

# Open Networks Ecosystem Competition

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**Case study on the Open Networks Ecosystem competition, which awarded ~£80.5m in funding to projects supporting the UK's 5G Supply Chain Diversification Strategy**

## The objectives were to:

- Develop, demonstrate and test approaches to optimising Open RAN network performance in High Demand Density (HDD) environments.
- Develop open and interoperable software, including RIC technologies.
- Develop hardware solutions for open interface infrastructure and reduce/remove barriers to scaled market adoption.

The competition funded projects developing new software and hardware products, as well as live demonstrations of Open RAN technologies in challenging real-world environments. It worked alongside related programmes including the Future RAN Competition (FRANC), the Future Open Networks Research Challenge, SONIC Labs, the UK Telecoms Innovation Network and the UK Telecoms Lab.

Funded projects were expected to develop, demonstrate and test practical solutions that improved Open RAN performance, created interoperable software, and advanced scalable hardware platforms. Together, the projects contributed evidence, prototypes and operational learning to support future deployment of open mobile network infrastructure in the UK.

## Related material

- Open Network Ecosystem competition guidance (Open Networks Ecosystem Competition - GOV.UK)
- Original list of successful projects (Open Networks Ecosystem competition: successful projects - GOV.UK)

## 5G MoDE (Mobile oRAN for highly Dense Environments)

- Main location(s): Reading, Guildford
- DSIT funding amount: ~£1m
- Partners: Virgin Media O2, Mavenir, VMWare and University of Surrey
- Dates: September 2023 to March 2025

The 5G MoDE project was funded by the Department for Science, Innovation & Technology through the Open Network Ecosystem competition to test new ways of building mobile networks that are more open, flexible and competitive. The aim was to demonstrate that Open RAN (Open Radio Access Network) could handle very high levels of mobile traffic in real environments, such as major sports events, helping diversify the UK's telecoms supply chain beyond a small number of large suppliers.

The project moved from laboratory tests to live public demonstration. In the lab, partners integrated hardware and software components and tested basic performance. These components included cloud-based network units and radio antennas connected through open interfaces that allow flexible

deployments. The team then built a temporary test site and deployed the system at Twickenham Stadium, culminating in a live demonstration during a Six Nations rugby match where the Open RAN system carried real customer traffic and operated alongside the existing mobile network.

The project successfully showed that Open RAN can work under peak demand, support calls and data, and interoperate with established networks. Key lessons included practical insights into power and network configuration in dense venues, the importance of thorough emergency-call testing, and the need to manage supplier dependencies effectively.

For further details on the project outcomes, see the 5G MoDE closure report.

## **5G ONE4HDD**

- Main location(s): Surrey
- DSIT funding amount: ~£1.6m
- Partners: DTG, Ateme, Virgin Media O2, Imaginary Pictures, University of Surrey,
- Dates: September 2023 to March 2025

The ONE4HDD project was funded to address a common problem at live events: mobile networks often became overloaded when thousands of people tried to access data at the same time. Building permanent infrastructure for occasional events can be costly and inefficient. The project aimed to develop a flexible, quickly deployable 5G solution that increased capacity only when and where it was needed, while also enabling new broadcast services for fans.

The consortium developed a portable “cell on wheels” using Open RAN radio equipment and satellite backhaul, combined with 5G Broadcast technology. This allowed a single video stream to be delivered to many devices at once, reducing congestion compared to one-to-one streaming. The system was demonstrated at live UK events, scaling from small trials to a deployment at a major motorsport finale with over 10,000 attendees. The project also tested secure multicast delivery, ensuring content protection without slowing network performance, and trialled enhanced fan features such as multi-angle video, statistics, and personalised audio.

The project delivered an operational prototype that showed alternative radio suppliers could match existing network performance in high-demand environments. It demonstrated a practical pathway to temporary, cost-comparable deployments and highlighted a potential UK market for event connectivity. Key learnings included the value of open network technologies, rapid deployment models, and collaboration between broadcast and mobile sectors to support future 5G ecosystems.

