Autonomous transport

2020 – launch date for Google's car 2020

1.24 million – number of road deaths globally p.a.

Autonomous transport

The shift to fully autonomous transport is an evolution via truck platoons on highways and small urban delivery pods. Connected cars create the network and test the technologies for the eventual revolutionary driverless experience.

The concept of self-driving, autonomous vehicles has been talked about for years. Whether from the automotive sector, science fiction or big data enthusiasts, the advent of cars, trucks and buses that navigate and drive themselves has been a common aspiration. The reality is however getting increasingly closer and, over the next decade, many expect to see some pivotal advances introduced at scale in some parts of the world, though at different speeds in different sectors and in different regions.

Over the past thirty years there have been numerous proof of concept tests, such as the European Prometheus project and the DARPA funded Autonomous Land Vehicle project in the US. The 1997 National Automated Highway System Consortium project brought the idea to wider public attention, when twenty or so self-driving vehicles were demonstrated on Interstate Highway 15 in San Diego. These early projects set the direction, proved the principles and also raising many questions, including data access, ownership and sharing as well as network reliability.

The key question is whether the next decade will be an evolution or revolution.

Some car manufacturers became confident enough to put major stakes in the ground – Volvo, in particular, declared that by 2020, no one would be killed in a Volvo and saw the ability of a car to take over, when an accident was likely, as a key safety improvement. Recent developments by the likes of Google, Apple and Amazon have shown how innovation from outside the automotive sector can speed up development. The key question is whether the next decade will be an evolution or revolution. By 2025, will we see fully autonomous vehicles at scale or will it be a patchwork approach, where this only happens in certain locations; and, elsewhere, will we see more assisted driving but not the complete autonomous experience?

The connected car is certainly a priority for many and a forerunner to a world of autonomous vehicles. In 2013, Nissan announced its plans to launch several driverless cars by 2020 and has a dedicated proving ground in Japan. BMW and Mercedes have connected vehicles now driving along German Autobahns where autonomous driving is working as an evolution of adaptive cruise control and assisted driving - which is already in production cars showing automated lane keeping, parking, acceleration, braking, accident avoidance and driver fatigue detection. In 2014 Tesla introduced its AutoPilot systems in its Model S electric cars and in 2015 a car designed by Delphi Automotive completed a coast-to-coast trip across the US, 99% of which was automated driving.

Interconnected systems

The recent acknowledgement by Apple that its autonomous car project, 'Titan', is a 'committed' project has brought much speculation about what is also underway in Cupertino, after tripling its dedicated team to 1800 including many recruits from across the automotive sector. Google are probably furthest ahead, building over 100 vehicles and already clocking up over 1m miles; they started working on driverless cars as far back as 2005 when they won the DARPA grand challenge and in the past few years have successfully lobbied for regulatory approval for autonomous cars and started road testing in 2012. By June 2015, Google's fleet had encountered 200,000 stop signs, 600,000 traffic lights, and 180 million other vehicles and had only had between 12 and 14 (depending on who you ask) minor accidents. Launch date for Google's car is set at 2020. The fundamental issue here is whether or not they can pull off driverless vehicles that work in cities, can deal with roundabouts, avoid unpredictable actions by pedestrians and certainly don't crash.

Much attention is also focused on moving goods. Already in off-road applications such as mining and farming, many of the ingredients of autonomous and driverless vehicles will get large-scale traction in this area. The advent of truck platoons or trains, lines of long distance trucks electronically coupled to each other running along the highway, is upon us – Daimler's Freightliner highway pilot has been given approval to operate in Nevada and rivals such as Volvo and Scania are undertaking similar trials in Sweden. However the revolution in this space is for small urban delivery vehicles – slow-moving, driverless electric pods delivering packages to homes, offices, drop-off points and even traditional car boots. No surprise that many are looking at Amazon to take the lead here; the opportunity to simplify the last mile of delivery in terms of both reducing human cost and optimizing drop-off schedule is a hugely attractive business proposition.

What remains to be determined are the all-important issues that sit around the core platforms. Mobile operators are already sharing data, but who owns the shared data required to make the whole system work and how it is accessed? This is matter of trust, value and liability and, depending where you are in the world, the balance between government, tech companies and vehicle manufacturers shifts significantly. This needs to be addressed, as most business models require visibility of 100% of the vehicles on the road – 99% is not good enough.

However the revolution in this space is for small urban delivery vehicles – slow-moving, driverless electric pods delivering packages to homes, offices, drop-off points and even traditional car boots.

And then there is the tricky issue of risk and ethics. From an insurance perspective the advent of autonomous vehicles should mean that cars don't crash and we don't need motor insurance. But insurance companies see the risk simply shifting from the owner to others - the vehicle manufacturer, the road network or the whole system. With the costs of system failure significant, this is a big issue that few seem to have yet resolved.

Meanwhile, on the ethical side, some are questioning who is going to code the decision to sacrifice the 'driver' rather than the child who runs into the road. While the likes of Google DeepMind, helping with the Google car, are leaders in artificial intelligence, ethics professors are not sure how quickly this will be resolved. Varied perspectives from different cultures have to be considered here.

Insurance companies see the risk simply shifting from the owner to others - the vehicle manufacturer, the road network or the whole system.

Autonomy is not far away. The technology is being proven, the money is being invested and the potential for safer, less congested roads is a big social benefit. Governments are starting to discuss regulatory issues in both the US and EU and some of the ingredients such as automated connections like eCall are becoming mandatory in major markets in the next few years. By 2025 we will certainly see more assisted driving and autonomy on highways for both cars and trucks, where everyone is going in the same direction with controlled entry and exit, and maybe full autonomy in cities for goods delivery pods. However, at the moment, it looks like full autonomy in cities for passenger vehicles is a few years away.
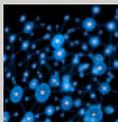
Related insights

Ethical machines

Automation spreads beyond trading and managing systemic risk. As we approach technology singularity, autonomous robots and smarter algorithms make ethical judgments that impact life or death

Everything connected

Over 1 trillion sensors are connected to multiple networks: everything that can benefit from a connection has one. We deliver 10,000x more data 100x more effectively but are concerned about the security of the information that flows.

The increasing value of data

As organisations try to retain as much information about their customers as possible, data becomes a currency with a value and a price. It therefore requires a marketplace where anything that is information is represented.

Access to transport

The widespread need for individuals to travel short distances becomes a key feature of urban design and regeneration. Planners use transport infrastructure to influence social change and lower carbon living.