The boxy black electric car that trundled around a cordoned-off section of Auckland’s Wynyard Quarter yesterday didn’t exactly suggest scream ‘communications revolution’.

The car, more of a four-seater shuttle bus, was built by Ohmio, a Christchurch-based company that has been piloting its driverless vehicles at Christchurch Airport. The Auckland demonstration was the first in the country involving a driverless car operated over a 5G mobile network.

Spark’s 5G test network connected the car to a central server that controlled the pre-programmed test drive loop the car completed. What was shown off can certainly be achieved without 5G – the fifth generation of mobile technology that will arrive here in 2020 and require hundreds of millions of dollars spent on upgrading the country’s mobile networks and smartphones.

But in the various scenarios and ‘use cases’ for 5G you are going to hear about in the coming months, driverless cars, themselves years away from taking to New Zealand public roads, will feature prominently.

Remote control

“A significant drop in latency, or the reaction time when one device talks to another, will give cars human-like reflexes and opens up multiple possibilities for connected infrastructure and a smart city ecosystem,” Dr Mahmood Hikmet, Ohmio’s research and development head said yesterday.

Last month at the Mobile World Congress in Barcelona, I watched a man sitting in front of large computer monitors and a steering wheel driving a truck that was actually thousands of kilometres away in Gothenburg, Sweden. Man and truck were connected via a 5G network built by the Swedish equipment maker Ericsson.

The T-pod autonomous and electric truck was developed by another Swedish company Einride, which wants to develop fleets of driverless trucks to ferry cargo around Europe. It also has the T-log, a logging truck that can be operated remotely.

One of the big benefits of 5G connectivity touted by Ericsson was the ability for a human to take control of the truck as it approached a work zone on the road. That starts to take on significance when you consider that four road workers were killed on New Zealand roads in the last month, three in one horror Bay of Plenty crash alone - involving trucks.

In the 5G world where sensors on trucks and roading infrastructure talk to each other and update vehicles, such tragedies may be avoided as trucks are automatically forced to slow down or avoid areas where road workers are operating.
5G laggard

But again, that scenario is likely some time off. While South Korea will be the first country to turn on a fully-fledged 5G network later this month, and Australian operators Telstra and Optus will have partial 5G networks in operation in the coming months, our own network operators are followers, not leaders in the move to 5G.

Spark wants to have 5G live on the Auckland harbour by July 1 next year, so it can assist Team New Zealand in its preparations for the America’s Cup in March the following year, by offering a fast network for collecting data from the boats in real-time.

Setting up a few sites to cover the harbour won’t be too difficult, but the nature of the 5G technology evolution makes a national roll-out a lot more complicated. That’s because “5G” will require a different type of network architecture to the 3G and 4G networks we currently use to surf the web and stream video on our mobiles.

5G will, in some cases, operate at higher radio frequencies to deliver data speeds of over one gigabit per second, 50 times or more the average speed of 4G. However, the physical nature of the radio waves used means that a larger number of sites will be required to fill in coverage black spots. They won’t be the large, 20-metre high cell towers that currently dot the landscape, but smaller base stations attached to buildings and blending into the urban environment.

Our three mobile network operators, Spark, Vodafone and 2Degrees are yet to secure the radio spectrum from the Government they will need to operate 5G services. Spark’s plans for 5G are in limbo with its technology partner Huawei facing the prospect of being barred from constructing the network over security concerns raised by the GCSB.

Three phases of 5G

Still, it is unlikely Kiwis will be too envious in the next 18 months as they cast their eyes abroad to the 5G networks that will begin to emerge from Europe to Asia. Consumer services may get a quality boost, but the business and industrial applications that will really showcase 5G will be slower to take off.

“I've always looked at 5G as having three distinct phases,” says Peter Lau, the founder and chief executive of Chinese mobile phone maker OnePlus, which will launch a 5G smartphone on the network of British mobile operator EE in the next few months.

While Lau sees new smartphone applications and cloud computing services such as online gaming and video streaming benefiting from the increased access speed and lower network lag times of 5G in the
next couple of years, it is phase two of 5G, which Lau suggests will arrive in 2021, that will start to change the nature of mobile.

