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Cisco and network of partners to help address digital divide in the UK with 5G for rural communities

UK government funded testbed, 5G RuralFirst, to help the UK take a leading position in 5G, enabling some of the UK's disconnected, remote and rural communities to be the first to benefit from the technology

London, UK – March 28th 2018 – Autonomous tractors and farmland drones, digital tools for small businesses and radio to your phones. All of which present tremendous opportunity for industry and rural communities in the UK, yet they are hindered by one thing. Connectivity. More specifically, a lack of secure, reliable mobile connectivity.

Geographically, only 63% of the UK has mobile data coverage from all of the four main providers ([Ofcom](#)), yet recent research highlights that increased usage of digital technologies in rural communities represents tens of billions of pounds' worth of opportunity for the UK economy. Still, today the business case for investment in connectivity crucial to make these digital technologies viable is challenged; it relies on outdated economic models for return on investment (ROI) that are unable to pre-empt the benefit of new technologies, whether for the nation or for business.

This is the challenge that 5G RuralFirst aims to help solve. It was announced by the UK Government Department for Digital, Culture, Media and Sport (DCMS) as a co-innovation project between industry, government and academia as part of the recent 5G testbed and trial competition to help position the UK as a global leader in 5G. As such, it will explore the benefits of 5G for rural communities and industries like agriculture, broadcasting, and utilities. It will also look to address the barriers to, and build the business case for, investment in 5G rural deployment.

With Cisco as the named lead, and principal partner the University of Strathclyde, the network of 32 organisations includes some of the most innovative startups, tech leaders and academic institutions in the UK. The project will aim to create a complete end-to-end rural 5G testbed system for trials of new wireless and networking technologies, spectrum sharing, new applications and services; stimulating new business models, all with a focus on testing and demonstrating innovative approaches for ensuring that 5G connectivity is accessible and affordable in hard-to-reach rural areas.

Testbeds and trials for the project will primarily be based on the Orkney islands to the very north of Scotland, and the farmlands of Somerset and Shropshire. The locations will be linked to the distributed Cisco® 5G cloud platform at DataVita's Tier III data centre facility near Glasgow and will collaborate with the wider 5G UK ecosystem with the University of Surrey 5G Innovation Centre (5GIC).

The project will look to support and inform the development of the UK's 5G eco-system so that it is able to address the needs and aspirations of communities and businesses in rural locations in ways that 4G, 3G, and 2G have not been able to do.

Key use cases:

- **Broadcast radio delivered over 5G with the BBC** – the BBC believes internet-based delivery will become increasingly important to broadcasting. It will use the 5G testbed on Orkney to trial the capabilities of 5G to deliver traditional radio and new forms of BBC audio content over these new technologies.
- **Smart farming in partnership with Agri-EPI Centre** – [72% of the UK's area](#) is utilised for agricultural production, and the agri-food sector is an important contributor to UK GVA ([over £112B per annum](#)). The trial will help provide significant opportunities to transform UK agriculture into a smart, high-tech industry, through innovations in sensors & remote diagnostics, data collection, UAVs (drones), wider precision farming techniques and autonomous vehicles.
- **IoT in Utilities and Environment Management** – Electrical utilities and energy providers (wind, wave and solar), water companies, environmental monitoring, oil and gas industries – all have requirements for both general reliable data communications alongside low bit-rate, but high reliability and high security data communications for IoT (internet of things) in very remote areas. This will be addressed via network slicing and network edge data aggregation for 5G networks, alongside coverage trials and investigation.

- **Dynamic Shared Spectrum development and trial** – this potentially disruptive work led by the University of Strathclyde and others seeks to demonstrate the applicability of dynamic and shared spectrum technologies for 5G communications in rural areas, coupled with the deployment of low cost software-defined radio technologies, both with the intention of lowering the cost of future rural 5G communications deployment and presenting the opportunity for network self-provisioning.

Margot James, Minister for Digital and the Creative Industries said: "New technology has the potential to transform business and society and we're determined nowhere in the UK will be left behind by a 5G future. These testbeds will show how our rural communities can harness the power of this revolution in connectivity, bringing benefits across agriculture, industry and wider society."

