

# UK 6G Activities

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Smart Internet Lab

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[bristol.ac.uk/smart](https://bristol.ac.uk/smart)

# Smart Internet Lab

- One of the UK's leading centres for research, innovation and experimentation in advanced connectivity
- Home to 100+ experts bridging academia, industry, and policy to shape future telecoms
- Key Affiliations:
  - UK Telecoms Innovation Network (UKTIN)
  - UK Federated Telecoms Hubs
  - 6G Smart Networks and Services Industry Association (6G-IA)
- Flagship projects:
  - REASON – 6G Architecture
  - JOINER – Nation-wide experimentation platform for 6G connectivity

# Advanced Connectivity Technologies in the UK

- 6G defined as evolution of 5G
  - Target: standalone 5G by 2030 as foundation for 6G trials
- Design principles: openness, security, resilience, energy efficiency
- Digital infrastructure as national priority: 10-year strategy
- Delivery focus

## Strategic Priorities for 6G Development

- *Technology convergence*: AI for automation and threat detection; quantum-safe cryptography
- *Spectrum innovation*: dynamic sharing, automated licensing, NTN integration
- *Environmental targets*: AI-driven traffic optimisation, energy-efficient materials and architectures

GOV.UK: [Future communications technologies](#)

GOV.UK: [Open consultation – Proposed Statement of Strategic Priorities for telecommunications, the management of radio spectrum, and postal services](#)

GOV.UK: [UK Infrastructure: A 10 Year Strategy](#)

techUK: [Telecoms and the UK Infrastructure Strategy: Delivering the Foundations of a Digital Economy](#)

UKTIN: [Future Capabilities Report](#)



# Joint Open Infrastructure for Networks Research



Engineering and  
Physical Sciences  
Research Council



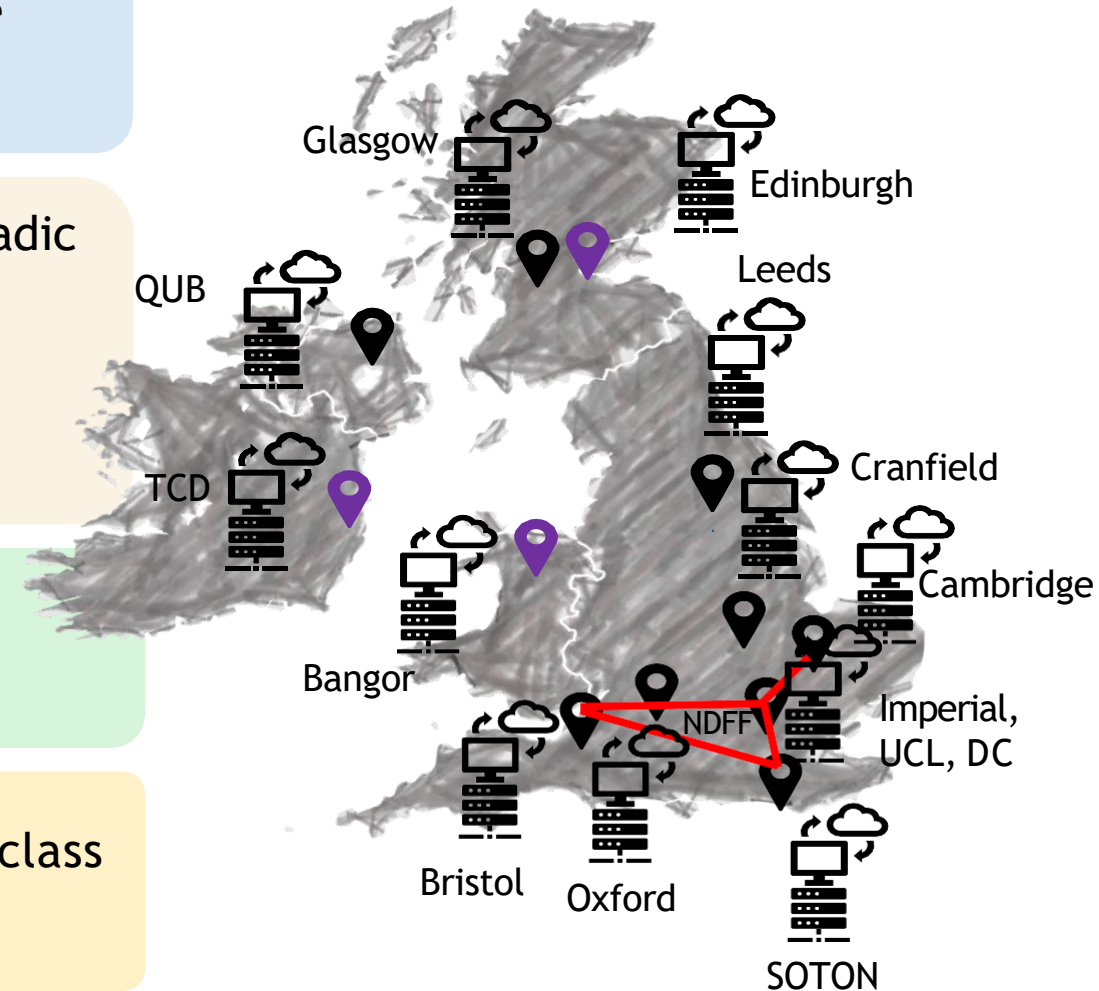
National-scale platform for future network research and large-scale experimentation

