

PRESS RELEASE

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SPEEDING UP THE DEVELOPMENT OF ULTRA FAST BROADBAND – AND CHANGING THE WAY THAT BUSINESSES OPERATE

The development of the next generation of internet access technology – Ultra Fast Broadband – looks set to be accelerated following the start of over a dozen innovative research and development feasibility projects – and the result could be a major change in the way that businesses operate across the world.

The Technology Strategy Board – the organisation that drives technological innovation in the UK – is investing £1 million to help companies carry out initial research that will ultimately lead to the introduction of internet access technology with speeds of between 1 and 10Gb/s – 100 to 1000 times faster than current broadband speeds.

The feasibility projects – each costing between £30,000 and £100,000 – will, in turn, help establish European collaborations that will participate in larger EU-funded research and development initiatives. The ultimate aim, the development of pan-European Ultra Fast Broadband, could see European companies gaining a massive competitive advantage on a global scale.

Explaining the potential long-term impact of Ultra Fast Broadband, Mike Biddle, lead technologist at the Technology Strategy Board, said: “Putting together an optical broadband capability across the whole of Europe, will fundamentally change the way that businesses operate and will give European companies a major competitive edge. Imagine the efficiencies that could be achieved through broadband that is up to 1,000 times faster than we have now. Then add the opportunities for more flexible working arrangements, including an increase remote working and you begin to see the many advantages.”

Commenting on the decision to fund the projects, Mike Biddle, added: “The challenge is to identify ways to address the technical issues facing the introduction of Ultra-Fast Broadband within the next decade and to build European collaborations to exploit the technology, while generating wealth for the UK. Our intention in providing this funding is to help British companies establish future European collaborations that will participate in larger EU funding initiatives.”

Notes to Editors

1. Details of projects are:

Title: High volume photonic packaging for bi-di components (HIGH BID)

Summary: It is anticipated that most implementations of future FTTX networks (Fibre To The X – cabinet, Premises, House, Building, Node) will require a bi-directional duplexer (bi-di), i.e. a dual wavelength fibre-coupled transmitter (Tx) and receiver (Rx) with integrated multiplexer. This project will develop new bi-di photonic packaging techniques which will reduce component size and cost, and

provide a cost-effective route to mass manufacture, whilst maintaining compatibility with existing transceiver standards and permit up to 10Gbps operation.

Partners: Gooch and Housego (lead), Oclaro.

Title: Feasibility Examination of Low Cost, Tunable ONUs for WDM PONs

Summary: A Wavelength Division Multiplexed Passive Optical Network (WDM PON) with high channel count offers excellent prospects for bandwidth and reach scalability (up to 10Gb/s), whilst presenting simple standard interfaces at the network and customer terminals. One of the main barriers to such an approach is the current high cost of tunable laser based solutions, especially for the subscriber terminals (optical network units, ONUs). The study will examine the feasibility of shifting the burden of providing the stability and calibration of the laser to the network, thereby simplifying the ONU.

Partners: Oclaro (lead), ADVA, BT, Cambridge University.

Title: Feasibility study related to low-cost, high-density, scalable WDM-PON OLT Subsystem

Summary: Studies have shown that Wavelength Division Multiplexed Passive Optical Network (WDM-PON) technology can meet the key requirements of future high-speed optical access networks, which include scalable speed (1Gbit/s-10Gbit/s), symmetrical in operation, low-cost, low-footprint, low maintenance, high-reach, interoperable and energy-efficiency. The Optical Line Termination (OLT) is the WDM-PON subsystem that is highest in complexity and has highest potential for cost, form factor, and energy consumption savings. The project will undertake a detailed analysis of optical component capabilities and manufacturing yield characteristics required in order to prove their use in a high volume, low maintenance environment. The study will develop the OLT specification based on what is achievable in the field of integrated photonics and high-density packaging for laser and modulator arrays

Partners: ADVA Optical Networking Ltd (lead), CIP, Oclaro.

Title: Roadmap for Broadband Optical Internet Access Towards 10Gbit/s Everywhere

Summary: This project will carry out a focused road-mapping study, with the aim of identifying promising routes forward in achieving the ambitious goals of Photonics21. The study will seek the solutions which show the most promise of cost effectiveness, are future proof (i.e. allowing bandwidth evolution and infrastructure reuse) and allow simple interfaces which can be standardized. The results of the study will be made available to UK industry in order to maximize the opportunities for the UK in the next stage of development,

Partners: Oclaro (lead), Ericsson, CIP, BT, Gooch and Housego, Cambridge University, Swansea University, Essex University, UCL.

Title: ALOHA (AlInGaAs Lasers for Optical Home Access)

Summary: The inexorable growth in broadband communications is beginning to create an enormous market for low cost, single-mode lasers emitting around 1.3um. Current technologies deployed (such as GPON – Gigabit Passive Optical Network, EPON – Ethernet Passive Optical Network) operate at line rates of 1.25Gb/s. However, satisfying future bandwidth demand will require implementation of next generation PON schemes (eg 10GPON, LR-PON) operating at 10Gb/s line rates. Key to the deployment of this technology is the

availability of high performance, uncooled, single mode, laser diode chips at consumer grade pricing. This feasibility study will address the key challenges in the step change in performance required to enable a new breed of low cost, high specification laser diode sources to become the 10GPON source of choice.

Partners: CST Global (lead), IQE Europe.

