

Fully autonomous cars are on the way, with many kinds of 'self-driving' tech already commonplace. How will passionate drivers react to relinquishing control behind the wheel – and what role will IAM RoadSmart play in the transition?

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"After years of optimism, car makers now see more problems than solutions," says Neil Greig, IAM RoadSmart director of policy and research. Until recently, the consensus was that 'autonomous' would progress smoothly through a series of stages from 0 (no automation)



Nissan has spearheaded research with its autonomous Leaf

“WHAT’S REALLY WORRYING EXPERTS NOW IS THE TRANSITION. ‘IN-BETWEEN’ IS WHERE SERIOUS ISSUES LIE; IT’S WHERE YOU STILL HAVE HUMAN INVOLVEMENT BUT NOT ALL THE TIME”

to 5 (full automation). “What’s really worrying experts now is the transition,” explains Neil. “Many want to go straight to Level 5, because ‘in-between’ is where serious issues lie; it’s where you still have human involvement but not all the time.”

Matthew Avery, director of research at Thatcham Research, foresees two key problems during the transition period, when only a small proportion of cars are autonomous. The first is making CAVs interact with other traffic. “CAVs will be very cautious and slow, and frustrate other road users at first; you might even decide to turn off the tech and take over. Until everyone has one, people will feel disadvantaged using these systems,” he predicts.

A bigger threat to autonomous is public fear. “These cars are not going to be 100 per cent safe,” says Matthew. “They will have crashes and the media will jump on it. It will be ‘get these killer cars off our streets’ - even though they are far safer than cars driven by people. This will create a misleading perception

that they are dangerous.”

Of particular concern during this transition period is the ‘handover’ - the critical moment when an automated vehicle hands control back to the motorist, perhaps after a prolonged period during which the ‘driver’ has lost concentration. “This is where IAM RoadSmart must play an important role - training people to deal with this situation,” says Neil, who, like Matthew, estimates it is unlikely society will be fully autonomous before 2050. “Millions of cars being sold today - that need to be driven by people - will still be on the roads for years to come,” observes Neil. “They won’t just disappear.”

Will drivers be banned from driving altogether?

Unveiling its Leaf, Nissan said that 96 per cent of collisions were caused by human error, suggesting automation could virtually eliminate casualties.



Driving enthusiasts are concerned about future ramifications of autonomous tech

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Under such circumstances, could any responsible Government allow its citizens to drive? The answer, says Neil, is that eventually nobody will need a licence, as fully autonomous cars won’t have steering wheels.

In the meantime, Neil fears that motorists are failing to take full advantage of assistance systems on new cars. “IAM RoadSmart is asking whether, during the transition period, drivers should have to earn a different, ‘semi-autonomous’ licence to prove they know how to use this emerging technology,” he says. “The only way to ensure people update their skills and properly use ADAS (Advanced Driver Assistance Systems), is to make it compulsory.”

He continues: “This would be great news for road safety. Some of the latest driver aids are very complicated indeed, leading to distraction and complacency. People need help.”

Dr Lisa Dorn, head of the Driving Research Group at Cranfield University, fears the introduction of ADAS technology could cause more accidents than it saves, in the short term at least.

She says new in-car technology could be moving ahead of motorists’ ability to adapt to it. She fears that in its present, relatively unrefined state, some ADAS may be lulling drivers into a false sense of security, compounded by manufacturers, dealerships and fleet managers who should do more to educate drivers on using systems safely.

“I would like all cars to go straight to fully autonomous simultaneously, so that we don’t have this mix of vehicles being driven manually some of the time and semi-autonomously the rest of the time,” says Dr Dorn. “When drivers are fully in control some of the time, but at

THE SIX STAGES OF AUTOMATION

What technology lies along the route to fully self-driving cars?

LEVEL 0

NO AUTOMATION

Human driver is in full control of all critical driving functions.

LEVEL 1

DRIVER ASSISTANCE

While driver maintains ultimate control, vehicle can perform certain functions for itself, such as cruise control.

LEVEL 2

PARTIAL AUTOMATION

Vehicle can perform at least one driving task simultaneously, including accelerating and steering. However, driver must remain alert and in control.

LEVEL 3

CONDITIONAL AUTOMATION

Under certain conditions car drives itself, but human intervention is necessary upon request, giving sufficient time to respond. Constant alertness is not expected from driver.

LEVEL 4

HIGH AUTOMATION

All critical driving tasks are performed by car, which also monitors road conditions throughout journey; no human intervention is required. Self-driving is limited to certain locations and situations.

LEVEL 5

FULL AUTOMATION

Is this where we’re all heading? Car drives itself from A to B; human plays no role at all. Its performance is equal to or better than a human’s, and potentially therefore steering wheel and pedals are not needed.



