Department for Digital, Culture, Media & Sport

5G Testbeds and Trials Programme

Programme Update

September 2018

Department for Digital, Culture, Media & Sport

Introduction

As referenced in the 5G Nation Report created by the Digital Catapult, the UK 5G landscape is highly interconnected, gaining momentum and strong.[1] The UK Government has been playing a growing part in accelerating this, alongside industry, through the work of the DCMS 5G Testbeds and Trials Programme (5GTT).

The 5GTT Programme is a fundamental part of the Future Telecoms Infrastructure Review (FTIR), announced in the Government's Industrial Strategy. The FTIR has taken an in-depth look at the market to understand incentives to invest in future telecoms infrastructure, including 5G, and to establish what policy interventions are needed to deliver on Government's future connectivity objectives.[2] It sets out the framework and conditions necessary to underpin investment and innovation in 5G, and deliver the Government's manifesto commitment to have 5G coverage for the majority of the UK by 2027.

In light of that, the purpose of this publication is to:

1. Provide a brief update on the progress made by the 5GTT Programme in delivering projects that drive towards its targets and objectives and;
2. Provide a forward look of what activities the 5GTT Programme is planning over the next 12 months.

The 5G Testbeds and Trials Programme

*The 5GTT Programme is here to **foster, build** and **lead**.*

***Foster** - the development of the UK's 5G ecosystem*

***Build** - the business case for 5G by stimulating new use cases and create the conditions needed to deploy 5G efficiently*

***Lead** - the way in 5G R&D to drive UK 5G leadership*

Through the 5GTT Programme, Government will coordinate pilots and trial activities to identify potential deployment and technical challenges for 5G, reduce commercial risks associated with investment in 5G by stimulating demand for new services, and help to inform future policy.

As part of a Government investment of over £1bn in digital infrastructure, £200m has been allocated to support 5G Testbeds and Trials, with an additional £35m allocated to joint rail projects with the Local Full Fibre Networks Programme.[3]

5G Development

5G is used to describe the fifth generation of mobile communications technologies. It is anticipated that it will deliver a step change of ultrafast, low latency (i.e. minimal delay), more

[1] https://www.digicatapult.org.uk/news-and-views/publication/5g-nation
[2] https://www.gov.uk/government/publications/future-telecoms-infrastructure-review
[3] https://www.gov.uk/guidance/broadband-delivery-uk#local-full-fibre-networks-programme

reliable wireless connectivity that is able to support ever-larger data requirements, as well as wide-ranging new applications.

The path to a 5G future is likely to integrate existing and new technologies and require wireless networks to align ever more closely with fixed networks. This will take place in the context of a maturing 4G market, with many of the technological innovations that may be classified as 5G being introduced early on through evolution of the current 4G standards.

Opportunities that 5G could enable include the development, trialling and use of new capabilities in core networks as well as interactions involving a range of wireless networks (potentially including future 5G radio networks, 2G, 3G, 4G, low power wide area networks, narrow band IoT, Wi-Fi and fixed wireless access networks).

Testbeds and Trials projects are intended to provide opportunities to:

- Pilot ways of addressing deployment and technical challenges that will help to establish the conditions under which 5G can be deployed in the UK in a timely way.
- Provide environments where UK businesses, including SMEs, can test and develop 5G applications, services and products.
- Develop and trial new business models for parties in vertical industry sectors and telecommunications providers.
- Take advantage of areas where the UK has a competitive advantage such as our strengths in security, systems integration, scientific research, engineering talent, and the rich ecosystem of relevant technology companies.
- Continue to develop international relationships to learn and share best practice, form partnerships between trials, promote the UK and help to build the business case.
- Contribute to meeting the grand challenges set out in the Government's Industrial Strategy to put the UK at the forefront of the industries of the future[4].
- Stimulate the development of a strong pipeline of trials from many different future 5G users (including machines in the Internet of Things), learning lessons and driving productivity while helping to build the 5G ecosystem, and;
- Contribute to economic development in local economies.