Title: Feasibility study for Uncooled Tunable laser for WDM-PON

Summary: Fibre to the home (FTTH) next generation optical access networks offer new opportunities for novel optical component designs. WDM-PON (Wavelength Division Multiplexed Passive Optical Network) has the potential to provide higher bandwidths, allow network simplification and cost reduction by removing local exchanges. CIP has identified a possible opportunity for its hybrid integration technology in WDM-PON applications, to create a compact wavelength tunable transmitter to go in the customers' premises. This project aims to look at the feasibility of designing the photonic device to work without using costly and environmentally inefficient active cooling devices.

Partners: CIP (lead), Greenwich University.

Title: HOWL- Hi-performance Optical-Wireless Links for home access

Summary: Indoor base stations for broadband access – or 'picocells' – are predicted to be one of the fastest growing areas of mobile comms. We propose a feasibility study to improve the wireline/wireless interface in the home by investigating a single chip optical-wireless (OW) picocell interface using a recently invented optoelectronic integrated circuit (OEIC) technology based on a resonant tunneling diode (RTD) monolithically integrated with a laser diode (LD). We aim to design and develop an early stage prototype, single chip OW interface and assess the commercial potential to be a core component in mass produced picocell base stations.

Partners: CST Global (lead), Glasgow University.

Title: LEXION- Laser sources for EXtended reach Interconnected Optical Networks

Summary: One of the greatest challenges of Next Generation Network (NGN) architectures is to extend the reach of current solutions to minimise the number of transponders for ever increasing coverage. Demands for increased capacity is driving the deployment of higher transmission rates in all parts of the network. This study aims to develop ultra-narrow linewidth diode lasers that have significantly narrower linewidths and better SMSRs (Side Mode Suppression Ratios) under high bit rate modulation than state of the art DFBs (Distributed FeedBack lasers). The project will deliver proof of concept demos of 1550nm diode lasers specifically tailored for extended reach solutions.

Partners: IQE Europe (lead), CST Global.

Title: Uncooled High Speed Reflective Semiconductor Optical Amplifier

Summary: Reflective Semiconductor Optical Amplifiers (RSOA) are considered to be key enabling components in future FTTH (Fibre To The Home). The main stumbling block for commercial FTTH deployment is cost. Currently, RSOA devices operate cooled or semicooled in order to meet the necessary performance criteria. This cooling increases both cost and power consumption. The feasibility study intends to investigate the possibility of making high performance uncooled RSOA devices for WDM PON (Wavelength Division Multiplexed Passive Optical Network) systems.

Partners: Amphotonix (lead), Strathclyde University.

Title: Wavelength-agile digital coherent access network

Summary: The purpose of this project is to assess the digital coherent receiver as an enabling technology for next-generation access networks. The project will study the feasibility of digital coherent techniques in the access network, including both technical and economic aspects, and will undertake feasibility experiments using integrated optoelectronic components already developed for coherent core network transmission systems.

Partners: Oclaro (lead), UCL, Nokia Siemens (DE).

Title: WDM Access Networks Based on Arrayed Waveguide Gratings

Summary: This project concentrates on studying the novel architectural integration of key components in wavelength-division-multiplexed passive optical networks (WDM-PONs) to achieve the “2020 vision” of 10Gb/s everywhere. Full exploitation of the cyclic, Latin-routing capabilities of arrayed-waveguide gratings (AWGs) across the full 1.3-1.6 μ m (43THz) fibre transparency window in combination with tunable laser arrays is proposed.

Partners: Oclaro (lead), Gemfire, Essex University.

Title: Cost-effective Customer Premises Equipment for High Speed Access Networks

Summary: The aim of this project is to identify cost-effective solutions for customer premises equipment (CPE) in next generation access networks, operating at data rates in the 1-10Gb/s range (‘towards 10Gb/s everywhere’). Although fibre links in the core network have operated at 10Gb/s for the last decade, these systems are far too costly for consumer use. An improvement of between one and two orders of magnitude is required.

Partners: Oclaro (lead), ST Micro, Gooch and Housego, University of Cambridge, Genexsis (NL), ComX (DK).

Title: Next Generation Radio over Fibre Distributed Antenna Systems

Summary: A key feature of Future Next Generation Internet Access will be that users will wish to receive internet information using mobile devices receiving last drop wireless services, rather than being restricted to wireline links. To deliver this effectively, new optical internet access technology is required able to manage efficiently the different types of (multiservice) traffic involved, supporting both wired and wireless services over a converged infrastructure using low cost methods. This project aims to address this major opportunity and challenge by taking advantage of the greatly advancing photonics distribution at the edge. This feasibility study will define the likely specification requirements for sub-systems for a next generation multiservice converged network, and determine a development route and options for low cost manufacturing.

Partners: Zinwave Ltd (lead), Alps Electric, University of Cambridge.

2. The Technology Strategy Board is a business-led executive non-departmental public body, established by the government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. It is sponsored by the Department of Innovation, Universities and Skills (DIUS).

3. To request an interview with Mike Biddle please contact Nick Sheppard or Claire Cunningham at the Technology Strategy Board.

Issued by

Nick Sheppard
Media Relations Consultant
Technology Strategy Board
Mobile: 07724 241214
e-mail: nick.sheppard@tsb.gov.uk

Additional contact

Claire Cunningham
Media Relations Manager
Technology Strategy Board
Mobile: 07554 115745
e-mail: claire.cunningham@tsb.gov.uk