

# Birthplace of fibre optics

case study



advanced electronics sector

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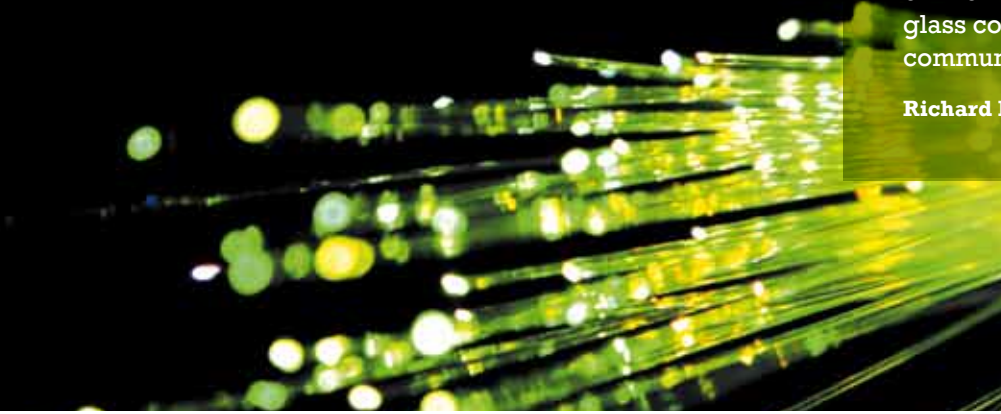
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# Essex

## the birthplace of fibre optic communications



Essex has helped to shape the direction of the communications industry with innovations that have transformed the way businesses operate. One of the most significant developments was the invention, more than 40 years ago, of fibre optic communication at a research centre in Harlow, currently part of Nortel. While traditional communications had been based on transmitting electronic signals over copper wire, fibre optic technology focused on sending light signals through very narrow glass fibres. These light pulses form a generator for signals that can be picked up by receiver at the other end, sometimes thousands of miles away. Using different light colours multiplies the amount of information that can be sent on one strand.

While a typical copper cable could carry less than 100 long distance phone calls simultaneously, an equivalent fibre optic cable has the capacity for some 1.6 billion calls. The speed, quality and performance of fibre optic technology has been critical to the emergence of the high-speed global communication networks that underpin productivity tools like email, the Internet, videoconferencing and low-cost long distance phone calls that are essential to the success of businesses throughout the world.

The development work was led by Dr Charles Kao of an early Nortel company – Standard Telecommunications Laboratories/Standard Telephones and Cables – who recognised that communication devices based on fibre optics often needed to operate over long distances and required a light loss of no more than 10 or 20 dB per kilometre. By 1964, he and his team had identified a critical and theoretical specification for long-range communication devices that met the required light loss standard. He also illustrated the need for a purer form of glass to help reduce light loss which led to the invention of optical waveguide fibres capable of carrying 65,000 times more information than copper wire.

Richard Epworth, a communications engineer and a member of Dr Kao's team from the outset, explains that the team spent almost 20 years putting together better and more efficient versions of glass fibres. "Optical fibre reduces the high loss of information. Light could now travel huge distances without being lost – enormous masses of information could be put through the tiniest glass core. What fibre optics has done for communication, the wheel did for transport."

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**Richard Epworth, Communications Engineer**

After Dr Kao's pioneering work, the Harlow research centre continued to accelerate the fibre optic revolution. In 1978, the first installation of a fibre optic cable was completed, running between Hitchin and Stevenage, all designed and developed in Harlow. Ten years later the first fibre optic trans-Atlantic telephone cable was laid, the first time a submarine cable of that length had been possible.

**Essex has a proud tradition of innovation and is home to a large number of technology companies such as e2v technologies, BAE Systems, Gardner Aerospace who are established global leaders in their field. The county also has the skills, business infrastructure and collaboration networks to support research and development among small and medium-sized businesses within a dynamic innovation community.**



INVEST Essex provides confidential advice and practical support to companies wanting to establish a presence or expand in the UK. We promote Essex as an outstanding business destination and help existing and potential investors make the most of our strategic location, thriving business environment, and quality of life.

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