[4] https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

5GTT Programme funded projects

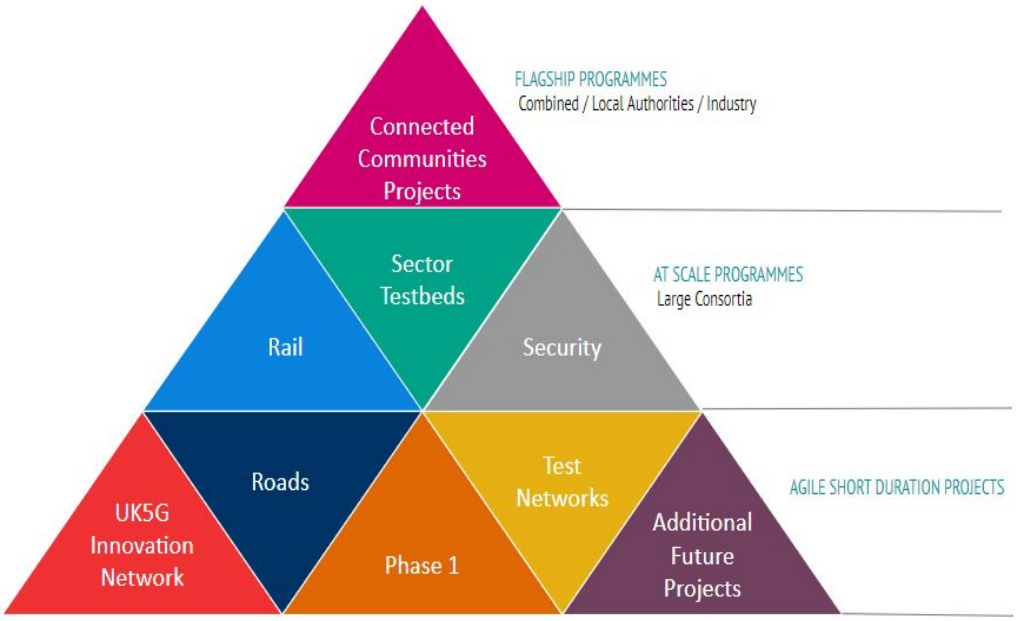


Figure 1 - *5GTT Programme Delivery Approach*

5GUK Test Networks

5GUK, the world's first end-to-end 5G network, was completed in March 2018. The DCMS funded, £16m network was created through a collaboration between the 5G Innovation Centre at University of Surrey, the University of Bristol and King's College London.

At Mobile World Congress in February 2018, 5GUK demonstrated their cutting-edge 5G technology through multiple interactive demonstrations including a 5G-connected robotic football player. 5GUK have also successfully demonstrated their technology to wider public audiences in the Millenium Square, Bristol, on site at King's College London and at London's Guildhall, including real-time immersive experiences made possible by the ultra-reliable and low latency communications and ultrafast mobile connectivity developed by the project.

The 5GUK test network is now open for business and is being used to trial further 5G applications and technologies. This includes our Phase 1 projects, and over 25 further projects, of which more detail will be available later this year.

Phase 1 projects

In March 2018, the Government selected six bids from across the UK as the winners of a £25m competition for an initial phase of the 5G Testbeds and Trials Programme. This includes successful applications located across the UK, including the Midlands, the West and North of England, Wales and Scotland. The projects aim to explore innovative radio technologies that will help to explore a number of exciting and interesting use cases. For more details about all of these projects, please visit https://uk5g.org/discover/testbeds-and-trials/