For further details on the project outcomes, see the 5G ONE4HDD closure report.

### 5G One4HDD Case Study

## **5G SWaP+C (Size, Weight and Power + Cost)**

- Main location(s): South Wales
- DSIT funding amount: ~£850K
- Partners: Compound Semiconductor Applications Catapult, BT, Space Forge
- Dates: September 2023 to March 2025

The 5G SWaP+C project brought together partners to build and test new power amplifiers, a core part of mobile network equipment that boosts radio signals. These amplifiers were developed using ultra wide band gap semiconductor materials, which can operate at higher frequencies and temperatures than conventional materials while using energy more efficiently. In practical terms,

this supports faster and more reliable 5G services with lower power consumption.

During the project, partners fabricated and tested prototype power amplifier modules in controlled laboratory environments. The work focused on improving radio performance while reducing size, weight, power use and overall cost. New approaches to thermal management (how heat is removed from components) and device packaging were developed to support stable operation at high frequencies. These prototypes demonstrated measurable performance characteristics suitable for future 5G radio equipment.

The project delivered working hardware prototypes and test data that can be used to inform future radio designs for 5G and beyond. It also strengthened links between network operators, semiconductor manufacturers and UK research organisations, helping build domestic capability in advanced radio hardware.

Key lessons included the importance of early integration between materials research and system-level testing, and the value of collaborative development across the supply chain. The results provided evidence that advanced semiconductor technologies could be developed and tested within the UK, supporting supply chain diversity and contributing to the long-term development of open and energy-efficient mobile networks.

For further details on the project outcomes, see the 5G SWaP+C closure report.

## **ARIANE (Accelerating RAN Intelligence Across Network Ecosystems)**

- Main location(s): Ipswich, London
- DSIT funding amount: ~£6m
- Partners: Telecom Infra Project, British Telecommunications plc, Accenture UK Limited, Amdocs UK Limited, Arqit UK Limited, HCL Technologies UK Limited, Reply UK Limited trading as Net Reply UK, Viavi Solutions UK Limited, VMWare UK Limited
- Dates: September 2023 to December 2025

The ARIANE project developed and tested new software tools designed to help mobile networks operate more efficiently. These tools ran on a platform known as a RAN Intelligent Controller (RIC). In simple terms, this is software that allows operators to monitor what is happening across a mobile network and automatically adjust how it runs to improve performance.

During the project, partners created several software applications that could analyse network conditions and respond in near real time. For example, some applications were designed to direct mobile traffic to the best available connection, helping maintain service quality during busy periods. Others explored ways to reduce energy use by adjusting network resources when demand was lower.

The project built a multi-vendor test environment that simulated a real Open RAN mobile network using equipment and software from different suppliers. Within this environment, the team tested how multiple applications could run at the same time and interact with one another. This helped demonstrate how intelligent software could manage different aspects of a network while avoiding conflicts between applications.

ARIANE also examined the performance and security of the software interfaces that allow Open RAN components to communicate. Testing helped confirm that applications from different suppliers could operate together and identified areas where improvements to standards or implementation would support more reliable deployment.

The project produced working prototypes, testing results and practical guidance on deploying intelligent network applications in open, multi-vendor mobile networks. These outputs provided evidence to support future development and adoption of software-driven 5G networks and contributed to the growing UK capability in Open RAN technologies.

For further details on the project outcomes, see the ARIANE closure report.

## **BEACH**

- Main location(s): Worthing, West Sussex.
- DSIT funding amount: ~£8.34m
- Partners: Dense Air Limited, West Sussex County Council, University of Glasgow, Sitenna, Kinneir Dufort Design Ltd, Radisys UK Limited
- Dates: September 2023 to March 2025

The BEACH project aimed to design, build and test a shared, energy-efficient mobile network to meet fluctuating demand in busy public places such as Worthing's town centre and seafront.