“The combination of 5G plus artificial intelligence plus cloud functionality will enable a whole host of new possibilities,” he says.

Phase three, from 2025, will see 5G enable a network of internet of things devices to talk to each other offering a level of intelligence and feedback from the real world we’ve yet to experience.

A window to everything

5G is not just about faster data speeds, but greatly reduced network “latency”, that time it takes to connect a mobile device to a central point. Less latency means real-time services such as high-quality video and virtual or augmented reality can be delivered much more smoothly.

“As you do any computation you'll be able to benefit from the low latency and artificial intelligence,” says Cristiano Amon, the president of Qualcomm, the US company that makes the chipsets and processors that will go into many of the 5G handsets hitting the market this year.

With a low latency connection over 5G giving you instant access to processing power and data stored online in the cloud, things like storage capacity and processing power in your smartphone will be less important.

“Your device is going to be a window to everything. It’s less about the relevance of the operating system, it will be the era of artificial intelligence in the cloud and the applications fusing into one,” says Amon.

He sees consumers very quickly experiencing a difference in their mobile experience, comparing it to how 4G’s introduction helped spur the move from music downloading to music streaming.

“It is going to happen with video. Now 95 per cent of the time on 5G, you'll be playing a video at the full bitrate [ultra high-definition] content. That will change how we consume video on demand but also live sports. It is a big challenge and an opportunity for broadcast.”

Easing congestion

When 5G does roll out it generally won’t be in one big bang upgrade across the country. EE, the British carrier formerly known as Orange, will switch on 5G at 16 sites across the UK over the northern summer with London, Cardiff, Edinburgh and Belfast the first cities to go live.

But rather than delivering fancy new services, 5G will initially serve to ease network congestion.

"We have sites now carrying more than a terabyte [of data] a day, millions of customers connecting to them,” says EE’s chief executive, Marc Allera.

“As a network operator our responsibility is to give them a brilliant connection. With 4G on its own that's now not possible. Very soon we'll be able to unleash that capacity in our busiest sites and then we start to look forward to the really exciting developments with low latency, mobile edge computing, cloud and AI.”

Later, says Allera, will come “smarter hospitals, smarter cars, smarter factories, smarter businesses as well as fun stuff in terms of amazing games and mixed reality experiences”.

We will pay more for 5G.
“I do believe that 5G should be priced at a small premium to 4G, it's a faster, better experience,” says Allera.

Handsets featuring 5G chipsets are more complicated and have to deal with greater power demands, so will also sell at a slight premium, at least initially.

What will 5G mean for fixed networks, such as the government-funded ultrafast broadband network that has significantly increased broadband speeds around the country where the fibre optic service has rolled out?

Where’s the business case?

Don’t expect 5G to make fibre obsolete any time soon. According to the GSMA, the body that runs the Mobile World Congress each year, by 2025 only 15 per cent of the world’s mobile connections worldwide will be running on 5G.

The cost of upgrading to 5G networks - estimated at US$160 billion a year globally says the GSMA, may also prove too rich for the blood of mobile operators who may want to wait until the applications in robotics, healthcare, driverless cars and entertainment emerge to prop up their 5G business cases.

The hype around such applications is intense - there was even a flying car at the Mobile World Congress that supposedly is controlled over, you guessed it, a 5G network.

One thing is clear, there won’t be any shortage of 5G smartphones ready to connect to the next generation of mobile networks even if the ones sporting a foldable screen will come with an eye-watering price tag.

Qualcomm’s Amon says the industry will avoid the issues that plagued the arrival of 3G and 4G networks, where there initially was a dearth of devices capable of connecting to them.

“We've learnt our lesson. We are not going to have a device bottleneck with 5G,” he says.

“Every generation of technology sees an opportunity to separate winners and losers and I think with 5G it will be unforgiving, given how fundamental the transformation is. You have to take risks, you have to be fast and flexible.”

Eighteen months is a long time in the world of technology, but that’s realistically the amount of time it will take for the first 5G services to arrive here.

This, however, is one revolution it may not pay to be at the forefront of.

Source: noted.co.nz

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