



# IN SAFE HANDS

Connected cars will quickly, quietly,  
and carefully change your life

In 2025, you probably won't own a car. The chances you'll die in a road accident will also be much slimmer because there'll be far fewer incidents than today's annual global figure of 1.4 million. Instead, picture yourself watching your favorite TV show in the safe, virtual hands of an autonomous data center on wheels, zipping along in the smoothly flowing traffic of one the biggest tech disruptions in the first quarter of this century.

By Gary Maidment, Huawei





## Experience comes in threes

**B**y 2025, 20 million fully autonomous vehicles will make up around 1 percent of all vehicles on the world's roads, which is set to rise to four in ten in some cities by 2030.

Three experience stops will get us there. The first is today's 4G-based **telematics**, a mix of infotainment, e-calls, on-line navigation, and remote diagnostics. We're now transitioning into the second, which is **safety**: a time of 4.5G-enabled V2X (vehicle-to-everything) connectivity, partial automation, and greater environmental awareness. Rolled out in 2015, Tesla's ADAS (Advanced Driver Assistance System), which can self-drive 90 percent of the time, exemplifies this stage. Enhanced safety, says Tesla, is the "combination of various sensors... cameras with image recognition with radar and long-range ultrasonics." The third and final stop will be **comfort**.

Enabled by 5G, high or full-automation and enhanced V2X connectivity will start to mature around the mid-

2020s. Vehicles will be completely aware not just of other cars, but of cyclists, pedestrians, traffic lights, and other infrastructure.

The Society of Automotive Engineers defines six levels of autonomy, ranging from Level 0 with full driver control to Level 5, where the AI driver equals human capabilities.

## Smile, you're on camera

Video will feature heavily in the connected car ecosystem in a triumvirate of functionality: entertainment, safety, and security. Volvo's Concept 26 reflects the belief that the 26 minutes you commute each day "could be spent doing something more meaningful," including watching videos. Chevrolet is working with Future Lab to create interactive VR displays on rear passenger windows, while Lockheed Martin pulled off something similar in 2016 on a school bus. In partnership with VR specialists Framestore and McCann, it displayed the surface of Mars on the bus windows, giving children the impression they were traveling across its surface. The tech included a virtual 3D map of the red planet, a laser surface

velocimeter, GPS, and custom screens.

Augmented reality will make a strong showing in both unconnected and connected scenarios for safety. In 2015, BMW demonstrated augmented vision at the Shanghai auto road show. Drivers could see through their vehicles by relaying exterior camera feeds to special glasses, which aimed to eliminate blind spots and increase all-round visibility. Fully driverless vehicles will benefit from detailed hazard mapping enabled by video to identify things like potholes.

Internal and external video and audio fields will provide strong protection against car theft and damage, with motion sensors, cloud storage, and real-time alerts sent to phones that render autonomous cars virtually unstealable. A clutch of big names are already making inroads with trials: Ford and Intel are working on a joint facial recognition project, while Volkswagen is researching infra-red scans to ID would-be drivers.

However, there's no guarantee that you'll be using this tech to protect your own car come 2025, because the attractiveness and affordability



of owning one is likely to drop fast. People tend to use their cars just 4 percent of the time, which works out at just 58 minutes per day. But, in the US for example, the average car costs nearly US\$25 per day to run – that’s US\$9,125 per year. Economically, car ownership will make little sense when being asset-lite makes you better off.

By 2025, it’s more likely that biometric tech will be verifying you for a driverless car you’ve called up on an app, with the ID process tailoring the in-car experience based on your usage history.

## Painting the town green

The on-demand, driverless model will also be good for the planet. Many future autonomous cars will be electric as the cost of lithium-ion batteries continues to fall, cutting global fuel use by up to 75 percent by 2030. Big cities in emerging economies like Mumbai and Mexico City will see a clean and shared model relieve congestion, pollution, and transport costs. In affluent urban centers with high population densities like London and Singapore, electric vehicles could

account for 60 percent of all vehicles.

When full autonomy and electric vehicles become commonplace, traffic flow will be faster and smoother, with traffic jams and exhaust clouds having spluttered out of existence. According to the Environmental Protection Agency, motor vehicles produce roughly 50 percent of all pollutants like VOCs, nitrogen oxide, and particulate matter. Moreover, it’s predicted that one autonomous car will be able to replace about 30 manned cars under the on-demand model, drastically cutting the total number of cars on the road.