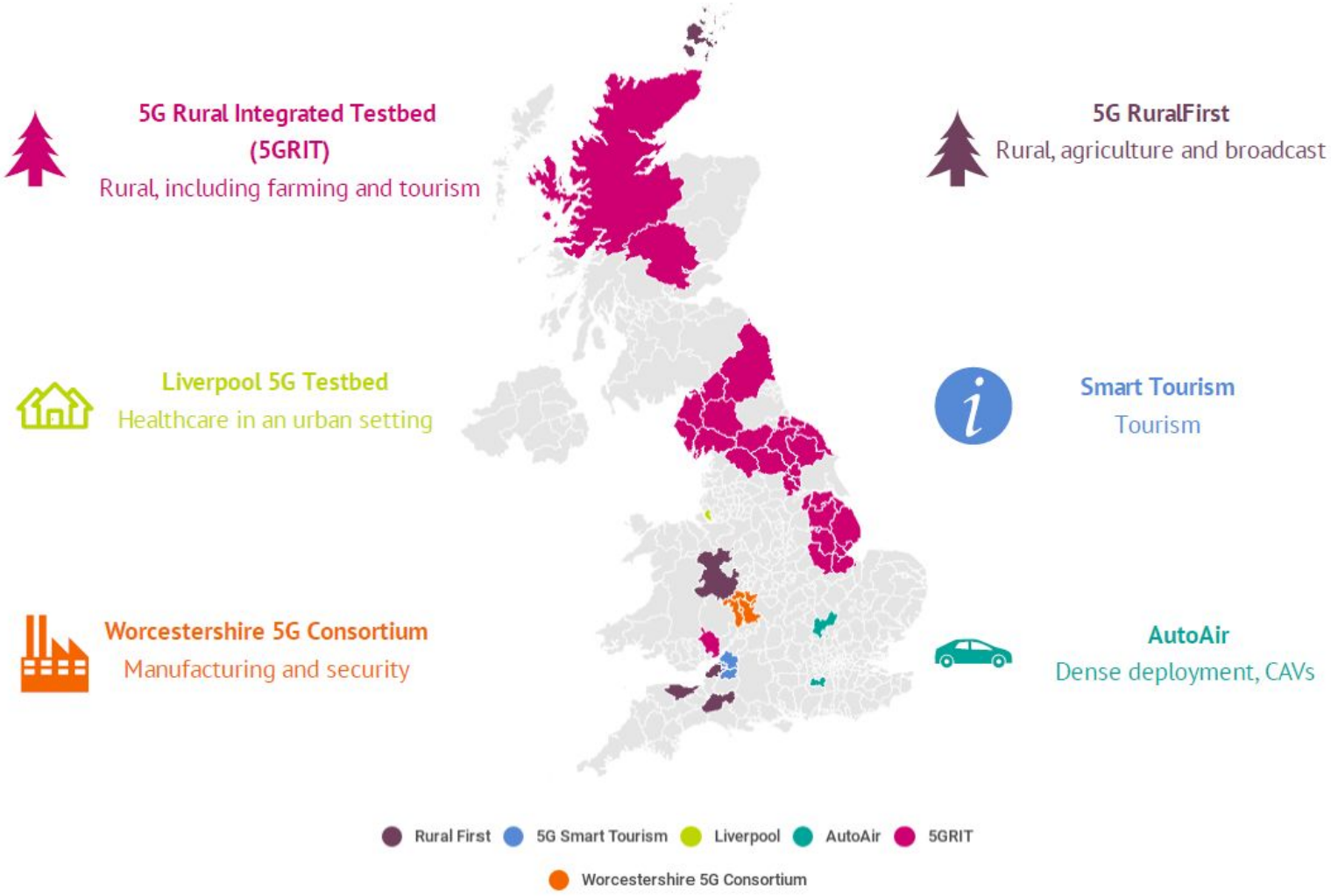


Figure 2 - *Geographical distribution of the Phase 1 projects*

UK5G Innovation Network (www.uk5g.org)

The UK5G Innovation Network was launched in March 2018.

DCMS funded, but independent and impartial, UK5G is the new national innovation network dedicated to the promotion of research, collaboration and the commercial application of 5G in the UK. It has been created to facilitate and encourage the engagement and coordination of organisations working on 5G activities across the UK. It acts to enhance links between ongoing research and development and other activities being undertaken by organisations across telecoms and other sectors.

A senior national advisory board steers the activities of UK5G, and advises the 5GTT Programme, providing expert feedback from industry, identifying their priorities and advising on potential future areas of focus.

Roads

At Autumn Budget 2017, the Government allocated £5m to consider business models for improving 5G connectivity on the UK's roads. As part of this, a feasibility study is underway to identify short and medium term demand for applications of 5G technologies on roads. This will explore and understand new commercial opportunities for road authorities and mobile network operators to work together and share infrastructure.

By undertaking this study, we aim to prove, new technology and business models that can support future demand and ensure we have connectivity on the roads that is fit for the future. The study will collaborate with other ongoing projects and departments, e.g. UK CITE, West Midlands CAV testbed, Transport for West Midlands and the Centre for Connected and Autonomous Vehicle (CCAV) to ensure benefits and findings of these programmes are incorporated into the feasibility study. The feasibility study is to be completed in December 2018 with a review of the pilot proposal completed by 31st March 2019.

Rail

At Autumn Budget 2017, £35m was announced for projects to enhance connectivity on UK railways.

We are planning to upgrade Network Rail's Rail Innovation and Development Centre at Melton Mowbray to allow 5G technologies to be tested and made railway-ready in a controlled environment.

We have also announced plans to work with the Local Full Fibre Networks (LFFN) Programme on the Transpennine Route Upgrade (TRU) to trial 5G track-to-train connectivity on the Transpennine route between Manchester and Leeds.

The key objectives of TRU are:

- To trial delivering high capacity fibre to premises using Network Rail's assets between Manchester and York;
- To provide high speed connectivity to the train utilising the rail corridor between Manchester Piccadilly and Leeds along with infrastructure currently being deployed along the route; and
- To create a 5G testbed at Network Rail's 'Rail Innovation Development Centre' (RIDC) at Melton Mowbray.

