



# 5G Rural Showcase

@5GRural #5GRural

Lancaster Conference Centre

25th September 2019



Department for  
Digital, Culture  
Media & Sport

**5G Testbeds & Trials**

# Agenda

1.00-1.20	Welcome & Project Overview
1.20-1.35	UK Government plans for 5G in rural areas
1.35-2.15	5G & Rural Broadband - Can 5G deliver superfast broadband to remote areas?
2.15-2.55	Tourism - Can 5G deliver a compelling step change in tourists' interpretation of their destination?
2.55-3.15	Break
3.15-3.50	Precision Agriculture - Can 5G deliver productivity improvements through smart agriculture for upland livestock farmers and lowland arable farmers?
3.50-4.25	Drones - Can 5G deliver data to extend the range of Unmanned Aerial Systems?
4.25-5.00	Emerging business models for 5G in rural areas & plans for 5GRIT
5:00-6.00	Drinks & Networking, Demonstrations

# Housekeeping



5G Testbeds & Trials

# What is 5G?



5G Testbeds & Trials

# Defining 5G - Uses

- Faster connectivity / Lower latency / higher reliability / more devices (“things”) connected, better network availability, etc.
- Virtual reality, streaming/real time 360-degree video
- Immersive reality (you are actually there) and augmented reality
- Innovative applications; haptic communications (not just sight and hearing being transported over wireless comms, also touch)
  - E.g., remote surgery, remote manufacturing
- Industry: Latency and reliability compatible with wireless replacing industrial wired networks (e.g. controlling robots/equipment in a factory)
- Better visitor experience/tourism (in line with immersive reality)
- Smart Agriculture

# Defining 5G - Technology

## Open Source

- ▶ Communication network is almost entirely in **open source software**
- ▶ E.g. customizable, upgradable capabilities, network slicing, etc.

## Mm-wave

- ▶ Massive capacity due to larger transmission bandwidths

## (Massive) MIMO, beamforming (and tracking)

- ▶ E.g. using the same spectrum transmitting in multiple different directions; big increase in what can be transmitted over certain resources

## New Radio

- ▶ Limited increases in spectral efficiency, although more compatible with the capabilities of 5G

# Defining 5G - Standards

Tech Standards bodies have different views:

- ▶ ITU defines what 5G actually is; the standards (“IMT 2020”) have been completed for a long time.
- ▶ Tech standards for mobile phone systems - “3GPP” - are in two phases:
  - ▶ 5G Phase 1, which is not “5G”.
  - ▶ 5G Phase 2 will be finalised towards the end of 2019.
- ▶ At IEEE, there are various standards which are partly implementing 5G in a broad sense. 802.11ay - 20Gbps over 60 GHz unlicensed, MIMO, etc.
- ▶ Also other aspects such as network management being improved in the standards, to have a more integrated network.

# 5GRIT & 5G

- ▶ In Autumn 2017 Government wanted to trial technology that did not yet have:
  - ▶ standards
  - ▶ equipment
  - ▶ spectrum
- ▶ However - we could provide:
  - ▶ A 5G experience using Wifi for ends users on their smartphones
  - ▶ Mm Wave radio
  - ▶ Test spectrum management and efficiency, using TV Whitespace
- ▶ Bring together to benefit rural communities across the UK
- ▶ Start from end user perspective



# Partners



Quickline (Lead)

Cybermoor

Broadway Partners

Precision Decision

Blue Bear

Kingston University

King's College London

Lancaster University

North Pennines AONB

World Around Me



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# Exploring uses of 5G

- ▶ 5GRIT applications
  - ▶ Rural Broadband - delivering connectivity to homes, businesses and tourism destinations
  - ▶ Rural Tourism - improving the visitor experience
  - ▶ Precision Farming - giving farmers the data to make better decisions from images
  - ▶ Unmanned aerial systems - giving regulators the confidence to allow drones to fly further in rural areas
- ▶ Panels where partners explain their application then take questions
- ▶ Summary of findings
- ▶ Future plans and ideas