

5G and Driver Training

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Our 'connected' world is about to get even faster



What does it mean for driver training?

We have come a long way very quickly!



“Traditional” Mobile phone mast



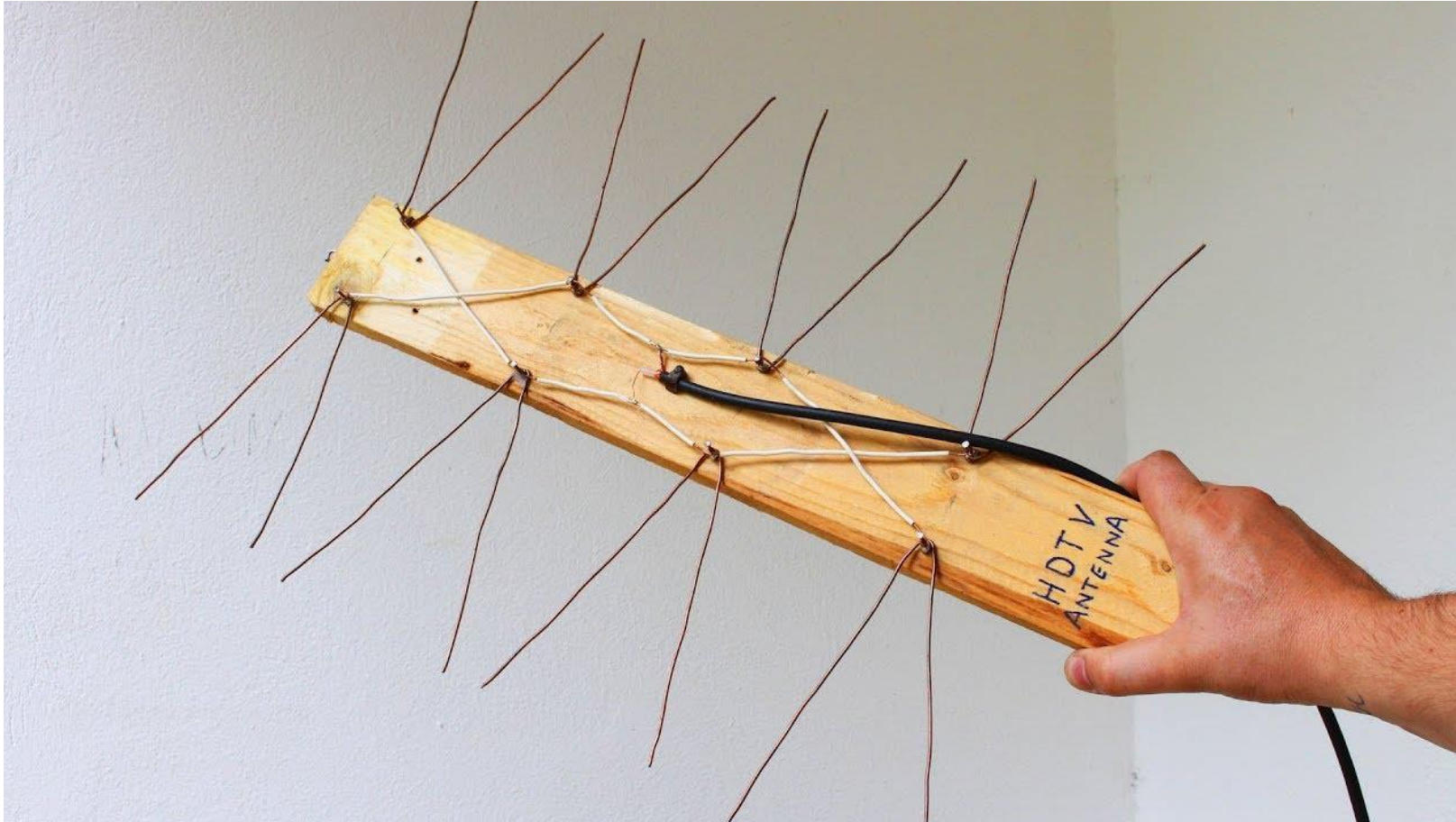


Curious
“Traditional”
mobile
phone mast

5g Antenna in South Korea



5g Antenna in the other Korea



THE CONNECTED COMMUNITY



UNDERSTANDING DATA MEASUREMENTS



Kilobyte =
1000 bytes



Megabyte =
1000 kilobytes



Gigabyte =
1000 megabytes



Terabyte =
1000 gigabytes

1.5 gb

NO PLAN. NO BACKUP. NO CHOICE.

