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What is 5GRIT?

The 5G Rural Integrated Testbed (5GRIT), led by Quickline Communications Ltd, aims to provide solutions for rural areas that can be used on a 5G network. The project will upgrade existing wireless networks belonging to Quickline and Broadway Partners, using TV White Space to provide a superfast service to households and businesses in rural communities, and test out innovative applications for rural areas.

What are the challenges?

The rural test sites present many challenges for 5G. Many rural areas have been left behind due to poor connectivity. The project will harness TV White Space, new frequencies freed up by Digital Switchover to deliver broadband into areas that were previously too difficult and expensive to reach.

What are the objectives?

5GRIT is all about testing connectivity across tourism, farming, remote broadband and interface with airborne 5G technology via drones.

The **augmented reality tourism app** by World Around Me will provide an enhanced experience for tourists visiting rural areas. It is being developed with data from North

Pennines AONB Partnership to provide users with information on the location, in the form of visual and spoken histories, details of local events, and nature experiences such as bird watching and stargazing.

The **precision farming** service is under development by Precision Decisions, Blue Bear Systems Ltd and Kingston University. A crop and livestock monitoring service will improve the efficiency of farms in tasks such as targeted crop spraying with fertilizers or pesticides, and monitoring animals' location and health. Data will be collected from drones and other sensors, transmitted over the new network for analysis, and fed back to the farmer.

Test flying **Unmanned Aerial Systems** beyond visual line of sight (BVLOS) will allow Blue Bear Systems Ltd to trial a new drone control system connecting to the 5G network. The benefits of the ability to fly BVLOS will be demonstrated by collecting images from farm land and could transform the future operations of drones in the UK.

The **broadband service** aims to connect hard-to-reach customers to reliable and fast broadband. Quickline and Broadway Partners will build upon existing rural networks to test

how shared spectrum radios can deliver superfast broadband.

Rural Broadband with TVWS

At the Loch Leven nature reserve in Perth & Kinross, Broadway Partners, as part of the 5GRIT team are using TVWS to transmit superfast broadband to the castle on an island in the middle of the loch.



This temporary installation transmits signals between an aerial alongside the company hub to the castle.



This is the first time that this tree-locked castle has ever had any broadband connection. With full deployment and renewable power it has been estimated that it could generate >£120,000 additional revenue for the castle tourism business alone.

At trials on Monday 2nd July 2018, the team could watch Wimbledon in High Definition on BBC iPlayer via this connection:

<https://youtu.be/ES9BDcY79JA>

Project Partners

5GRIT brings together a consortium of 6 SMEs, North Pennines Area of Outstanding Natural Beauty Partnership (AONB) and 3 universities.

SMEs



Communications Ltd deliver fast reliable internet connectivity to Business, Public Sector and Residential customers in urban and rural locations via an independent Fibre and Fixed Wireless Access network. As lead partner and a leading ISP, Quickline will contribute to the testbed by overlaying parts of their existing wireless network with TV White Space equipment, providing previously unconnected customers with fast rural broadband. <https://www.quickline.co.uk/>



Research provides capabilities in design and development of UAV platforms, full flight and ground control systems. In the 5GRIT project, Blue Bear will test their ability to fly beyond visual line of sight to collect image data from

flying over farms etc.

<https://www.bbsr.co.uk/>

BROADWAY PARTNERS

Broadway Partners combine

state-of-the-art 5GHz and TV White Space technology to deliver rural and urban in-fill super-fast broadband. One of two leading ISPs on the project, Broadway Partners will contribute their extensive knowledge and experience of using TV White Space to connect rural communities, to the 5GRIT network.

<http://www.broadwaypartners.co.uk/>



Cybermoor is a social

enterprise based in Alston Moor, Cumbria, providing innovative digital services to rural areas. It is supporting Quickline in the co-ordination of the project and the design of the use cases. <http://www.cybermoor.org/>



Precision Decisions offer

comprehensive precision farming services based on sound agronomic and practical experience, with specialities across agronomy, engineering, software and customer service. Precision Decisions are collaborating with Blue Bear and Kingston university to develop farming technologies which function on the

TV White Space network.

<http://www.precisiondecisions.co.uk/>



World Around Me is an award-winning Augmented Reality app which allows users to discover places

around them such as restaurants, shops and cash machines. WAM will be developing the Augmented Reality tourism app to be trialled on the testbed. The app will allow users of the network to discover natural attractions, local events and sites through Oral Histories and other mediums.

<https://worldaroundmeapp.com/>

Universities & Public Sector



King's College London provide the project with expertise on 5G and TV

White Space to manage trials and provision each use case to work on the rural network.

<https://www.kcl.ac.uk>



Kingston University London are training algorithms to analyse images and detect different plants and animals

in fields, allowing them to measure crop density and livestock activity.

<https://www.kingston.ac.uk/>



Lancaster University
will monitor both

network and service performance to identify and resolve any issues that may arise and improve the service. They will also work on the exploitation of the testbed and the services developed.

<http://www.lancaster.ac.uk/>



North Pennines
AONB Partnership
is responsible for

co-ordinating efforts to conserve and enhance the North Pennines. They will contribute data to construct the AR tourism app and highlight areas of interest for tourists. The data provided will include oral histories.

<http://www.northpennines.org.uk/>

What is 5G?

5G is a term used to describe the fifth generation of mobile communications technologies. There is not yet a common standard of what 5G will encompass, as it is not fully developed. Indeed, definitive standards are only due to be agreed in 2019 and incremental deployment is expected over the following decade.

However, there is an anticipation that it will deliver a step change of ultrafast, low latency (i.e. quicker reaction times), reliable, wireless connectivity, that is able to support ever larger data requirements, as well as wide-ranging new applications.

What 5G attributes is the project testing?

TV White Space is an early stage in the management of available spectrum via a database so it can be shared by a number of operators across the UK. In the future 5G promises more efficient use of spectrum as radios can switch frequencies. However, we need to understand how this works at scale.

In rural areas, tourism and farming businesses tend to struggle with superfast connectivity due to their remoteness.

DCMS



Department for
Digital, Culture,
Media & Sport

The 5GRIT project is
one of six projects
chosen to represent
the best of UK

innovation, resources and expertise. The six chosen projects were announced by the Department for Digital, Culture, Media & Sports (DCMS) on the 1st Anniversary of its Digital Strategy, as part of the government's £1 billion commitment to keep Britain at the forefront of connectivity by accelerating the deployment of next generation digital infrastructure and driving forward new 5G business opportunities.



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