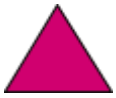
We have recently launched a call for information for the TRU project. The closing date for comments to be submitted is noon **14th September 2018**.[5]

[5] https://www.gov.uk/government/news/trans-pennine-railway-5g-trial

Security

The security and resilience of the UK's telecoms networks is also of paramount importance. The 5GTT Programme has allocated £10 million to create capabilities where the security of 5G networks can be tested and proven, working with the National Cyber Security Centre.

Further 5GTT projects:



Urban Connected Communities Project

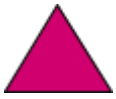
The Urban Connected Communities (UCC) project will create a large scale 5G testbed in an urban area in the UK. The 5GTT Programme will be working with West Midlands Combined Authority to deliver this project, in association with private sector organisations.

The project will provide the opportunity to use developing technologies in the innovative delivery of both public and commercial services to individuals and businesses, and to improve the quality of urban living and working. It will support economic development by stimulating the 5G ecosystem, encompassing multiple industry sectors.

Up to £50m is currently available for the project, subject to further development and approval of the business plan. This includes £25m from DCMS and a further £25m match funding from regional partners. An additional £25m may be made available at a later stage, subject to the the eventual project design and business plan justification.

Alongside the UCC project itself, DCMS, the Local Connectivity Group[6] and UK5G will be engaging with fast-following local authorities all over the UK to help continue to develop their digital strategies so that those locations are prepared to take full advantage of 5G and its benefits.

Further details of the UCC Project are available at:
https://www.gov.uk/government/news/west-midlands-to-become-uks-first-large-scale-5g-testbed



Rural Connected Communities Project

To reflect the challenging economics of providing connectivity in rural areas, DCMS will use the Rural Connected Communities (RCC) programme to explore new commercial models and technical solutions to improve coverage. The RCC will help promote demand for services from consumers, enterprises and the public sector in rural areas and will also explore how "neutral host" infrastructure sharing and spectrum sharing can be used to improve the incentives to invest.

[6]As identified in the update to the 5G Strategy, the Local Connectivity Group is made up of local areas, government departments, Ofcom, landowners and industry. The Group will help to provide an accurate picture of local area requirements for the deployment of digital infrastructure, encourage local areas to develop local plans for digital connectivity and could limit inconsistencies in interpreting regulations affecting infrastructure deployment across the country.

We plan to work with local authorities and industry to refine and finalise options over the autumn. Subject to the outcome of that engagement, we would then aim to run a competition so as to appoint delivery partners early in the New Year, ahead of initiatives commencing in the spring.

Sector Testbed and Trials Projects

We are considering projects that will have a primary focus on specific vertical industry sectors. These projects will be explored in the Autumn of 2018, with activities expected to commence in 2019. We expect industry organisations to partner with the telecoms industry, the public sector, and academic and research organisations to build the facilities for the trialing of applications, services and products that will develop the 5G ecosystem in those chosen sectors. The Programme has allocated around £25m to support several sector testbeds, alongside commercial funding.

Based on sector analysis work undertaken by DCMS, we envisage that these projects will focus on the manufacturing and logistics sectors, though we will also consider proposals from other sectors. Trials involving other sectors, such as health and social care, could also form part of the Urban and Rural Connected Communities projects. Initial engagement with organisations interested in industry sectors as part of Sector Testbeds and Trials Projects will be through UK5G. We will publish further details on the project later in the Autumn.

Additional Future Projects

The 5GTT Programme is considering options for additional future interventions that may comprise a series of smaller scale funding opportunities to cover a broader range of activities. These will help build and sustain the development of the 5G ecosystem. Further details will be shared later in 2018/19.

Alongside the projects and funds listed in this publication, DCMS is keen to promote other funding streams for potential 5G related projects beyond the 5GTT Programme. Namely initiatives like:

- The Open Programme Funding competition (https://apply-for-innovation-funding.service.gov.uk/competition/188/overview)
- The next wave of Local Full Fibre Networks Programme funding (https://www.gov.uk/guidance/broadband-delivery-uk#local-full-fibre-networks-programme)
- Other competitions for funding from the Industrial Strategy Challenge Fund (https://www.gov.uk/government/collections/industrial-strategy-challenge-fund-joint-research-and-innovation)

DCMS recommends joining the UK5G Innovation Network (www.uk5g.org) to link into the activities of the growing 5G community in the UK, and to stay up to date with further funding opportunities.