



WHAT CAN CONNECTED VEHICLES PROVIDE?

IN THE PAST



I was once asked, what were my thoughts on home communications and technology. This was at a time when the following was happening:

- Mobile phones were new, very large and expensive
- Columbo was still using house phones
- Faxes were popular
- Internet was non-existent
- I had to apply for my IP address – Ham Radio
- Speeds were 1200 Baud
- It took 3 days to get data around the world

My answer was:

Each house would have a single pipe where all the comms will come down it. I could see the benefit from the Ham Radio IP days, but it was slow.

This has taken 30 years to do...



"How do you send text messages?"

THE FUTURE?



I am now being asked as to how I see the future for connected cars...Simple...!!

- All vehicles, people will be connected and will increase the current internet by 1000 fold.
- Autonomous vehicles will not be able to function as effectively without connectivity
- What is the connectivity drive: Safety, ease of use, minimise congestion, control traffic before traffic happens
- Enabler technology: V2I combination of cellular 5G/6G/7G, Complex junctions mmWave+, V2V subsets of the above that will work with or without Infrastructure
- Perhaps Information signs will eventually be in museums. Traffic lights?
- Every vehicle will know what every other vehicle is doing.
- There will be a mixture of privately owned and on demand vehicles linked to your daily needs.

The above sounds daunting at this stage, but once people start working on it, who knows in another 30 years it may be second nature. But there needs to be a single body that is able to take all the data. Similar to the met office taking on the large task.

WHAT WILL VEHICLES PROVIDE?



- Cars will provide all its sensor data – including sensors that are not working properly
- Maps will be updated on the fly
- Cause and effect of traffic will be predicted through Artificial Intelligence
- People will provide speed and direction through watches (fitbit, Garmin) etc.
- Powerful off-board computers will save local vehicles having to be high real estate
- V2V Latencies will be sub 1mS in cities – multiple connections for robustness
- Data will be shared direct and via cloud servers
- Etc.

The problem here is not the data. It's the amount of data vs latency vs whether it is IP protected:

>150mS is considered as old data. 50mS is considered the normal V2V speed for Safety today. Remember: A human takes 800mS to react.

Now imagine sharing Lidar data with TeraBits of information. Bandwidth and speed will be of the essence

WHAT ABOUT THE NEXT 5 YEARS (to 2022)



- Big data is being used by many cars to locate, service information etc.
- Vehicles will have V2X capability
- China will be the first to mandate and will choose C-V2X
- US will be the second to mandate, probably within 12 months – currently DSRC but likely to sway towards C-V2X
- Korea will be the first to 5G, and will follow C-V2X
- EU will take time to debate and decide – market forces may decide fate
- Toyota/GM/BMW/Daimler – already have connected capability
- Every car will need eCall by March 2018 – opportunity to grow fast
- VW will have connected car capability by 2019
- All cars will be connected by 2022
- Etc.

WHAT WILL YOU GET?



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- Auto Tolling, parking, road toll, home garage
 - It is possible to pay your fuel through V2X
 - Improved road safety – at least 80% improvement
 - Reduced roadside infrastructure.
 - Improved road status – map data, potholes, weather, road hazard spots
 - Improved ETA estimates – your route will include knowledge of how long each traffic light will delay you
 - Better traffic assessments – rich low latency data along with predictable traffic at any time of the day
 - More granular data equals improved routing choices
 - Predictable journeys and speeds will make the drive smoother
 - Driver health status
 - Etc.



THANK YOU

Colin Lee
V2X Group Research manager
M +44(0)7342 025 996

clee13@jaguarlandrover.com

Jaguar Land Rover
W/1/26 Abbey Road, Whitley
Coventry CV3 4LF, UK

jaguarlandrover.com