside, analysts with the global research and consulting firm of Frost & Sullivan believe driverless vehicles will become increasingly common in the years ahead. They have predicted that more than 1 million Level 4 vehicles will be on the roads of Western Europe by 2021, and that number will rise to 8 million by 2025, after which production and sales volumes will grow "rapidly," earning a small but respectable share of the total number of registered vehicles by 2030.