T O M C R U I S E
MISSION:IMPOSSIBLE
GHOST PROTOCOL

PARAMOUNT PICTURES AND SYTYMANCE PRODUCTIONS PRESENT A TOM CRUISE / BAD BOY PRODUCTION A BRAD BOO FILM TOM CRUISE "MISSION: IMPOSSIBLE - GHOST PROTOCOL" JEREMY RENNER SHAWN PEGG PAULA PATTON VISUAL EFFECTS INDUSTRIAL LIGHT & MAGIC MUSIC BY MICHAEL GRACISANO COSTUME DESIGNER MICHAEL KAPLAN EDITOR PAUL HIRSCH, A.C.E. PRODUCTION DESIGNER JONAS BUSSELL
EXECUTIVE PRODUCERS ROBERT ELSWIT, M.P. EXECUTIVE PRODUCERS JEFFREY CHENNOY DAVID ELLISON PAUL SCHWARTZ DANA COULBERS PRODUCED BY TOM CRUISE J.J. ADAMS BYRON BURN
BASED UPON THE TELEVISION SERIES CREATED BY ROBERT SELLER WRITTEN BY JOSH APPELBAUM & ANDRE NEWMAN DIRECTED BY BRAD BOO

EXCLUSIVE IN IMAX AND SELECTED THEATRES
AT CINEMAS DECEMBER 26

Download speeds for a two hour movie?



3g – 3mbps – 26 hours

4g – 100mbps – 6 minutes

5g – 10**gbps** - 3.6 seconds

(5g is 100 X faster than 4G)

NO PLAN. NO BACKUP. NO CHOICE.

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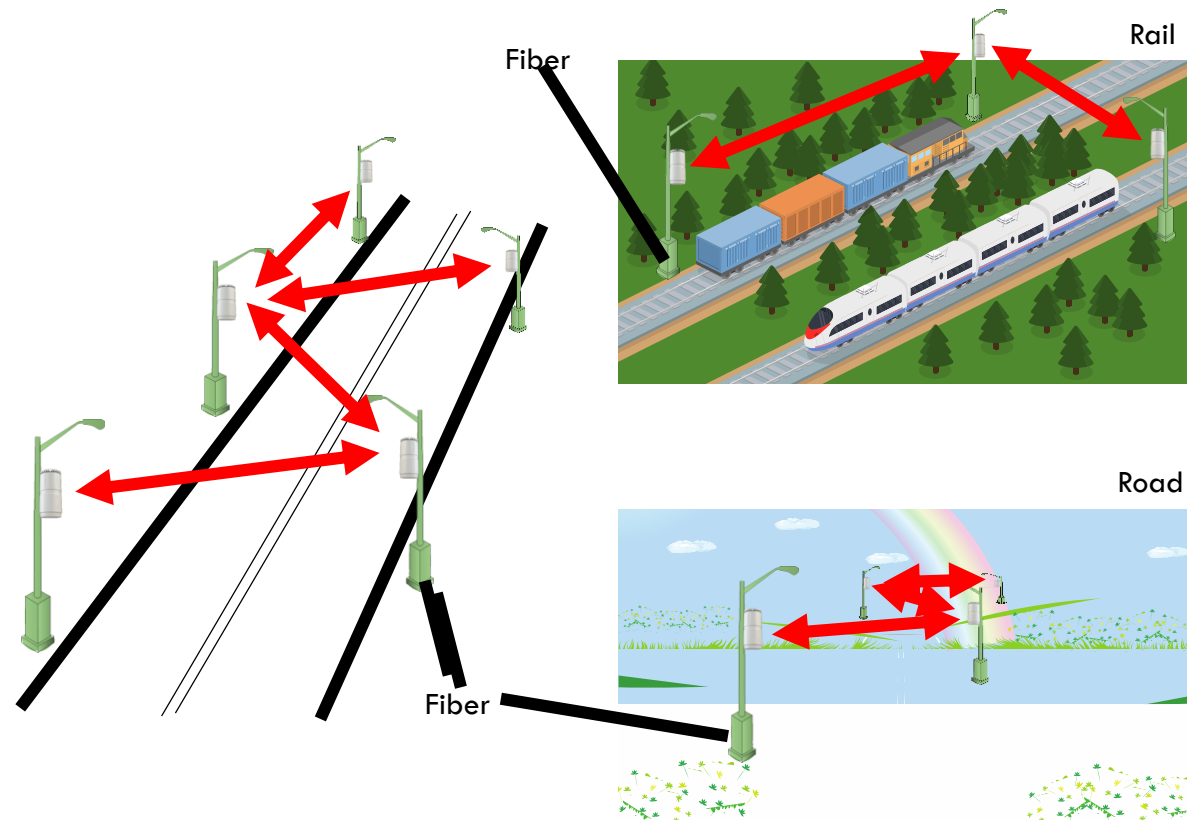
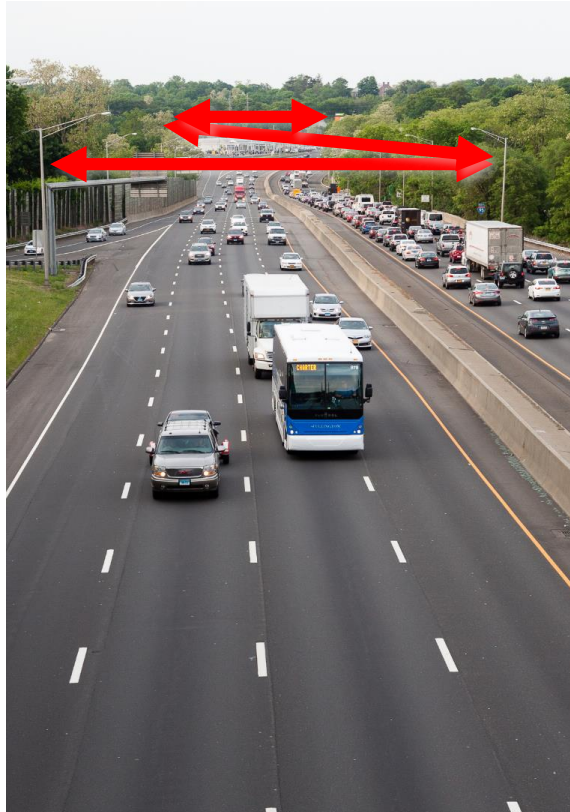
Download entire movie in about 0.5 seconds!