Open, programmable infrastructure interconnecting 14 labs + nomadic terminal

Features: hybrid cloud, RIC, mobile cores, ORAN, NTN emulation, spectrum tools

Supports UK telco ecosystem including industry and international collaboration (US/FABRIC, EU/SNS)

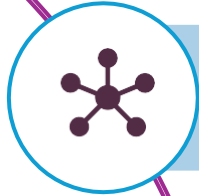
Collaborative, heterogeneous, system-level research led by world-class labs





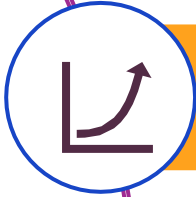
# Why JOINER

A Federated testbed



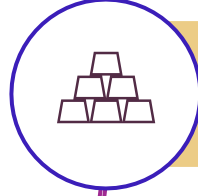
**sharing of experimental resources, introducing new technologies, services and applications** resulting from R&D programmes

A platform to accelerate



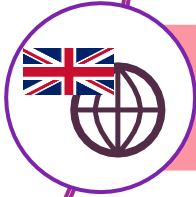
**translation and TRL advancement of early-stage research** and provide credible experimental evidence towards the introduction of new IP and products into the UK supply chain

A large-scale host



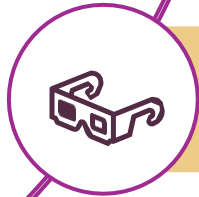
**research and pre-commercial collaboration** across the academics, industry and Government

A national champion



demonstrates UK capabilities on future network concepts **supporting UK's ambitions into standards and international collaborations** with similar experimental initiatives/platforms

A Host of technology



**Trials and adoption pilots:** e.g., the Connected Futures Festival, March'25



# Facilities, Features and Functions

## Network Infrastructure



- High-capacity private WAN
- Dark fibre connectivity (NDFF)
- Satellite backhauling
- Direct connect to public cloud SP
- ✓ Advance SDWAN technology
- ✓ Dynamic Overlay network slicing
  - ✓ Layer 2 stretched networks
  - ✓ Layer 3 advance networks
- ✓ PTP\*

## Hybrid Cloud



- On-premises distributed cloud
- AWS cloud native services
- HaaS (Hypervisor as a Service)
- ✓ Virtual Machines and Containers
- ✓ AI workloads
- ✓ Advance storage solution
- ✓ Openstack and OpenShift over the air implementation



# Facilities, Features and Functions

## Predefined Catalogues



- mATRIC (Multi Access Technology Realtime Intelligent Controller)
- RIC
- 5G packet core

## Advance research facilities



- Nvidia L40S
- FPGAs
- P4 Programable switches

## Monitoring and Analytics



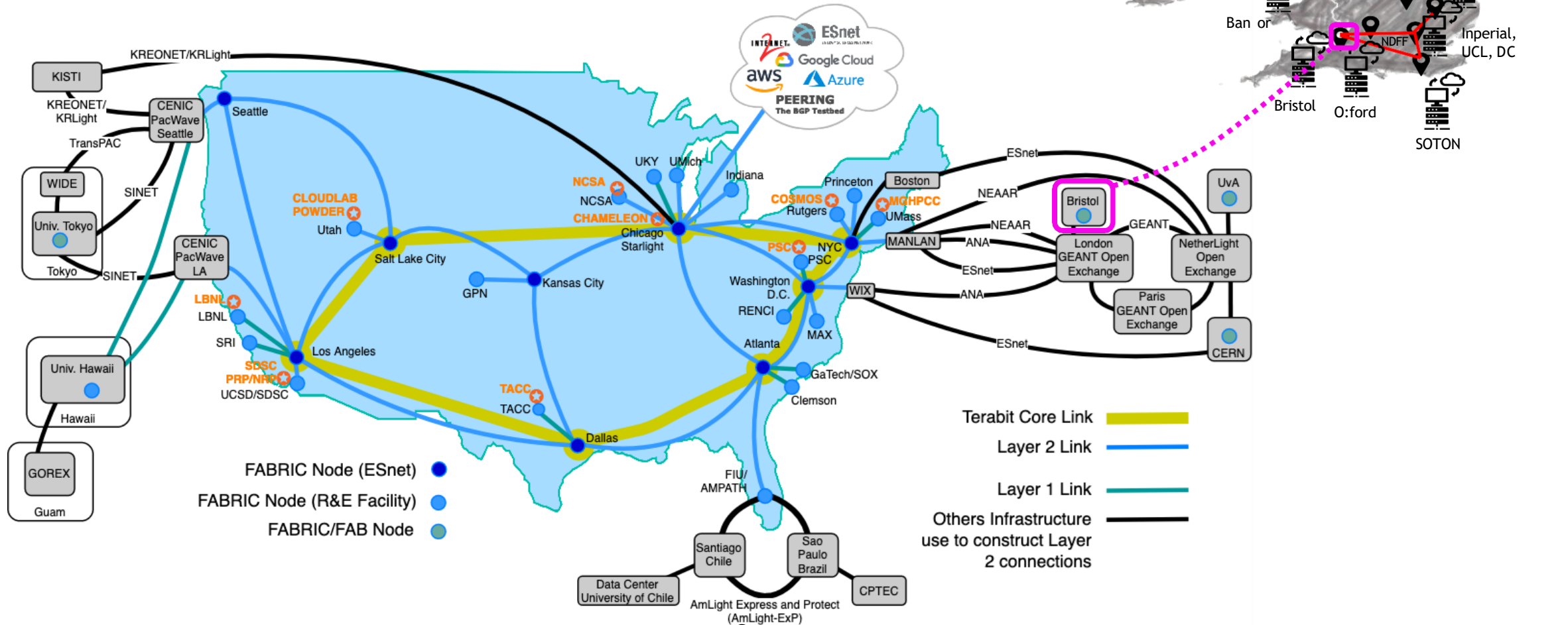
- Central monitoring system
  - Infrastructure monitoring
  - Hybrid Cloud monitoring
- Data analytics
- Data visualisation