Most autonomous vehicles are likely to be smaller than today’s four or more seaters because they’ll be designed for single-occupancy journeys. Today, around 75 percent of car journeys are single-occupancy and this is unlikely to change. As a result, driverless “cars” may be more likely to resemble connectable driverless pods, rendering today’s form-factors obsolete before they get off – or rather on – the ground. Two Italian designers are looking at developing this new mode of transport for release in 2020, which would enable a series of pods which

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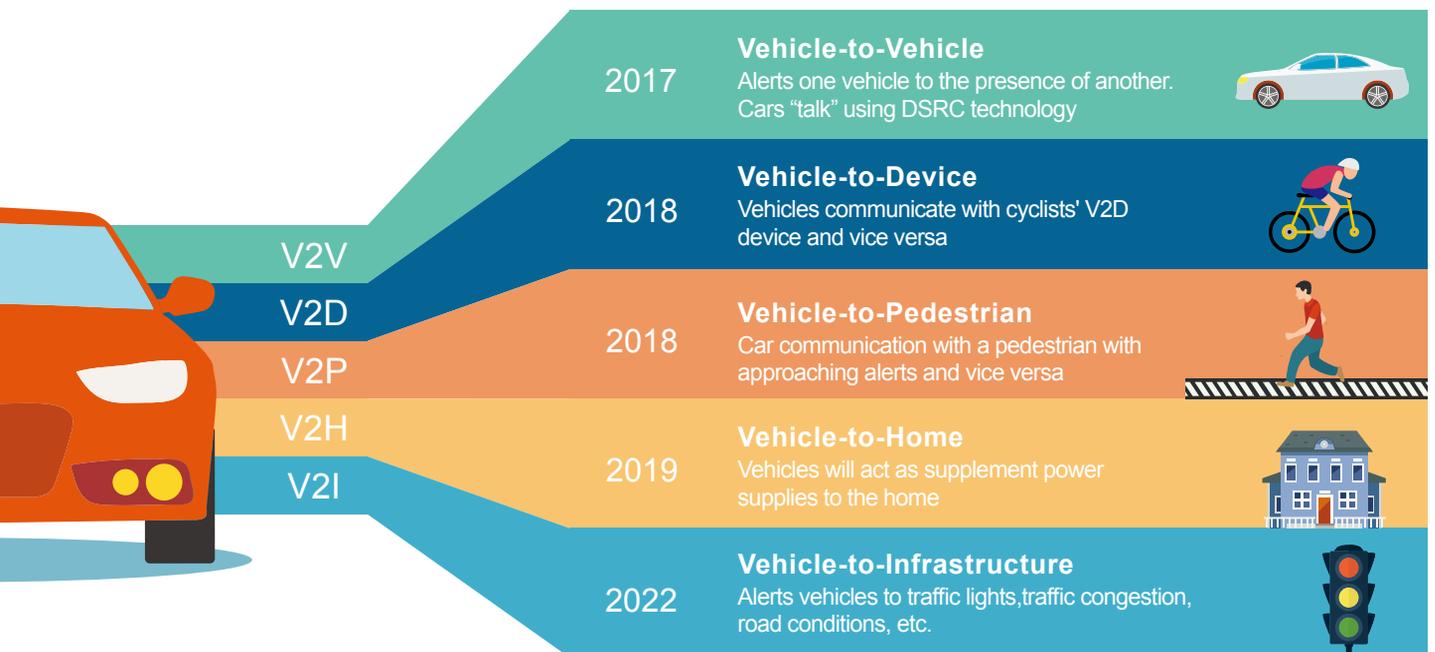
could connect into a mini-train.