EXCLUSIVE IN IMAX AND SELECTED THEATRES
AT CINEMAS DECEMBER 26

- Poor mobile coverage in transport corridors
 - Road
 - Rail
- Connected, Autonomous Vehicles (CAVs)
 - Need constant connectivity
 - Need low latency and high throughput
- 5G ideally needs a new model
 - There will never be multiple nationwide networks
 - It is uneconomic for each network operator to build their own network



Multiple Antennas connected by Fibre



Driverless Uber bristling with technology



Laying claim to the **First Driverless Lessons**



Levels of Driving Automation

Level 0	Driver	Full manual operations
Level 1	Hands on	Cruise control, lane departure etc
Level 2	Hands off	Accelerating, braking AND steering
Level 3	Eyes off	Emergency braking eg Audi Auto Pilot
Level 4	Mind off	No driver needed for any safety aspect
Level 5	No driver	Fully autonomous

Level 3 is where the leaders in the industry are currently

PAScAL

“Improving human behaviour and
Public Acceptance of Connected
Autonomous Vehicles”

European Commission Research Project

PAScAL Consortium

1	Luxemburg Institute of Science and Technology	Lux
2	Automobile Club d Italia	Italy
3	Luxmobility SARL	Lux
4	RED Driving School	UK
5	Etelatar Innovation OU	Estonia
6	University of Leeds	UK
7	University of Liverpool	UK
8	Universite Bourgogne	France
9	E-Bus Competence Centre SARL	Lux
10	ExaMotive SA	Lux
11	Universitaet Mannheim	Germany
12	GFi	Belgium
13	Union Europeenne Des Aveugles UEA Association	France

Key Objective

- To assess the public's acceptance and attitude towards Connected, Autonomous Vehicles, analyse their concerns, model and simulate hands-on scenarios and hence understand the major social obstacles that may hinder the acceptance of CAV's
- Timescale – conclusions by Dec 2021.

So assuming the product works
and
the laws have been written
and
insurance and liability is clear,

do you want a driverless car?

Market Penetration Estimates

- McKinsey – 15% of all cars sold globally in 2030 could be level 4
- UK research – 31% of all sales by 2035 could be level 3 – 5 including cars, HGV's and buses.
- That would 1.1m vehicles sold in the UK in 2035.
- Note – levels 3 and 4 still need a driver!

“1,000,000 Level 5 Tesla cars by end of 2020”

Elon Musk



I will believe that when my computer finally
talks to my printer!!



But the roads will be safer, won't they?

- UK – 2.59 deaths per 100,000 citizens
- USA – 12.44 deaths per 100,000 citizens
- Do our friends across the pond see CAVs as the solution?

Tesla Model X



Confidence in Data and Sensor Fusion

What is Data and Sensor Fusion?

- Research indicates that about 275 million miles would be required for AVs to demonstrate, with 95 percent confidence, that their failure rate was at most 1.09 fatalities per 100 million miles—the equivalent of the 2013 US human-fatality rate.

Examples of 5G applications

- Gatwick Airport South Terminal – speed and capacity
- Liverpool Health Services Support systems
- Dairy farming – cows open their own gates at milking time!
- Crop spraying – drones control tractors about when and where to spray
- Fuel consumption and route tracking for Fleet drivers
- Predictive maintenance for fleet vehicles

What does this mean for driver training?

- Years – decades – of cars that need drivers!
- More technology to teach – cars will get more complicated.
- Business must embrace technology
- Customers expect fast response 24/7,
- Online systems booking systems
- App based account management and training support.
- Moving to a cashless society!

Maybe there's niche market for a retro driving school
.....but it won't be RED!



Personally, I am going to embrace new technology



Thank you.

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