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New £1.85m/\$2.8m funding for UK consortium continues successful research on uncooled photonic devices

** project targets new energy efficient technologies for photonics, and materials research*

** expected to deliver advanced monolithic photonic devices with higher speed operation, wider temperature performance and greater tunability*

** award for consortium of CIP Technologies, Bookham Technology, SAFC Hitech, Loughborough Surface Analysis, Universities of Sheffield and Surrey*

Martlesham Heath, UK, March 27, 2009

The UK's Technology Strategy Board has invested £1.85m (\$2.8m) in a follow-on collaborative project to develop integrated InP-based photonic devices and new active materials. The project is part of the Technology Strategy Board's Collaborative Research and Development programme, which supports the research and development of new technologies that will underpin products and services of the future. The organisations involved are CIP Technologies (CIP), Bookham Technology, SAFC Hitech, Loughborough Surface Analysis (LSA), the University of Sheffield and the University of Surrey.

The three year project is called ETOE II (Extended Temperature OptoElectronics), and continues the successful collaboration by the same partners in ETOE I. The new project has two main thrusts. The first is the development of reliable aluminium-containing active photonic devices, to support the high temperature operation of advanced functions such as integrated semiconductor optical amplifiers and electro-absorption modulators (SOA-EAMs), and widely-tuneable lasers with integrated MZ modulators (digital supermode distributed Bragg reflector with Mach Zehnder interferometer). A second, longer-range element of the project is to look at alternative active layer materials for InP and GaAs devices, including nitrogen, antimony and bismuth.

Reducing power consumption is now becoming one of the most significant challenges for the information and communications industry. A number of telecommunications network operators have recently announced plans to cut their carbon footprints and this is placing demands on equipment suppliers to develop energy efficient solutions.

What is not always appreciated is that for each watt of power consumed within a device on an equipment card, another two watts can be required to remove the heat it produces from the building. This is particularly important for optoelectronic components such as lasers and amplifiers, because their operating temperature ranges need to be controlled with local thermoelectric cooling - wasting yet more power. ETOE II will tackle this power efficiency

problem by raising the allowable operating temperature range of optoelectronic components, and reducing or eliminating the fundamental need for cooling.

Results from the project are expected to lead to high speed, high power integrated devices that can operate uncooled, enabling drastic reductions in power consumption and closer stacking of optical interfaces.

The consortium's partners have the complete range of skills necessary to meet this ambitious goal. These include the development of new metalorganic vapour phase epitaxy (MOVPE) growth processes from novel precursor technologies for the in-situ etching of aluminium-containing materials (SAFC Hitech), layer growth (Bookham, CIP and Sheffield), structural design and modelling (Bookham, CIP and Surrey) and device fabrication (Bookham and CIP), with comprehensive characterisation at all stages to assess progress (LSA, Sheffield and Surrey).

CIP's Ian Lealman, project manager for ETOE II said, "This project builds on successful technology developed under ETOE I, and I confidently expect it will result in advanced monolithic photonic devices offering higher speed operation, wider temperature performance and greater tunability."

Explaining the Technology Strategy Board's support for the ETOE II project, Lead Technologist for Electrical Systems, Mike Biddle said: "We are committed to stimulating the development and deployment of technologies which, as well as benefiting society, also represent major business opportunities for the UK. This project brings together the UK's world class expertise to research and develop an innovative technology that could be exploited globally. We are delighted to offer our support and investment to CIP and their partners in this important project."

Notes to editors

About CIP Technologies

CIP Technologies is the trading name of The Centre for Integrated Photonics Ltd, a leading manufacturer of advanced photonic hybrid integrated circuits and InP based optoelectronic chips, devices, arrays and modules for the communications and defence markets. With over 600 man-years of expertise in photonics and nearly 250 published articles and patents, CIP Technologies refines research into viable, manufacturable products based on leading edge technologies, helping customers develop the photonic products of tomorrow. CIP Technologies is a major provider of technical services and consultancy and its uniquely broad range of competencies is based on world-renowned research, incorporating III-V photonic materials, silicon micromachining, planar silica waveguides and network architecture design and analysis. With state-of-the-art, ISO9001:2000 registered, co-located fabrication, coating, test, validation and pilot production facilities, as well as strategic partnerships with volume packaging providers, CIP Technologies is able to develop and deliver exciting products based on these core competences. (www.ciphotonics.com)