Nick Chrissos, Director of Innovation, Cisco Europe said: "The UK currently ranks 5th in the world when it comes to our readiness to embrace digital. We have the ambition, the innovative heritage and the expert ecosystems to shape the UK's digital future, but to do so we have to address fundamental issues like making internet connectivity work for everyone. 5G RuralFirst looks to help close the digital divide in the UK. To uncover the opportunities and challenges faced in 5G deployment, and to ensure that it can do what other generations have yet to. It's not only about implementing the right technology in the right way. It's about designing networking technology intelligently from the very start. Giving careful consideration to critical issues like security; which becomes even more complex when you are connecting everything from drones to autonomous tractors."

Professor Bob Stewart of the Centre for White Space Communication at the University of Strathclyde said: "After a number of years trialling with TV White Space shared spectrum, we now see the very clear opportunity for future 5G mobile and wireless radios and networks to support and use shared and dynamic spectrum access technologies. Working with innovative radio manufacturers and spectrum database providers we see very clear opportunity for shared spectrum to work effectively alongside the services and coverage from current licensed mobile spectrum and unlicensed (Wi-Fi) spectrum"

Dave Ross, CEO, Agri-EPI Centre said: "As the UK centre for precision agriculture and engineering technology, we are delighted to be a strategic partner in 5G RuralFirst. The UK agricultural community is under pressure to produce more food, with less labour and less impact on the environment. Drones, autonomous vehicles, robotics and remote sensing and diagnostics will significantly change how we farm in the UK, but this innovation will only be possible if network connectivity in our rural areas is dramatically improved. Through a series of trials conducted by our 6 SME Agri-Tech partners, 5G RuralFirst will prove what would be possible in our agricultural sector and we hope will lead the way for investment and development in rural network connectivity and associated Agri-Tech services."

Kieran Clifton, Director, Distribution & Business Development, BBC said: "The BBC is delighted to be part of the 5G RuralFirst project. We're excited to be developing new ways to deliver both traditional radio and new forms of audio content around the UK and to help audiences get the best possible services in difficult to reach areas."

NOTES TO EDITORS:

About the network of partners, including additional quotes:

The partners in the project cover the core areas of (i) 5G Core Network and Cloud Services, (ii) 5G Access Technologies and Dynamic Spectrum Access (iii) Broadcast Application, (vi) Agriculture Technologies, (vi) Industrial IoT, and (vii) Community, Infrastructure and Services.

5G Core Network and Cloud Services:

- **Cisco**

Cisco (NASDAQ: CSCO) is the worldwide technology leader that has been making the Internet work since 1984. Our people, products, and partners help society securely connect and seize tomorrow's digital opportunity today. Discover more at newsroom.cisco.com and follow us on Twitter at @Cisco.

Today's announcement is the latest example of Cisco's commitment to support digitisation in the UK. Cisco's Country Digital Acceleration (CDA) strategy is a long-term partnership with government, industry and academia to deliver real outcomes faster and more effectively for the country.

- **Datavita**

Datavita was founded in 2014 to operate the most resilient and physically secure datacentre in the north of the UK, just outside Glasgow. DataVita provide innovative colocation, connectivity and cloud services to a wide variety of organisations from small start-ups to global corporations.

Danny Quinn, Managing Director said *“At DataVita we’re really looking forward to working with the 5G RuralFirst partners to develop next generation connectivity for Scotland”*

- **Zeetta Networks**

Zeetta Networks is an Open Networking software company that extracts greater efficiency and agility from a network while enhancing the end-user experience. Our main product, NetOS®, is network orchestration software that provides a single, converged and secure platform for monitoring, managing and automating the operations of an ICT network.