The project developed and deployed 4G/5G small cell networks, smaller versions of the large antennas used in traditional mobile networks, that were efficient and could adapt capacity as demand changed. A new neutral host platform called "cellShare" was created to allow multiple mobile operators to share the same infrastructure, increasing coverage for all users without duplicating equipment. BEACH also built a 5G small cell prototype, energy efficiency models, and tools to monitor network performance and installation data.

The team installed network equipment on local authority assets in Worthing, tested it in real environments and produced demonstrable results including operational prototypes and software for network performance reporting. They also developed improved security and asset management frameworks to support future deployments.

Key lessons included practical experience with shared infrastructure, energy-efficient network design, and the integration of diverse hardware and software systems.

For further details on the project outcomes, see the BEACH closure report.

The BEACH Project

## **Cambridgeshire Open RAN Ecosystem (CORE)**

- Main location(s): Cambridge
- DSIT funding amount: ~£7m
- Partners: Cambridgeshire County Council, AWTG, Benetel, Ontix, Wolfram, University of Surrey
- Dates: September 2023 to March 2025

The CORE project deployed and tested a high-performance 5G Standalone mobile network using Open RAN technology in Cambridge. The project was funded to demonstrate that this approach could support high-demand urban environments where many people use mobile services at the same time.

The project designed and built a live network across Cambridge city centre and the Corn Exchange venue, supported by a laboratory test environment in London. The deployment used small radio units on street furniture and buildings, fibre connections, and a cloud-based 5G core network. New

software tools were developed to automate network management and optimise performance in real time.

Technical innovations included upgraded radio units that allowed multiple mobile operators to share the same infrastructure, and new control software (known as rApps and xApps) that adjusted network settings automatically during busy periods. The network supported demanding use cases such as augmented reality experiences, live video streaming and online gaming in crowded locations.

The project delivered an operational Open RAN 5G network and market-ready software and hardware components. Key learnings included practical methods for deploying shared networks in city centres, the value of software-driven automation, and the benefits of close collaboration between local authorities, universities and technology suppliers.

For further details on the project outcomes, see the CORE closure report.

Cambridgeshire Open RAN Ecosystem (CORE) Project - Case Study

### **Dorset Open Networks Ecosystem (DONE)**

- Main location(s): Dorset
- DSIT funding amount: ~£2.9m
- Partners: Dorset Council, ARM, Keysight, Kimcell, Neutral Networks, Strathclyde University, Telint, Wildanet
- Dates: September 2023 to March 2025

The DONE project explored how future mobile networks could be made more open, flexible, efficient and suitable for rural and hard-to-reach areas. It focused on advancing open and interoperable Radio Access Network (RAN) technologies, with an aim to reduce costs, energy use and barriers to deployment in areas where traditional solutions have been expensive or slow to install.

DONE brought together industry, research and local partners to build, test and demonstrate components of an open mobile network. The project developed a real-world test environment combining hardware and software from different suppliers, including processor platforms based on Arm architecture and traditional systems, and tools to support interoperability and testing of RAN technologies. It created a “lab-to-live” environment with physical radio equipment and digital test models to understand how open systems worked together. The project also measured energy use of alternative processing units, showing potential for significant power savings compared with standard equipment.

The outcome was an operational test facility at Dorset Innovation Park that demonstrated key Open RAN capabilities, including interoperable components, energy profiles and expanded testing tools. The project produced open-source releases and detailed technical learnings on interoperability, power performance, and security testing for Open RAN, helping define a blueprint for future rural network deployments.

For further details on the project outcomes, see the DONE closure report.

### **Energy-efficient Composable Optical Topologies for Assembled Processing (ECO-TAP):**

- Main location(s): Leeds
- DSIT funding amount: ~£760k

- Partners: Ultracell Networks Ltd, King's College London
- Dates: September 2023 to March 2025

The ECO-TAP project aimed to tackle rising energy use and costs in data centres that support future 5G and cloud services. Traditional servers house all key parts together, which can waste power and limit flexibility. ECO-TAP aimed to design more energy-efficient network structures that break servers into separate components and reassemble them as needed, improving efficiency and reducing energy consumption.