## National Spectrum Facility

## Advance NTN emulation platform

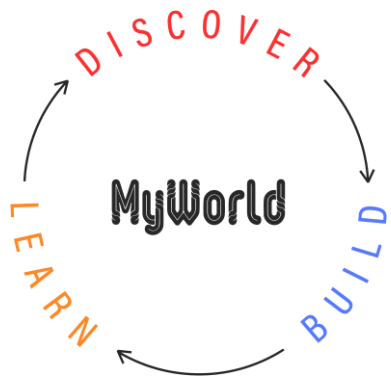


# International



# Synergy and Strategic Investment in Advanced Connectivity Technologies

- Links telecom and other industries for economic and societal impact
- Cross-disciplinary programmes combine production, technology, and academic expertise to accelerate innovation



## Example: MyWorld (West of England)

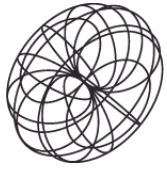
- £30M UKRI Strength in Places Fund investment
- 13 partners uniting research, industry, and training to pioneer **creative technology**
- Focus on new products, processes, and facilities to drive regional and national growth



# Thank you

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# Backup Slides



# JOINER Terminal Deployments



QUB



Cranfield



DCAT



Cambridge



Leeds



UCL



Oxford



Imperial



Glasgow



Southampton



Bristol - Staging



Operations - Staging



# Spectrum access research – questions and roles

DSIT's Spectrum Statment calls for:

“ A renewed focus on innovation in wireless technology, enhanced sharing of spectrum bands, continuing to expand the frontiers of usable spectrum, advanced spectrum management techniques, improved interference management, monitoring and resilience will enable us to significantly improve spectrum availability, ensuring that spectrum access is not a limiting factor on the UK's economic and societal potential. ”

## Spectrum research questions

How to support **continued growth** in spectrum usage:

- Growth in data consumption
- Wider diversity of uses : Public, private, NTN
- Increased societal reliance on critical national infrastructure - security and resilience needs
- New and higher spectrum bands

Enable **denser spectrum sharing** between adjacent networks and heterogeneous services, including sharing by frequency, time, location and power

How to ensure **spectrum usage more closely reflects actual usage** ensuring efficient assignment while delivering the necessary protections against harmful interference and investment certainty

## Roles for JOINER-NSF

**Spectrum Monitoring** - a national resource for monitoring real spectrum usage and creating open datasets

**Spectrum Replay** - playback measured and modelled spectrum usage to test or train new algorithms

**Spectrum Emulation** - emulate interactions between multiple spectrum users to test system performance

**Real-life Testing** - enable representative and reproducible evaluation of new techniques for spectrum allocation

**Dynamic Spectrum Assignment** - enable closed loop deployment of research solutions

Spectrum digital twin

MyWorld is built on the production, technology and research strengths of the West of England region to create a globally unique proposition for creative technology research and innovation.

Bringing together 13 world-class partners to create economic and societal change in the industry and region by pioneering new ideas, products and processes through research, funding, facilities and training.



# UK Research and Innovation

MyWorld was funded by £30M UK Research and Innovation (UKRI) Strength in Places Fund (SIPF)



**WATERSHED**



**LUX AETERNA**



**AARDMAN**





MyWorld's research is focused around the highly inter-related areas of content creation, capture delivery and consumption – the Creative Continuum.

Each of MyWorld's research focus areas explore the different stages of the Creative Continuum across:

- Intelligent Content Creation and Production
- Perceptually optimised delivery and interactivity
- Audience Understanding
- Experimental Productions

This generates new knowledge and confidence to exploit technical advances, allowing companies access to knowledge, lead innovation and create and maintain a competitive advantage in their industry.

