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Press release

techUK launches Optical Wireless Communications Roadmap to position the UK as a global leader in next-generation connectivity

[London, UK] 24 November 2025– techUK today announced the launch of its Optical Wireless Communications (OWC) Roadmap, a strategic plan to secure UK leadership in space-based connectivity.

As demand for secure, high-capacity communications grows worldwide, optical wireless technologies promise to complement and surpass traditional radiofrequency (RF) systems, delivering transformative benefits for resilience, security, and scalability. OWC uses light-based communication to achieve ultra-high data rates, inherent security, and reduced interference. These capabilities are increasingly critical as RF spectrum congestion intensifies. This technology underpins the concept of "fibre-in-the-sky," enabling satellite networks to replicate the performance of terrestrial fibre optics. With the Free Space Optical (FSO) market projected to more than double by 2030, the UK faces a strategic opportunity to lead in this rapidly expanding sector.

The roadmap published by techUK today highlights the UK's strong foundation: a world-class photonics industry, advanced quantum research programmes, expertise in small satellites, and a vibrant innovation ecosystem. These assets position the UK to shape international standards, develop sovereign capabilities, and integrate optical and RF systems into robust hybrid networks. However, the report warns that without decisive action, the UK risks falling behind major players such as the US, Germany, and China, who are investing heavily in optical satellite communications.

Core recommendations

The roadmap sets out a four-pillar strategy to secure UK leadership:

- **Standardisation**

Develop UK-led open architectures and common interfaces to ensure interoperability across international systems. Establish an Optical Communications Taskforce within the Department for Science, Innovation and Technology (DSIT) to coordinate industry-government collaboration and accelerate mission deployment. Close capability gaps by advancing critical subsystems for end-to-end integration.

- **Market Segmentation**

Focus on high-value areas where the UK can lead globally, such as dual-use terrestrial-space technologies. Build a UK-based value chain spanning operators, primes, component manufacturers, and end-users. Launch a UK Plc value proposition to stimulate cross-sector demand and showcase national strengths.

- **Interconnectivity**

Promote open-access testbeds aligned with international specifications to validate optical systems and encourage collaboration between academia and industry. Invest in hybrid optical-RF networks and align with the National Quantum Technologies Programme to future-proof UK infrastructure.

- **Resilience**

Apply optical technologies across defence, telecommunications, and critical national infrastructure (CNI) to provide redundancy and enhance security. Develop skills pipelines in photonics, quantum, and secure communications through academia-industry partnerships.

To achieve first-generation commercial deployments by 2030, the UK must accelerate technology readiness levels (TRLs), roll out demonstrator missions, and unlock funding for SMEs and scale-ups. Collaboration with international partners - such as ESA, Five Eyes, and NATO - is essential to ensure UK-developed solutions integrate into global constellations. The roadmap also calls for proactive engagement in international standards bodies to avoid exclusion from closed sovereign ecosystems. Following these recommendations will be critical if the UK aims to deliver operational optical ground stations and satellite systems, enabling secure, high-capacity connectivity for defence, enterprise, and government applications by 2030.

Sophie Greaves, Associate Director for Digital Infrastructure, techUK said:
"Optical wireless communications represent the next frontier of global connectivity, and the UK has every ingredient needed to leadThis roadmap provides a clear pathway to harness our strengths in photonics, quantum, and satellite innovation to deliver world-leading connectivity solutions."
ENDS

Notes for Editors

The full report can be found here.

Case studies driving innovation

The roadmap features compelling case studies that illustrate the transformative potential of optical wireless communications from space:

- **HydRON Programme (CGI)** – Branded as "Fibre in the Sky," HydRON aims to deliver terabit-per-second throughput via multi-orbit optical transport networks, integrating seamlessly with terrestrial fibre systems.
- **Ground Infrastructure (Archangel Lightworks)** – Highlights the role of optical ground stations in providing rapid-deploy alternatives to vulnerable submarine cables, strengthening global connectivity resilience.
- **Academic Developments (FTH)** – Showcases research into hybrid optical-RF architectures, underwater optical links, and quantum key distribution for secure communications.
- **ALIGN Mission (Telespazio and Northumbria University)** – Demonstrates autonomous intersatellite laser links for small satellites, enabling gigabit data rates and paving the way for mega-constellation connectivity.

About techUK

techUK is the technology trade association that brings together people, companies and organisations to realise the positive outcomes of what digital technology can achieve.

With over 1,100 members (the majority of which are SMEs) across the UK, techUK creates a network for innovation and collaboration across business, government and stakeholders to provide a better future for people, society, the economy and the planet.

By providing expertise and insight, we support members, partners and stakeholders as they prepare the UK for what comes next in a constantly changing world.