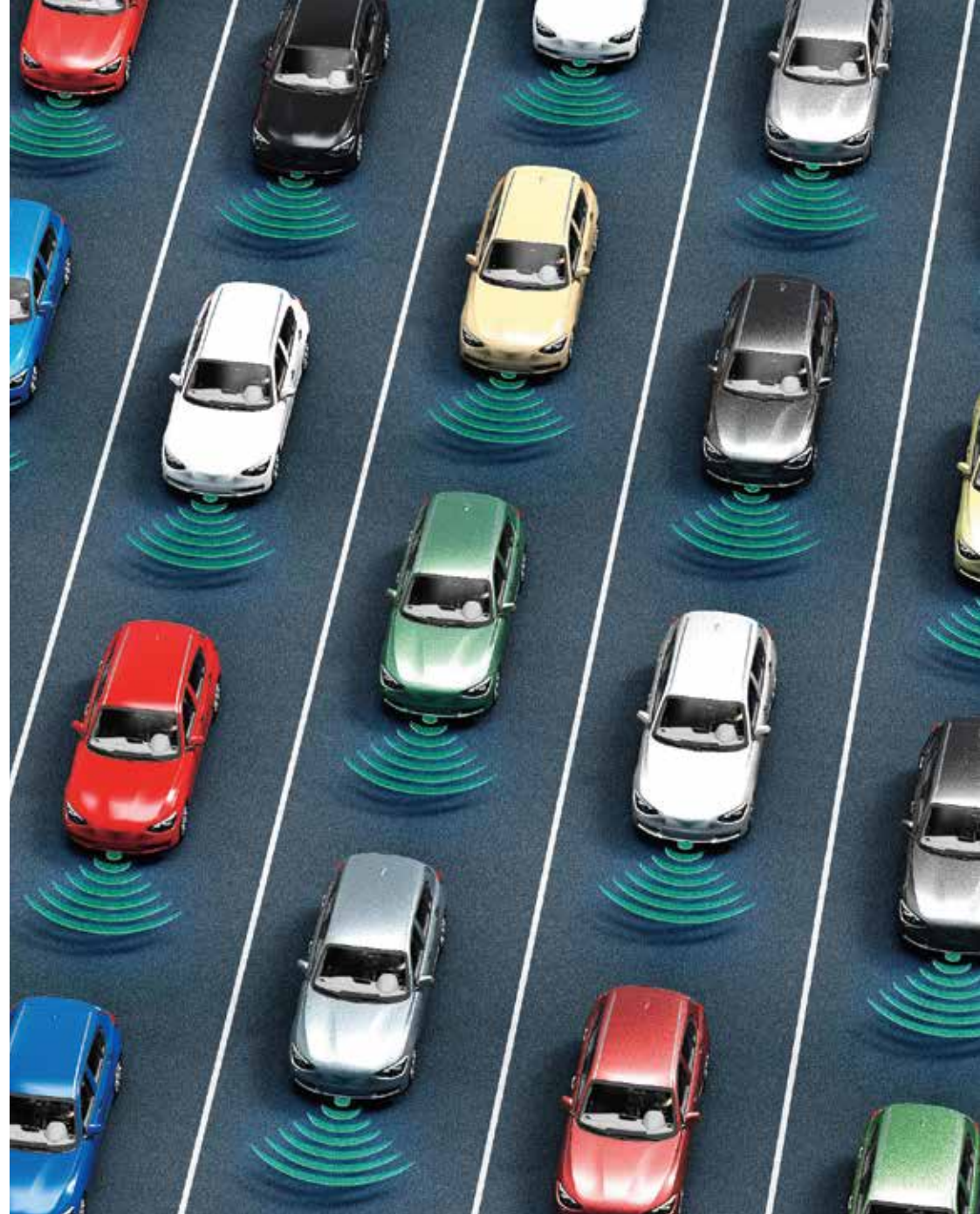


The race is on for car manufacturers
to create fully driverless vehicles—
but are we ready for the ride?