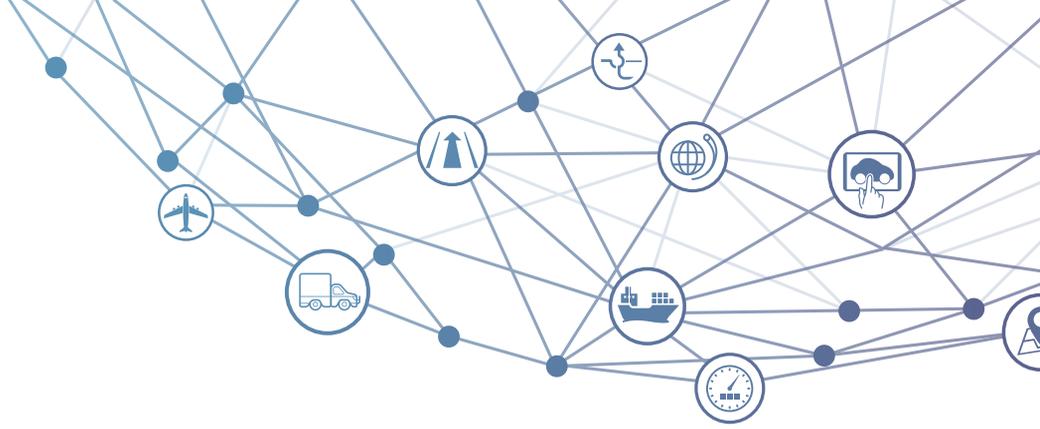
Because they'll be in constant use, the service life of autonomous vehicles will be relatively short compared with today's under-utilized cars.

The effect on the air we breathe and health will be huge. As well as environmental factors, quality of life will be improved in a less obvious way: the reality of overcrowding is often visibly, noisily, and time-suckingly manifested on the world's congested roads, eating into people's happiness. Solving

this issue will have a big impact on society's sense of well-being.

The switchover to autonomous driving won't happen overnight. Semi-autonomous tech like ADAS will ease consumers into the passenger seat with functions like lane changing, adaptive cruise control, and automated braking. It's predicted that people will start feeling comfortable taking the backseat by 2021, and that's when the market will shift up to high gear.





## Choose life

With an estimated 94 percent of road accidents caused by human error, driverless tech's V2X advantages are complemented by an AI driver who doesn't booze, doze, or text its friends.

Popular oatmeal.com blogger Matthew Inman wrote about his experience encountering a pedestrian in a timid Google driverless car in 2016: "The car was waiting for a further visual cue from the pedestrian to either stop or go, and the pedestrian waiting for a cue from the car. When the pedestrian didn't move, the self-driving car gracefully took the lead, merged, and entered the roadway....Freaky." Perhaps future generations will look back in faint amazement that people willingly drove around in a ton and a half of gas-guzzling glass and metal, one poor maneuver away from leaving a trail of death and destruction.

## Connected autonomy

What does this sort of safety mean on a networked scale? With every component in an intelligent car constantly generating data, a single vehicle could be producing up to 1 GB of data per second. Given this, a cloud

solution for the Internet of Vehicles (IoV) would need to receive that 1 GB in one second to fully understand the real-time status of a single cloud-controlled vehicle. If one car senses and then brakes to avoid a jaywalker, the ripple effect will cause the cars behind the first one to break, too. The network may then consider re-routing traffic to avoid a potential traffic jam. 4G isn't capable of the 1 ms latency required for this scenario, and IoV therefore requires the sub-1 ms latency afforded by 5G.

## Prepare for disruption

Driverless technology and connected cars are destined to be one of the biggest disruptors that many people alive today will experience. An estimated one in four employment options will be consigned to history as a slew of economic sectors are impacted, including driving jobs, gas stations, dealerships, mechanics, and even motels on common long-distance truck routes. However, job losses will be offset by job creation as new businesses arise from the innovation and possibilities created by this amazing new vertical.

Cities will also be subject to massive change. One aspect that requires

some forethought by policy makers will be the potential 50-percent-plus drop in city revenues as speeding fines, gas tax, parking fees, and many other traffic-related fees begin to disappear. Some re-zoning is also highly likely in the future's cleaner, safer, and quieter cityscapes. Parking lots, for example, will be ripe locations for redevelopment in cities like Los Angeles, where 14 percent of the city is designated for parking.

Business locations won't be as important as journey times become quicker. People can work or be entertained en route and their perception of distance will change. Some of this disruption will require careful planning, but the overall picture is one of a considerably better quality of life.

In 2025, we will see a Better Connected World in almost every way we can think of. Connected cars will be a game-changer in how we experience life and in how it impacts our culture. As noted futurist Glen Hiemstra puts it, "Eventually, pleasure driving will go the way of horseback riding for pleasure – a niche activity and a public racing spectacle." And that future isn't all that far away. [www](#)