ECO-TAP delivered technical innovations in both hardware and software. It developed new network architectures optimised for “server disaggregation”, a way of organising central computing components (like CPUs and memory) so they can be dynamically combined depending on demand. The project created advanced algorithms to manage how disaggregated parts are composed and separated with energy efficiency in mind. A key innovation was a Hybrid Cellular-Switched Topology, which combined features of cellular and switched network designs to improve how data moves between components. The team also produced a modelling tool that visualised performance and energy use under realistic conditions.

These developments were brought together into demonstrators that showed the potential for reduced energy use and flexible resource allocation compared with conventional server approaches. ECO-TAP reached its planned milestones, producing practical outputs and technical insights on energy-efficient network design.

Key lessons included the value of combining software optimisation with modular hardware design, and strategies for managing supply chain and resourcing challenges during research and development. The outcomes contributed to the UK's knowledge base on energy-efficient network architectures and helped inform future innovation in data centre structures that support advanced digital services.

For further details on the project outcomes, see the ECO-TAP closure report.

## **Factory of the Future Open Radio Access Network (FoFORAN)**

- Main location(s): Blackburn
- DSIT funding amount: ~£2.7m
- Partners: AMRC (University of Sheffield), BAE Systems PLC, aql, Safenetics, Dassault Systemes, Productive machines
- Dates: September 2023 to March 2025

The FoFORAN project was funded through the ONE competition to explore how Open Radio Access Network (Open RAN) and private 5G mobile network technologies could support the digital transformation of UK manufacturing. It aimed to make factory-wide connectivity more flexible, secure and cost-effective, helping manufacturers of all sizes access advanced wireless capabilities needed for automation and data-rich applications.

FoFORAN delivered a working open 5G network across multiple industrial sites, using a mix of hardware and software from different suppliers to show how these systems could interoperate. The team developed custom 5G devices suited to manufacturing environments and deployed use case demonstrations such as remote robotic inspections, real-time optimisation of machining processes, and secure digital tracking of supply chain data. These trials showcased how 5G could connect machines, sensors and control systems with high reliability and performance.

The project built operational prototypes and documented reference designs and infrastructure models that show how open network technologies can be deployed in real industrial settings. It compared multi-vendor Open RAN solutions with conventional single supplier networks to assess performance and cost characteristics.

Key learnings included practical insights into deploying open mobile networks in complex manufacturing environments, guidance on security strategies for industrial 5G, and lessons on interoperability between components from different vendors.

For further details on the project outcomes, see the FoFORAN closure report.

## **HiPer-RAN (Highly Intelligent, Highly Performing RAN)**

- Main location(s): Surrey
- DSIT funding amount: ~£7.6m
- Partners: University of Surrey, AWTG, Keysight technologies UK, Lime Microsystems, Viavi Solutions UK, Virgin Media O2
- Dates: September 2023 to March 2025

The HiPer-RAN project aimed to create a platform capable of hosting flexible software intelligence across all parts of the Radio Access Network (RAN) helping to accelerate the UK's Open RAN innovation and adoption.

HiPer-RAN brought together universities, mobile operators, technology vendors and specialist companies to deliver both practical innovations and exploratory research. The team built and tested advanced software and hardware including: an enhanced RIC (RAN Intelligent Controller) framework to automate network tasks; intelligent software modules (xApps and rApps) that improved energy use, device connectivity and security; and flexible radio components based on open hardware that could be integrated across vendors. It also developed a testbed combining these elements for realistic evaluation of performance improvements and threat responses.

The project achieved operational prototypes and demonstrations showing measurable benefits such as improved energy efficiency and spectral performance, robust security testing, and scalable software orchestration across the RAN architecture. Its results were showcased at industry events and contributed to Open RAN standards.