Vassilis Seferidis, CEO: *“In the RuralFirst project we will be contributing our award-nominated NetOS platform, delivering an infrastructure capable of supporting multiple vendors, multiple technologies, and multiple tenants so they can access the benefits of 5G. By bringing together all network sub-systems (domains) under a centralised control, NetOS not only improves their operational efficiency but also enables better monetization of network resources via new applications and services. Our technology enables Network Operators to drive down roll-out and operational network costs while improving scalability and flexibility. “*

- **University of Surrey, 5G Innovation Centre**

University of Surrey 5GIC is the largest 5G open innovation academic/industry test bed in the world with 26 corporates and over 300 SMEs engaged in or wider network

Prof Rahim Tafazolli, founder and Director of 5GIC, said, *“The 5GIC is delighted to give its support to this programme which will offer world leading insights into how the tremendous social and business benefits of 5G can be extended into more remote communities.”*

- **Microsoft**

Paul Mitchell, Microsoft, Senior Director, Internet Governance, CELA *“Connectivity is central to Microsoft’s mission to empower every person and organization on the planet to achieve more and we’re thrilled to be a part of the groundbreaking 5G Rural Coverage and Dynamic Spectrum Access testbed. We look forward to exploring how 5G and dynamic access technologies can improve coverage for rural areas and bring new opportunities such as precision agriculture and the Internet of Things to these communities.”*

5G Radio Access Technology and Dynamic Spectrum Access:

- **University of Strathclyde, Centre for White Space Communication**

University of Strathclyde, Centre for White Space Communication (CWSC) has been working for a number of years on rural wireless connectivity projects, starting with the first TV White Space network on the Isle of Bute testbed back in 2011. The Centre has extensive experience working on Software Defined Radio, and FPGA implementations, two technologies which will be key components of shared spectrum development and deployment.

- **Parallel Wireless**

Parallel Wireless is on a mission to connect the 4 billion unconnected people with end-to-end 2G, 3G, and 4G Open RAN innovative solutions by making cellular deployments as easy and as cost-effective as Wi-Fi.

Steve Papa, Founder and CEO, Parallel Wireless said. *“We are proud of our role as a part of this ecosystem in enabling the world’s first 5G RuralFirst testbed with ambition to foster rural wireless connectivity and new wireless services like connected farming, broadcasting, and connected utilities to successfully build the business case for investment in 5G in hard to reach areas.*

- **Lime Microsystems**

Lime Microsystems is the world’s leading designer and manufacturer of field programmable RF transceivers. The company’s software configurable chips can run any mobile standard and any mobile frequency and have been used in a vast array of systems including mobile base stations and small cells, SDR platforms, indoor navigation and machine-to-machine communication systems.

Lime CEO Ebrahim Bushehri commented "*Wireless innovation has been limited by access to affordable, easy-to-use, maintainable and programmable hardware. By making radio networks software configurable, Lime Microsystems is unleashing the next phase in virtualising wireless networks and bringing products that operators can use for future real-world deployments that can serve the communities from urban to rural areas equally*"

- **pure LiFi & Edinburgh University**

pureLiFi is the world leader in Light Fidelity (LiFi) innovation, enabling the communication of data through light. Established in 2012, pureLiFi is a spin-out from the University of Edinburgh, where its pioneering research into LiFi communication has been in development since 2008. In October 2017 pureLiFi Launched the LiFi-XC the most commercially ready LiFi system on the market. www.pureLiFi.com

Professor Harald Haas, co-founder and chief scientific officer, pureLiFi Ltd., and Director LiFi R&D Centre, The University of Edinburgh, said:

"The U.K. has the opportunity to lead the world in 5G of which LiFi will play a key role in the fruition of this vision for a connected planet. Specifically, ordinary solar cells which for the first time will simultaneously harvest energy and receive high speed from distant light sources. In combination with LiFi providing connectivity to the end user light communications will help close the digital divide and provide unprecedented end-to-end data connectivity not only here in the U.K., but after a successful project this could be replicated globally."

- **Heriot-Watt University**

Founded in 1821, Heriot-Watt has a rich heritage and an established reputation as a leading research-led university and provider of education around the world. The university is truly global, with campuses in Scotland, Dubai and Malaysia.

Professor Cheng-Xiang Wang, School of Engineering and Physical Sciences, Heriot-Watt University, said:

"We hope to highlight the benefit of 5G in applying higher frequencies to enable new services and business opportunities for rural areas"

- **Fairspectrum**

Fairspectrum is a leading provider of Dynamic Spectrum Access (DSA) solutions, which cover Television White Space (TVWS), Licensed Shared Access (LSA), and Citizen's Broadband Radio Service (CBRS).

Heikki Kokkinen, CEO of Fairspectrum: "*We hope to demonstrate the full potential of 5G in the sparsely populated areas by providing innovative spectrum sharing technology*".

