# Global internet 'capacity crunch' to be tackled by international project

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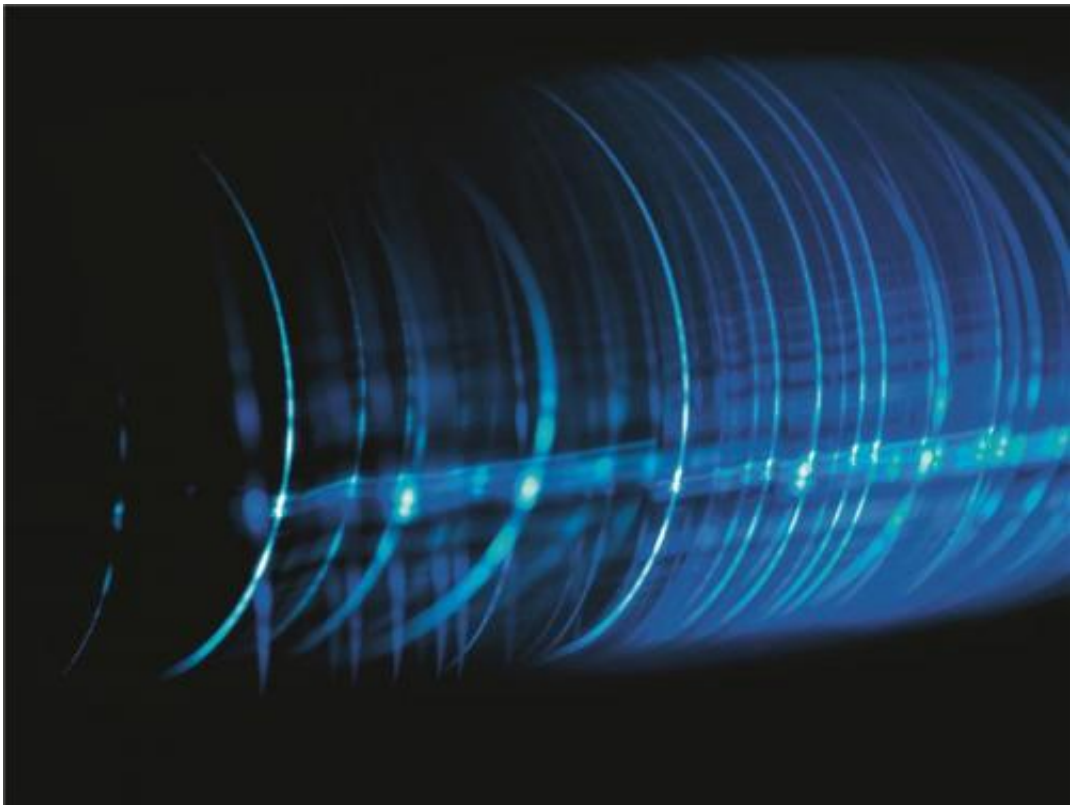

Credit: Aston Photonics

A £1.5m international communications project led by Aston University will tackle the growing worldwide internet 'capacity crunch' and reduce our network energy consumption.

The rise in the use of mobile networks and remote devices, such as smart

phones and tablets, has increased the strain on current communication networks dramatically. If this increase in demand exceeds existing bandwidth limit, a 'capacity crunch' is predicted which could impact on the future growth of the internet.

Aston University Professor, Andrew Ellis is leading the Petabit Energy Aware Capacity Enhancement (PEACE) project to significantly improve bandwidth and reduce energy consumption on our major optical fibre networks, which carry over 99 per cent of all our network data.

The project team believe that by using a balance of digital, analogue electronic and optical processing, they can transmit signals over an optical fibre with enough bandwidth to simultaneously support a million mobile phones operating at the same time while also halving energy consumption of optical transponders.

This could fundamentally improve the speed and quality of service provided to the 17.6 million UK mobile internet users and over 70 per cent of UK households who have broadband access.

Bandwidth is the rate at which data can be transferred to a computer or remote device from a website or internet service within a certain time. The amount of bandwidth available determines the efficiency and speed of internet and other telecommunications activity including mobile devices.

Professor Ellis, of the Aston Institute for Photonic Technologies, said: "Since the introduction of direct dialling in 1950 we have seen a long succession of applications affecting our network capacities. The boom in smart phone and tablet use is the latest phenomenon currently fuelling growing bandwidth. To facilitate the long-term exponential expansion of bandwidth, optical intensities at the core of optical fibres have been steadily increased. However, they have been amplified to such an extent

that they are now more intense than sunlight at the surface of the Earth's atmosphere, which results in significant signal distortion. It is this distortion which limits the amount of data which can be transmitted, leading to capacity crunch. This capacity crunch, if allowed to happen, could seriously impact upon the internet's future growth. This could lead to increased price or bandwidth rationing, both of which have undesirable consequences for society and the economy."

Professor Ellis is confident that the project team, working alongside industry partners, can resolve significant issues associated with transporting the huge bandwidths which will be required across all aspects of future communication networks and associated power consumption. The team estimate that the energy consumption of the internet is over eight per cent of the electricity generation capacity of a developed country.

Professor Ellis, adds: "Since over 99% of all data passes through optical fibre, by supporting the continued increase in the bandwidth of fibre networks we can impact the lives of nearly every person in the United Kingdom. We will increase network capacity by maximising spectral use, and developing techniques to combat the nonlinear effects induced by the high intensities encountered in today's networks. But equally importantly, by combining appropriate digital technique, such as those as those found in mobile phones, with analogue and optical signal processing we will develop equipment for use in optical fibre networks with less than half of the energy consumption per bit of current products."

Provided by Aston University

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