Key learnings highlighted the value of cross-sector collaboration, holistic end-to-end validation from hardware through software, and open, interoperable components for driving diversity in the UK 5G supply chain and supporting future telecom innovation.

For further details on the project outcomes, see the HiPer-RAN closure report.

## **Liverpool City Region High Demand Density Project**

- Main location(s): Liverpool
- DSIT funding amount: ~£7.8m
- Partners: University of Liverpool, Telet Research (N.I) Ltd, Qualcomm Technologies International Ltd, Radisys UK Ltd, Attocore Ltd, ITS Technology Group, CGA Simulation Ltd, Liverpool City Region Combined Authority, Liverpool John Moores University, Benetel, Foxcon
- Dates: September 2023 to March 2025

The Liverpool City Region High Demand Density Project, led by the University of Liverpool with industry and local partners, sought to develop and trial a private 5G network using Open RAN

equipment. This included compact, high-capacity radio units (“small cells”) and software for managing and securing the network. The team created simulation tools to model network behaviour and deployed the system at events including the Salt & Tar Music Festival and the ACC Liverpool arena to test performance under heavy user demand. These trials demonstrated 5G operation, automated network setup and monitoring, and coordination between Wi-Fi and 5G services within a single environment.

The work strengthened collaboration between universities, local authorities and technology suppliers, helping to build practical experience across the supply chain.

Key learnings included the importance of interoperability testing between vendors, early planning for security and network management, and the value of simulation before live deployment.

For further details on the project outcomes, see the Liverpool City Region High Demand Density Project closure report.

## **Navigate**

- Main location(s): City of London
- DSIT funding amount: ~£3.3m
- Partners: NEC EUROPE LTD, Freshwave Services Limited
- Dates: September 2023 to March 2025

The Navigate project was funded through the ONE competition to develop and test a practical approach for deploying shared 5G mobile network capacity in places with very high numbers of simultaneous users, such as central business districts. The goal was to create a “blueprint” that could be technically and operationally proven at scale, while encouraging a more diverse supply chain through open and interoperable technologies.

Navigate focused on designing, building and validating a multi-vendor, shared mobile network using Open RAN. The team constructed a phased test programme including lab integration and testing, interoperability work with radio hardware, and preparation for live deployment in central London. This included deploying core software on a cloud platform and validating connectivity between network elements, with a particular emphasis on meeting Joint Operators Technical Specifications (JOTS) for neutral host sharing, where one shared network serves multiple mobile operators.

Technical achievements included successfully integrating diverse hardware and software components in a lab environment, onboarding multiple radio units, and establishing secure, scalable configurations ready for field trials. The work demonstrated how shared infrastructure could improve energy efficiency and cost-effectiveness compared with traditional single-operator systems.

Project outcomes were detailed documentation, tested configurations and enhanced skills within the consortium on deploying and managing open network solutions. Key learnings included insights on security implementation, the complexity of coordinating multiple vendors, and the importance of early engagement with mobile network operators.

For further details on the project outcomes, see the Navigate closure report.

## **ON-SIDE (Open Network Shared Spectrum Innovation and Design Environment)**

- Main location(s): Glasgow
- DSIT funding amount: ~£1.7m

- Partners: Cisco, University of Strathclyde, Glasgow City Council, Xilinx Development Corporation Ltd, BBC R&D, University of Glasgow, Neutral Wireless Ltd, Scottish Wireless Ltd
- Dates: September 2023 to September 2025

The ON-SIDE project was funded through the ONE competition to address practical barriers to deploying private 5G networks, local mobile networks built for specific sites such as campuses, venues or industrial facilities. The project focused on improving access to shared radio spectrum and reducing the cost and complexity of deploying standalone 5G networks.

The project consortium, including industry partners, universities and public sector organisations, designed and deployed a city-scale private 5G test environment in Glasgow operating in the 3.8-4.2 GHz shared access spectrum band. The environment included multiple test locations across the city and used commercially available 5G radio equipment alongside a standalone 5G core network platform designed specifically for private deployments.