- **Nominet**

Nominet is driven by a commitment to use technology to improve connectivity, security and inclusivity online. For 20 years, Nominet has run the .UK internet infrastructure, developing an expertise in the Domain Name System (DNS) that now underpins sophisticated network analytics used by governments and enterprises to mitigate cyber threats. The company provides registry services for top level domains, and is exploring applications for a range of emerging technologies. A profit with a purpose company, Nominet supports initiatives that contribute to a vibrant digital future.

- **Telint**

Dave Happy, Managing Director of Telint Ltd said "*As intelligent telecoms and spectrum specialists, Telint are delighted to be part of this ground breaking 5G project.*"

- **BT**

BT runs the UK's largest fixed network, and the largest mobile network – EE – with 4G coverage in more places than any other operator. In 2015, EE won the tender to deliver Britain's Emergency Services Network, which will see the operator deploy 4G coverage in more remote areas throughout 2018.

Broadcast Application:

- **BBC:**

The BBC is the oldest and largest broadcaster in the world and has been at the forefront of developing the future of broadcast technology since 1922; from the birth of radio and television, to the first steps into the digital world with Ceefax, BBC Online and BBC iPlayer. Current projects include pioneering internet-based broadcast networks and new forms of content, including VR, AR and object-based media.

- **Faoese Telecom/SHEFA**

Faroese Telecom has vast experience installing mobile networks reaching 100% 4G coverage on the Faroe Islands and now doing 4.5G in all major cities. Shefa operates the Shefa-2 fibre optic submarine network bringing capacity to both Shetland and Orkney islands but also West of Shetland Oil & Gas assets.

CEO Jan Ziskasen: *"Facing rural areas as an everyday challenge operating both 4G, 4.5G and subsea fibre networks, Shefa / Faroese Telecom is proud to take part bringing new communications standards to Orkney"*

Agricultural Technology:

- **Agri-EPI Centre**

Agri-EPI Centre is the UK lead centre for the adoption of precision agriculture and engineering technology, across the whole agrifood chain. It does this by providing world-class R&D facilities and business incubation; facilitating industry and academic partnerships; and progressing cutting-edge sensing and imaging technologies, robotics and autonomous vehicles to create a new understanding of production efficiency.

- **Harper Adams University**

Harper Adams University is a public university located close to the village of Edgmond, near Newport, in Shropshire, UK. Established in 1901, the university is a specialist provider of higher education for the agricultural and rural sector. The university provides more than 50 foundation degree, undergraduate and postgraduate degree programmes to students from over 30 countries.

- **Milkalyser**

Milkalyser is an automated system which measures the fall of progesterone levels that occurs before ovulation in cows. Milkalyser technology can predict ovulation, allowing for optimal timing of artificial insemination - A typical farm could benefit by a net value of £150 per cow because of this innovation.

Professor Toby Mottram, CEO of Milkalyser said: *"We believe that the future of veterinary medicine in agriculture will rely on comprehensive information about the individual animal's health status and recent treatments being provided direct to the animal technician at the cow's side, via high speed data communications; animal welfare can be massively improved with reduced antimicrobial use by this approach."*

- **Kingshay**

Dairy specialists Kingshay have been providing independent research, advice and services to milk producers for over 25 years including leading edge innovations such as HowsMyCow, our 3D imaging system to measure cow health, and Dairy Manager, the country's foremost dairy costings service measuring key health and economic inputs and outcomes.

Duncan Forbes, Kingshay's Dairy Research Director says *"We are proud to have developed the 180 cow state of the art dairy unit in Somerset which is one of the test beds for the 5G Rural First project. There are so many exciting opportunities presented by 5G to improve productivity, welfare and sustainability for the dairy farm of the future and we look forward to testing the technology and demonstrating its economic benefits here at the Somerset 5G test bed."*

- **Afimilk**

Afimilk company's systems are installed and in use on thousands of farms in 50 countries across five continents. With hundreds of thousands of milk meters and millions of behaviour sensors installed, Afimilk sets the standards for dairy farming and management around the globe.

