

EPSRC Future Communication Systems Theme

The Future Communication Systems theme will address the key technological challenges required to deliver the next generation of connectivity and communications systems. This represents a significant opportunity for the UK, drawing on the strength of its research base and its established partnerships across academia, industry and government. The programme will build on EPSRC's existing investments across a range of research areas to drive innovation and impact.

Future communication systems research remains a UK government priority area and is covered by the Electronics, Photonics & Quantum technologies family of UK strength and opportunity, as highlighted in the [Innovation Strategy](#), DCMS report on [Accelerating the pace of telecoms innovation](#).

It is a critical area underpinning the future digital society and the UK benefits from a vibrant research and innovation community, supported by a substantial UKRI portfolio, primarily through EPSRC and Innovate UK.

In light of the UK's ambition to lead globally in communications technologies, systems and network, spanning terrestrial, satellite and underwater domains, it is essential to create an environment that supports the discovery, development and deployment of enabling technologies. This includes advances in components, protocols, algorithms and applications, underpinned by sustained investment in future communications.

By investing across this broad set of capabilities, the UK can strengthen its position as a science and technology leader and deliver long-term societal and economic benefits. Key areas of opportunity include:

- Advance future communications technologies and architectures, including 6G, AI-native networks, integrated and converged systems, and novel spectrum and physical-layer capabilities.
- Build resilient, secure and trusted communications ecosystems, spanning infrastructure, services, supply chains and cyber-physical systems.
- Strengthen UK capability, sovereignty and global influence in communications, through open research infrastructure, standards leadership, innovation translation and resilient digital supply chains.
- Deliver sustainable and climate-responsible networks, enabling energy-efficient communications systems that support net zero objectives.
- Unlock new applications and capabilities, including immersive services, advanced content delivery, and integrated sensing, communications and computing.
- Create autonomous and intelligent network management frameworks, enabling efficient, adaptive and resilient operation of future end-to-end communications systems.



The Future Communication Systems theme support the delivery of the Industrial Strategy (IS8) Challenge and the Advanced Connectivity Technologies (ACT) programme. IS-8 supports the development of trusted digital systems and the adoption of data-driven technologies across sectors such as manufacturing, infrastructure and the creative industries, helping to establish new approaches to digital innovation and system integration. In parallel, the ACT programme strengthens the UK's capability in next-generation connectivity by supporting research into 5G and beyond, including the development of testbeds and trials, open and interoperable network architectures, and advances in technologies such as Open RAN.

Future Communication Systems will build on these foundations by advancing the science and engineering needed for 6G and future network architectures and enabling secure, resilient and sustainable digital infrastructure. We will support the IS8 and ACT programme by supporting the translation of research into deployment, fostering stronger industry engagement, and embedding capability within UK supply chains. Through this, EPSRC will help to ensure that the UK not only develops cutting-edge communications technologies but also realises their economic and societal value at scale.

In addition to activities delivered through this theme, fundamental research in communications technologies, digital systems and data-driven innovation will be advanced through EPSRC's information and communication technologies portfolio.

[Please find the Information and Communications Theme page here.](#)

Why We Invest in This Area

Research and training in Future Communication Systems and Advanced Connectivity Technologies are vital to the UK's prosperity, security, resilience and quality of life. As digital technologies become increasingly embedded across society, advances in connectivity, communications infrastructure and intelligent networks will be essential to enabling economic growth, supporting public services and addressing major societal challenges.

It encompasses a broad spectrum of research, including wireless and mobile communications, optical and satellite communications, network architectures, resilient and secure connectivity, spectrum technologies, integrated sensing and communications, and emerging communications paradigms. These technologies provide the foundations upon which many other digital and engineering advances depend and contribute to achieving the full range of EPSRC's strategic outcomes.

To maximise benefit for the UK, the portfolio must support a balanced and interconnected research ecosystem, spanning discovery-led research through to technology development, integration and deployment.

The UK has internationally recognised strengths across many aspects of communications and connectivity research. Building on this strong foundation, we will

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continue to support world-leading research and maintain a broad capability across the landscape of future communications technologies. At the same time, we will actively shape the portfolio to address emerging opportunities, technological disruptions and evolving national needs.

To ensure the long-term health and success of the portfolio, we will:

- develop current and future leaders in communications and connectivity research and support talent throughout the research and innovation pipeline
- promote equality, diversity and inclusion across the research community
- embed responsible research and innovation considerations throughout the portfolio, including security, resilience, trust, sustainability and societal implications
- encourage researchers to maximise the impact of their work and contribute to addressing national and global challenges
- strengthen links between fundamental research, innovation and technology adoption to support the UK's leadership in future communications and connectivity technologies.

Alongside established areas of excellence, we will encourage bold and innovative research that explores new concepts, emerging technologies and transformative approaches to connectivity. This includes supporting the development of new research communities and fostering the agility needed to respond to rapidly evolving technological opportunities.

The portfolio has become increasingly collaborative, but there remains significant potential for greater interdisciplinarity and co-creation. Addressing future communications challenges will require deeper engagement between communications researchers, the wider ICT community, engineers, data scientists, social scientists, policymakers, industry partners and end users. We will therefore strengthen connections across disciplines and sectors to accelerate innovation and maximise impact.

The Future Communication Systems team work alongside a range of themes and research areas but predominantly look after the following remit areas at EPSRC:

- Networks and Distributed Systems
- Optical communications
- RF/MW communications
- Digital Signal Processing

For more information, please email us at: future.communications@epsrc.ukri.org