A key technical development was the creation and testing of portable and “pop-up” private 5G network units. These compact systems allowed a full 5G network to be deployed temporarily for events, venues or industrial sites. The project also developed and trialled automated spectrum management tools, designed to measure local radio conditions and dynamically allocate spectrum for short periods of time, helping multiple users share limited wireless capacity more efficiently.

The test network supported demonstrations across several sectors, including smart city services, live broadcasting and media production, connectivity for sports and events venues, and university and industrial campus environments. These trials showed how dedicated local networks could provide reliable, high-quality connectivity where public networks may be constrained.

The project delivered operational prototypes, a working city-scale testbed and real-world deployment data. These outputs provided evidence on spectrum sharing, deployment models and equipment integration, helping inform future policy, standards and commercial development of private 5G networks in the UK.

For further details on the project outcomes, see the ON-SIDE closure report.

## **ONE WORD**

- Main location(s): Cardiff, Bath, Shropshire, Worcestershire
- DSIT funding amount: ~£10m Partners: Telet Research (N.I.) Limited, Neutral Host Networks CIC, IQ Mobile Limited, Radisys UK Limited, cellXica Limited, Virtuser Business Comms Ltd, Antevia Limited, West of England Combined Authority, Bath & North East Somerset Council, Shropshire Council, Worcestershire Council, Cardiff Council, University of Lancaster
- Dates: September 2023 to March 2025

The ONE WORD project developed and integrated a full end-to-end 5G system combining radio hardware, cloud-based network software and automated management tools. A core focus was creating a repeatable blueprint for deploying Open RAN networks that could support demanding data applications. The project built a working prototype network in a controlled test environment and carried out staged interoperability testing between vendors. This included automated network orchestration, monitoring tools and secure data handling designed for operational use rather than laboratory experiments.

Technical milestones included successful multi-vendor integration, performance validation under simulated heavy traffic and demonstration of secure remote network management. The project

delivered hardware and software platforms that showed how radio equipment, cloud infrastructure and management systems could operate as a unified network. Tested configurations and reference designs were produced to support future implementations.

Project outcomes included an operational prototype, reusable deployment guidance and documented test results. The work demonstrated that open, multi-supplier systems could be integrated and managed at scale using standardised interfaces.

Key learnings highlighted the importance of early interoperability testing, shared technical standards and coordinated collaboration between suppliers.

For further details on the project outcomes, see the ONE WORD closure report.

Transforming Telecommunications with ONE WORD

## **PerceptRAN: Towards Maturing O-RAN based Data Driven RAN Monitoring and Control**

- Main location(s): Cambridge and Edinburgh, Scotland
- DSIT funding amount: ~£2.2m
- Partners: Metaswitch Networks Ltd. (a Microsoft Company), The University of Edinburgh, Capgemini UK PLC
- Dates: September 2023 to March 2025

The PerceptRAN project aimed to strengthen the UK's capability in Open RAN technologies by improving how mobile networks are monitored and controlled using data and artificial intelligence (AI).

The consortium developed a programmable platform that allowed developers to build new network applications using dynamic software models. A key achievement was a working real-time RAN controller, capable of responding in microseconds, enabling advanced functions such as interference management and predictive maintenance. The project also delivered a distributed AI runtime that allowed the same application to run across different hardware environments, supporting flexibility in deployment.

To support testing, the team created a large-scale cloud-based RAN emulation system and expanded physical 5G Open RAN testbeds, including a campus-scale network in Edinburgh. These environments enabled realistic training and validation of AI-driven applications without requiring costly live infrastructure. Demonstrator applications included security anomaly detection, device positioning, spectrum monitoring and software-based distributed antenna systems.

Project outcomes included operational prototypes, open-source software releases and validated test platforms which went on to be used by universities and vendors. Key learnings highlighted the importance of modular system design, interoperability across suppliers and early collaboration between academia and industry. The work expanded UK expertise in AI-driven Open RAN systems and contributed practical tools and knowledge to the global 5G innovation ecosystem.