Jaguar and Waymo have co-developed this self-driving electric i-Pace

“WE ARE ASKING WHETHER DRIVERS SHOULD HAVE TO EARN A DIFFERENT, ‘SEMI-AUTONOMOUS’ LICENCE TO PROVE THEY KNOW HOW TO USE THIS EMERGING TECH” NEIL GREIG, DIRECTOR OF POLICY AND RESEARCH

other times rely heavily on ‘self-drive’ functions, they become ‘intermittent operators’, which is the dangerous area.”

But I love driving

IAM RoadSmart believes ‘autonomous’ will start with specific zones in towns and cities where only fully autonomous vehicles are allowed to venture, before the practice spreads to other roads. When this happens, classic car enthusiasts might be restricted to circuits away from the road, although Neil says that is a “long way off”.

One area that will see growth, he believes, is motorcycling. “Bikes won’t be autonomous any time soon, and more people may turn towards them for commuting and motoring pleasure such as rides to the countryside.”



‘Real-world’ trials of self-driving cars have been taking place for some time - with mixed results for drivers and other road users

If a crash is inevitable, who decides the outcome. Who pays?

If your autonomous car senses it’s on a collision course with a pedestrian, and the only ‘escape route’ is blocked by a pram-pushing parent, which one does the car ‘decide’ is more dispensable?

IAM RoadSmart is lobbying car makers to create algorithms that - as closely as possible - replicate advanced drivers, to avoid these very situations. “The two areas where we are ahead of the game are insurance and the law,” says Neil. “Insurers are talking about shifting from personal insurance to product insurance, and the legal profession is consulting about possible changes to traffic laws. However, surveys show that the biggest concern for IAM RoadSmart members is hacking

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Arguably, autonomous vehicles are better suited to motorways than to urban streets

“A GOVERNMENT-COMMISSIONED REPORT SUGGESTS CONNECTED AND AUTONOMOUS CARS WON'T IMPROVE TRAFFIC FLOW - AT LEAST NOT UNTIL MOST VEHICLES ARE SELF-DRIVEN”

- if your car gets hacked, or gets a virus, who will be responsible? We simply don't know.”

Says Matthew: “The pedestrian/pram scenario is a red herring. As a driver you will probably never face this specific scenario; the frequency of this type of event is rare because you're a safe driver and you can anticipate danger. These cars can be programmed to do the same, but to process and react to situations even faster and more decisively than humans. Statistically, advanced CAVs will not get themselves into this situation in the first place. If a child does run in front who they haven't anticipated, they're going to brake and mitigate, or avoid the collision and stick within the letter of the law - which is what you or I would do today.”

What tech is available today?

One of the most advanced driver aids available today is 'adaptive cruise control', which dynamically 'holds' your car a set distance from the vehicle in front, on motorways, applying brakes and throttle accordingly. Some cars combine 'steer assist' that helps guide steering in and out of lanes, and 'brake assist' that applies brakes to

avoid a collision when the driver fails to respond. Combined with 'blind-spot monitoring', which spots other road users, these form the basis of the fully autonomous car of the future. Today, assistance technology can be switched off, but this option will vanish as technology improves.

Shared roads

Will autonomous cars make 'shared roads' - where motor vehicles no longer have priority - more likely? Some say it will, but John Adams, emeritus professor of geography, UCL, a leading theorist on risk compensation, fears human nature will be the Achilles' heel of autonomous vehicles, thanks to 'deferential paralysis'.

He says society's 'real challenge' is programming the car's response to on-road situations - while achieving change in people's minds. “Autonomous vehicles' programmed deference to other road users would become obvious to pedestrians and cyclists,” predicts John. “Secure in the knowledge that they were now kings and queens of the road, pedestrians would be liberated to stride confidently into the road, knowing traffic would stop for them.

There'd be a new game for children - throw a ball in front of a car and watch it bring whole streets to a halt.”

And, of course, there's the question of bicycles; thanks to their speed, agility, lack of mass and the unpredictability of their human operators, these could pose a big problem to autonomous vehicles.

Will connected and autonomous cars improve traffic flow?

Disappointingly, a Government-commissioned report - 'Impact of connected and autonomous vehicles on traffic flow' - suggests not, at least until most vehicles are self-driven. Until then, 'caution' built into CAVs might worsen the situation on high-speed roads.

“Until the model of car ownership changes, you won't see congestion benefits for cities,” says Neil. “Public transport must improve, too. If your choice is the crowded bus and Tube, or a nice little automated pod arriving at your front door, you're going to travel to work in the pod. It could be as great a threat to public transport as to private car ownership.”

Summary

“There is definitely a bright future for IAM RoadSmart,” concludes Neil. “We have much to contribute, training people to recognise hazardous situations that develop when they are using ADAS, even on cars with high levels of assistance.

“There is enormous potential for us, helping navigate society through this maze, explaining what all this new kit is and how to use it safely. Today there's not much public fear over autonomous, because the public isn't fully aware of what's around the corner. But that day will come - and we'll be there to help.”

➤ Find out how one IAM RoadSmart Council member has got to grips with autonomous technology on page 63

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