About Bookham Technology

Bookham is a global leader in the design, manufacture and marketing of optical components, modules and subsystems. The company's optical components, modules and subsystems are used in various applications and industries, including telecommunications, data communications, aerospace, industrial and military. The company has manufacturing facilities in the UK, US, China and Switzerland; and offices in the US, UK, Canada, China, France and Italy; and employs approximately 2000 people worldwide. (www.bookham.com)

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About SAFC Hitech

SAFC Hitech provides a unique chemistry service translating application understanding into performance materials worldwide. Through collaborative partnerships and an integrated approach from research and development, process development and scale up to commercial manufacturing, SAFC Hitech invests in innovation and manufacturing enabling current and future technology needs. (www.safchitech.com)

About SAFC: SAFC® is the custom manufacturing and services group within Sigma-Aldrich that focuses on high-purity inorganics for high technology applications, cell culture products and services for biopharmaceutical manufacturing, biochemical production and the manufacturing of complex, multi-step organic synthesis of APIs and key intermediates. SAFC has manufacturing facilities around the world dedicated to providing manufacturing services for companies requiring a reliable partner to produce their custom manufactured materials. SAFC has four focus areas – SAFC Pharma™, SAFC Supply Solutions®, SAFC Biosciences™, and SAFC Hitech™ – and had annual sales of nearly \$600 million in 2007. SAFC is one of the world's 10 largest fine chemical businesses. (www.safcglobal.com)

Sigma-Aldrich is a leading Life Science and High Technology company. Its biochemical and organic chemical products and kits are used in scientific and genomic research, biotechnology, pharmaceutical development, the diagnosis of disease and as key components in pharmaceutical and other high technology manufacturing. The Company has customers in life science companies, university and government institutions, hospitals, and in industry. Over one million scientists and technologists use its products. Sigma-Aldrich operates in 36 countries and has 7,900 employees providing excellent service worldwide. Sigma-Aldrich is committed to Accelerating Customer Success through Leadership in Life Science, High Technology and Service. (www.sigma-aldrich.com)

About Loughborough Surface Analysis

Loughborough Surface Analysis Ltd. is an independent company established in 1997 to provide a responsive surface chemical analysis service to high-technology manufacturing companies and universities worldwide. With particular expertise in SIMS analysis of compound semiconductor materials, the company presently operates three SIMS instruments and an Auger electron spectrometer, all backed up by sample preparation and microscopy facilities. (www.lsaltd.co.uk)

About the University of Sheffield

The University of Sheffield is one of the UK's leading and largest universities, and a member of the Russell Group. It has over 24,000 students from 117 countries. With its reputation for world-class teaching and research excellence across a wide range of disciplines, it has well-established partnerships with a number of universities both in the UK and abroad, as well as with many leading UK and global companies.

About the University of Surrey

The University of Surrey is one of the UK's leading professional, scientific and technological universities with a world class research profile and a reputation for excellence in teaching and research. Ground-breaking research at the University is bringing direct benefit to all spheres of life – helping industry to maintain its competitive edge and creating improvements in the areas of health, medicine, space science, the environment, communications, defence and social policy. Programmes in science and technology have gained widespread recognition and it also boasts flourishing programmes in dance and music, social sciences, management

and languages and law. In addition to the campus on 150 hectares just outside Guildford, Surrey, the University also owns and runs the Surrey Research Park, which provides facilities for 140 companies employing 2,700 staff.

The Sunday Times names Surrey as 'The University for Jobs' which underlines the university's growing reputation for providing high quality, relevant degrees.

Media enquiries relating to the University of Surrey only: Peter La, Press Office at the University of Surrey, Tel: 01483 689191 or E-mail: p.la@surrey.ac.uk

About the Technology Strategy Board

This project is co-funded by the Technology Strategy Board's (TSB) Collaborative Research and Development programme, following an open competition. The Technology Strategy Board is a business-led executive non-departmental public body, established by the UK Government to drive technological innovation in the UK. 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). For more information about the Technology Strategy Board please visit www.innovateuk.org

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