For further details on the project outcomes, see the PerceptRAN closure report.

## **Project AURA**

- Main Location(s): Bristol
- DSIT funding amount: £3.2m

- Partners: Parallel Wireless UK Limited, BT plc, Compound Semiconductor Centre (CSC)
- Dates: September 2023 to March 2025

The AURA project developed a new generation of energy-efficient Open RAN radio units, the hardware that connects mobile networks to antennas. It aimed to reduce operating costs, improve flexibility and support multi-vendor 5G deployments by creating modular radio equipment suitable for real commercial networks.

The consortium designed and built two working Active Antenna Units (AAUs): a low-power minicell and a high-power macrocell. Both used a modular architecture so components could be reused across frequency bands and power levels. Hardware innovations included a new microwave filter design to reduce signal loss, high-efficiency power amplifiers developed with UK research partners, and tightly integrated radio and baseband processing. A new fronthaul gateway, the interface linking radios to the rest of the network, was also developed to support open, interoperable deployment.

Five prototypes of each unit were manufactured and tested through laboratory validation, anechoic chamber measurements and live drive testing with commercial smartphones. Results showed the AURA units delivered the same network performance while using around 30% less electrical power, with some scenarios showing even greater savings.

The project produced operational prototypes and created a reusable hardware platform for future radio products. Key learnings highlighted the value of whole-system energy optimisation, modular design and close collaboration between industry and UK research institutions.

## **REACH (RIC EnAbleD (CF-) mMIMO for HDD)**

- Location(s): Blackpool, Yorkshire, Lincolnshire
- DSIT funding amount: ~£3.1m
- Partners: University of York, Cybermoor 5G Services Ltd, Quickline Communications Ltd, Virgin Media O2, SafeNetics Ltd, Viavi Solutions Ltd, Blackpool Council
- Dates: September 2023 to March 2025

The REACH project was funded through the ONE competition to improve mobile network performance in high demand density (HDD) locations places such as busy promenades and visitor hotspots where many people try to connect at the same time, putting pressure on standard networks. It also explored solutions for areas with little or no coverage, known as “not-spots”.

Led by the University of York with a consortium of industry partners and local authorities, the project built a private 5G network, deploying small-cell infrastructure along Blackpool promenade and installing connectivity in rural Buttermere. By combining open network software with advanced hardware, the team delivered systems that improved data throughput and reliability where demand was high, and basic voice and messaging in previously unserved locations.

A major technical achievement was a cell-free massive MIMO testbed, a research platform that combines signals from multiple radios to improve coverage and capacity. This testbed included a full Open RAN compatible 5G software stack and artificial intelligence-driven optimisation tools (xApps) that demonstrated energy savings and intelligent load management.

Project outcomes included operational prototypes, thousands of unique connections on the Blackpool network, and at least 50 emergency calls successfully completed in rural Buttermere that otherwise would not have been possible. The work produced new tools, patents and documented results that

expanded UK expertise in advanced 5G technologies and demonstrated how open, multi-supplier networks can support both high-usage urban environments and underserved rural areas.

Key lessons highlighted the value of combining research with real-world trials, modular software design, and collaboration between academia, industry and local partners to accelerate technology adoption and diversify the UK telecoms supply chain.

For further details on the project outcomes, see the REACH closure report.

## **SCONDA (Small Cells ORAN in Dense Areas)**

- Location(s): Glasgow, London, Reading and Surrey
- DSIT funding amount: ~£8.5m
- Partners: AWTG, Three, University of Surrey, University of Glasgow, Accenture, Boldyn, Scotland 5G Centre, Mavenir, PI Works, Freshwave Services Limited
- Dates: September 2023 to September 2025

The SCONDA project aimed to prove that Open RAN could operate reliably in busy city centres with very high demand. It focused on building a practical model for deploying small 5G cells in dense urban areas while reducing cost, increasing automation and supporting supply chain diversity.