- **Precision Decisions**

Precision Decisions grew out of a family farming business, and continues to offer comprehensive precision farming services based on sound agronomic and practical experience. Specialities across agronomy, engineering, software and customer service, working from new premises with dedicated workshops and development facilities.

- **Soil Essentials**

SoilEssentials are a precision agriculture company, established by farmers, based in the North East of Scotland and operating throughout the UK. Precision solutions include soil sampling, yield analysis/monitoring and online mapping.

- **Hyperceptions**

Hyperceptions will be providing specialist hyperspectral imaging and remote sensing services that will identify and quantify nutrients and quality attributes of pasture and crops. For remote diagnosis applications, these systems require very high bandwidth data transmission and Hyperceptions focus will be to explore the limits of the test bed capacity.

Industrial IoT

- **CENSIS**

CENSIS is the centre of excellence for Sensor and Imaging Systems (SIS) and Internet of Things (IoT) technologies. It enables industry innovators and university researchers to collaborate at the forefront of market-focused SIS and IoT innovation, developing products and services for global markets to create sustainable economic value in the Scottish economy.

Business Development Director, Mark Begbie says, "*CENSIS is excited about the benefits 5G will bring to the Internet of Things, particularly in the industrial domain. We believe the trials programme will demonstrate the transformative value 5G can bring to IoT in sectors including advanced manufacturing and agriculture.*"

- **Stream Technologies**

Stream Technologies remains at the forefront of the development of innovative, enabling and management software technologies for eSIM orchestration and management of cellular connectivity. The team's depth of technical expertise, coupled with extensive experience in the IoT industry, makes Stream the world's most technically advanced enabler for eSIM and IoT connectivity.

Alan Tait, Chief Technology Officer "*Stream are excited to be part of this project to help enable 5G, it's one faster way to drive adoption and use cases by sponsoring vertical and regional deployments.*"

- **Power Networks Demonstration Centre (PNDC)**

The Power Networks Demonstration Centre is a venture founded by government, industrial and academic partners with the aim of accelerating the adoption of innovative research and technologies from early stage research into business as usual adoption by the electricity industry.

Community, Infrastructure and Services:

- **Cloudnet**

Nikki Linklater, Director, Cloudnet "*As Scotland's First trialists in TVWS covering 1200Km² in Orkney we delivered TVWS to rural homes and business as well as onto our North Isles Ferries internet connectivity. 5G is simply an extension to this with exciting times and challenges ahead. We look forward to delivering 5G for Orkney and rural communities.*"

- **Orkney Islands Council**

Orkney Islands Council is the local authority serving one of the UK's most northerly communities. The Council provides a broad range of services for people living across a scattered community of around 20 inhabited islands.

Council Leader James Stockan said: "*This is a community which embraces innovation - and we are all too aware that digital connectivity is crucial to the future economic prosperity of our islands. Those two factors make Orkney the perfect testbed for this important project – lessons learned in overcoming challenges here will benefit remote and rural areas like Orkney for many years to come.*"

- **Scottish Futures Trust**

As an infrastructure delivery company owned by Scottish Government, the Scottish Futures Trust works with the public and private sectors to help plan future investment, deliver major infrastructure programmes, deploy innovative financing approaches to build new infrastructure as well as improve the management of existing buildings.

Derek Graham, programme director at the Scottish Futures Trust, said: *"We are working with partners to drive innovation and change ensuring the right mechanisms and commercial approaches are developed to facilitate the delivery of 5G ready infrastructure for Scotland. As the Chair for the Scottish Innovation Programme, which includes Cisco, Strathclyde and BT among its founding members and is dedicated to investigate solutions for Scotland's digital connectivity challenges, we are delighted that the lead 5G Rural First partners were able to capitalise on this initiative to use it as a platform to build the wider consortium supporting their successful bid."*

- **Broadway Partners**

Broadway Partners is a leading provider of broadband services to rural communities across the UK, and especially in Scotland and Wales. Using a combination of 5Ghz and TV WhiteSpace radio, it is uniquely capable of guaranteeing 100% superfast connectivity to all residents and businesses within its target areas.

Michael Armitage, Chairman and CEO, said: *"We are thrilled to be part of the 5G Rural First partnership, and we look forward to helping bring the future, faster to remote rural communities."*