Driving to the Future

BY CHRIS MENON



It was a sunny summer evening in 1996 and nine-year-old Imogen was standing with her mother and elder sister, waiting to cross the road as they made their way to the local swimming baths in Crouch End, London. Suddenly, a Mercedes veered towards them.

Ten days later, Imogen awoke from a coma in hospital. She'd been hit by the car's wing mirror. Miraculously her sister, mother and a friend had managed to get out of the way unscathed. According to witnesses of the incident, the driver had been

by that driver's carelessness, having battled depression and survived a brain haemorrhage in 2012.

"I have uncontrolled epilepsy, learning difficulties and significant memory impairment. I struggle a great deal with my spatial memory. I'm always getting lost and unable to recognise people, even friends I've known for decades. I volunteer at the moment. I tried to work at a retail store in Oxford Circus, but it was very hard and eventually I had to stop. I couldn't remember where all the stock was located."



MORE THAN 90 PER CENT OF ROAD ACCIDENTS ARE ATTRIBUTED TO HUMAN ERROR

talking on his mobile phone just before the accident happened. He never even stopped.

Fortunately a local doctor, who saw the crash from his window, rushed to provide help and CPR, which saved Imogen's life before she was rushed to hospital.

It took three months before Imogen was able to return to school, but even then she continued to suffer long-term debilitating injuries, including slight brain damage that affected her memory. From being top of the class she slid to the bottom.

Twenty years later and Imogen is still living with the damage wrought

Nevertheless, Imogen fundraises for Brake, a charity dedicated to supporting those injured or bereaved by road crashes.

"If you don't respect the power you have when you get behind the wheel of a vehicle—and give driving your full attention—then you could inflict enormous suffering on yourself or someone else. It's awful that so many drivers think it's OK to use their phone while driving, when someone could pay the price of their life for that call or text. Please don't take your licence for granted; tune into road safety and never use technology at the wheel," she advises.



In an effort to reduce the number of motorists using their mobiles, newly implemented laws dictate that those caught using their phones can receive six points on their licence, instead of three. On-the-spot fines have also been doubled to £200.

Of course, mobile phone use is just one of several causes of accidents due to distraction (watching sat navs, eating and fiddling with the radio are others). According to the latest figures from the Department of Transport, in 2015, driver distraction was cited as a factor in nearly 3,000 crashes, which resulted in 61 fatalities and 384 serious injuries.

Similarly, driver fatigue was a contributory factor in 1,784 car

accidents in 2015, resulting in 58 fatalities and 331 serious injuries.

TAKING THE WHEEL

Fortunately, semi-autonomous vehicles (Level 2 and above—see box overleaf) offer an opportunity to radically reduce the number of people injured in car accidents. Eventually, it's hoped that full automation, or driverless cars, will virtually eliminate accidents.

For example, among the latest technologies being introduced in semi-autonomous cars are driver-monitoring systems featuring eye-tracking and facial recognition. They're able to monitor the driver and warn them if they're showing signs of inattention or drowsiness. Toyota already has a basic system in its expensive Lexus LS, but a much more advanced system will debut in General Motors' semi-autonomous CT6 Cadillac later this year.

If the Cadillac driver looks away from the road for more than two seconds or shows signs of dozing off, the car will alert them with an escalating series of visual, audible and tactile warnings, including seat shaking. If these alerts are ignored, the car will pull itself over and stop. The driver will then receive a call from an advisor at Cadillac's OnStar emergency service.

The state of the art eye-tracking and facial recognition system in this

Cadillac was developed by an Australian company called Seeing Machines. Its technology is expected to debut in over 15 vehicle models from General Motors, launching between 2018–19.

Many other car manufacturers will launch semi-autonomous vehicles with such driver monitoring systems incorporated from 2018, helping drivers to avoid accidents.

James Hodgson, industry analyst at ABI Research, argues that driver-monitoring technology will eventually become as common as seat belts. “Their growth will be very much tied to the growth of semi-autonomous vehicles,” he explains. James estimates that by 2026, there will be around 17.5m semi-autonomous and autonomous cars produced with this technology each year.