The consortium delivered a live Open RAN small-cell network in central Glasgow, integrated with an existing national mobile network. The system used multi-vendor radio hardware, cloud-based software and commercial off-the-shelf servers. A containerised, automated platform allowed rapid deployment and remote management. A RAN Intelligent Controller (RIC), software that automatically optimises network performance, ran specialist applications that adjusted coverage, capacity and energy use in real time.

Extensive lab testing preceded live rollout, including over 90 integration and system tests. The operational network achieved 99%+ availability and average 5G download speeds of over 150 Mbps. Small cells absorbed 18% of traffic from surrounding macro sites, improving overall network performance. Automation reduced site deployment time by around 35%, and energy-saving applications demonstrated measurable power reductions.

The project delivered an operational blueprint for scalable Open RAN deployment, validated interoperability between multiple suppliers and produced reusable automation tools and documentation. Key learnings highlighted the importance of lab automation, security-by-design architecture and structured multi-vendor collaboration.

For further details on the project outcomes, see the SCONDA closure report.

## **Sunderland Open Network Ecosystem**

- Location(s): Sunderland
- DSIT funding amount: ~£3.4m
- Partners: Sunderland City Council, British Esports Federation, Sunderland Association Football Club Limited, Boldyn Networks Infrastructure UK Limited, Perform Green Limited
- Dates: September 2023 to September 2025

The SONET project was funded through the ONE competition to demonstrate how advanced Open RAN 5G technology could support reliable, high-capacity mobile connectivity at major event venues. It focused on addressing the intense demand for data that occurs at live sports and esports events, where traditional mobile networks can struggle to keep up with user needs.

The consortium designed and built a prototype High Density Demand Connectivity-as-a-Service (HDD CaaS) platform. This platform integrated cloud-native software with multi-vendor radio hardware to create a neutral host network. Automated network controls were used to manage traffic and improve performance without requiring a large number of base stations.

Technical milestones included deploying the Open RAN solution around Sunderland's Stadium of Light and the British Esports Arena, using distributed antenna systems and intelligent software to deliver extensive coverage and high data speeds during real events. The system demonstrated adaptable performance across different venues, supported immersive digital experiences, and reduced power and space requirements compared with conventional site builds.

Project outcomes included operational prototypes, detailed deployment documentation and tested tools for network automation and video analytics. Key learnings highlighted the importance of interoperability between vendors, automated management for high-demand environments, and collaboration between public bodies, industry and event organisers.

For further details on the project outcomes, see the Sunderland Open Network Ecosystem closure report.

### **MarK (Advanced Radio in Milton Keynes)**

- Location(s): Milton Keynes, Aylesbury
- DSIT funding amount: £0.5m
- Partners: MK City Council, Stadium MK, Dell, Wireless Excellence, Virgin Media O2, Open University, Ohmio
- Dates: September 2023 to March 2025

The MarK project was funded through the ONE competition to explore reducing barriers to deploying advanced mobile connectivity, broaden service options and support new digital applications in high-activity locations such as sports and event venues.

Key developments included systems for real-time network profiling, which collect and analyse data on how the network is being used so that services can be adjusted dynamically for demand and quality. The project prepared for deployment in high-usage sites including Stadium MK (home of MK Dons) and the nearby Marshall Arena, with use cases spanning visitor voice and data services, event operations management, connected vehicles and live video streaming.

Although some demonstrations didn't progress, the project delivered working prototypes, integration tools and documented technical designs for neutral host models that could serve multiple users and services from shared infrastructure. Outcomes included validated approaches for real-time monitoring and control, reference designs for shared connectivity and evidence of how shared mobile infrastructure could support commercial and community applications.

Key lessons highlighted the importance of modular design, real-time network visibility, and multi-partner collaboration to enable shared mobile networks.

For further details on the project outcomes, see the MarK closure report.

<https://www.gov.uk/government/case-studies/open-networks-ecosystem-competition>