THE EVOLUTION OF AUTOMATION

WE'RE SWIFTLY MOVING TOWARDS FULL AUTOMATION. However, many experts believe we're at least 10–20 years away from mass adoption of driverless cars (Level 5 automation).

LEVEL 0: Automated system has no vehicle control, but may issue warnings.

LEVEL 1: Driver must be ready to take control at any time. Automated system may include features such as adaptive cruise control, parking assistance with automated steering, and lane-keeping assistance.

LEVEL 2: The driver is obliged to detect objects and events and respond if the automated system fails to respond properly. The automated system executes accelerating, braking, and steering. The automated system can deactivate immediately upon takeover by the driver.

LEVEL 3: Within known, limited environments (such as motorways), the driver can safely turn their attention away from driving tasks.

LEVEL 4: The automated system can control the vehicle in all but a few environments such as severe weather. The driver must enable the automated system only when it's safe to do so. When enabled, driver attention isn't required.

LEVEL 5: Other than setting the destination and starting the system, no human intervention is required. The automatic system can drive to any location where it's legal to drive.

DRIVERLESS CARS

The ultimate aim is a fully autonomous car that eliminates the cause of most accidents: the driver. Hodgson points out, “From a safety perspective, the faster you can remove humans, the better, even if there are unfortunately a few accidents from new causes. It's a question of balancing the number injured or killed by autonomous vehicles with the people whose lives are potentially saved.”

It's a theme that Elon Musk, chief executive of electric car company Tesla Motors, has long espoused. His company are determined to be the first to deliver a fully autonomous vehicle to consumers. Last year, Musk announced that Tesla's 2017 goal was “to do a demonstration drive of full autonomy all the way from LA to New York...and have the car park itself.”

However, even Tesla admits that there are problems to overcome—the software needs further validation and the appropriate regulatory approval needs to be in place. Indeed, recent crashes of Tesla vehicles and Google cars confirm that the software isn't ready yet.

The UK government appears committed to encouraging the development of autonomous vehicles. It's supporting four city trials, publishing the Modern Transport Bill to reduce red tape around their introduction and adapting the legal system to take into account issues

such as insurance liability when a human isn't in control of a vehicle.

The insurance industry is similarly keen to facilitate increasing autonomy in cars. As the Association of British Insurers (ABI) points out: “More than 90 per cent of road accidents are attributed to human error.” This costs motor insurers a staggering £20m per day in claims.

To encourage what it calls a “road safety revolution”, the ABI has proposed that drivers should continue to buy a single motor insurance policy to cover both manual and automated driving. However, it wants the right to go after motor manufacturers and software companies if the vehicle technology is found to be at fault.

It also wants to see strict rules on what people can and can't do behind the wheel maintained, as drivers need absolute certainty about when they



Semi-autonomous cars could be the norm by as early as 2026

can safely allow their vehicle to be driven autonomously.

So how long before fully autonomous cars are the norm on our roads?

Ramnath Eswaravadivoo, senior research analyst at research firm Frost & Sullivan, argues that despite a plethora of current trials, the fully autonomous vehicle (Level 5) will only be the norm around 15 years from now, stating “reliability of the software, infrastructure, regulations, insurance, connectivity and many more factors need to be considered before it’s commercialised.”

Ultimately, industry observers such as Hodgson are convinced that the future of mobility is driverless vehicles used as a service, summoned using smartphones or some connected device. He believes that within 20 years, it’s feasible that

major cities in developed countries will have autonomous vehicles functioning in this way.

Singapore has been testing out the concept of Robotaxis and a system is due to launch there by 2019. One might therefore say the writing is “on the computer chip” for drivers.

The die-hard Jeremy Clarksons among us may fight the demise of human drivers to the death. Yet for others, it’s an enticing prospect that would not only radically reduce the number killed and injured on the roads, but also offer an ageing population greater freedom to travel.

It may help those whose lives have been negatively impacted by drivers too. “My dream job is working in wildlife rehabilitation, but you have to be able to drive,” says Imogen. In the future, perhaps Imogen will be driven. ■



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