



JOINT NEWS RELEASE

Japanese multinational companies extend presence in Singapore through research collaborations with IME *IME scores a hat-trick with Fujikura, Mitsui and Seiko in photonics, MEMs and IC design*

Singapore, 13 September 2006 – The Institute of Microelectronics (IME), a research institute of the Agency for Science, Technology and Research (A*STAR), has inked a series of agreements with leading Japanese companies to engage in research and development of microelectronics technologies. These Japanese companies include Fujikura Ltd, Mitsui Chemicals, Inc. and Seiko Instruments Inc (SII). The agreements augment A*STAR's initiatives to jump-start new industries leveraging on Singapore's well established semiconductor industry infrastructure through partnerships with local and overseas partners.

Partnership with Fujikura in photonic crystal CDC device

IME has signed a Research Collaboration Agreement with Fujikura to collaborate on R&D projects aimed at stabilising optical signals in high-speed optical networks. Both companies will develop a photonic crystal (PC)-based chromatic dispersion compensator (CDC) device to compensate for chromatic dispersion in optical signals, which causes data distortion over long distances in high-speed telecommunication networks. To be commercialised in the near future, the device will provide smooth and continuously adjustable tuning of the chromatic dispersion at the optical receiver (*refer to Annex A for details of the project*).

Fujikura will mainly take charge of the design of novel optical devices. The device fabrication and wafer dicing will be carried out at IME's advanced 8-inch silicon wafer processing and packaging facility, where deep ultraviolet lithography will be utilised to produce the photonic crystal structures for the CDC devices.

The market for such optical components is emerging, and demand is expected to accelerate quickly as the transmission rates increase. According to industry analysts, the global demand for CDC devices is estimated to grow at an annual rate of 120%.

The agreement with Fujikura follows the successful collaborative research between IME and Japan's Bussan Nanotech Research Institute Inc (XNRI), a wholly-owned subsidiary of Mitsui & Co Ltd, on CDC prototype device development. The collaboration, from September 2004 to May 2006, led to the successful completion of proof-of-concept projects and yielded the first reported electro-optic controlled chromatic dispersion compensator.

Mr. Yoshihiko Shichida, Director of XNRI said, "The successful completion of the first two phases of the project with IME has been very encouraging in this cross border R&D collaboration. Fujikura is one of the leading telecommunications companies in the world and it is well placed to take this project to the next level. Mitsui and XNRI will continue to provide strong support for this project. We look forward to commercialisation of this device and business opportunities with Fujikura and IME in the near future."

Dr. Ryozo Yamauchi, Senior Executive Officer of Fujikura Ltd, said, "Fujikura has long-time experience in R&D and manufacturing of optical fibers, cables and components for optical communication. We hope the collaboration between Fujikura and IME will produce excellent optical devices and contribute to the new generation of optical networks."

Research Agreement with Mitsui Chemicals in Opto-Electronic Circuit Board (OECB) development

IME will work with Mitsui Chemicals, a global leader in the chemical industry, to design and develop modules for Opto-Electronic Circuit Board (OECB) and demonstrate 10-Gbps bi-directional optical link on Mitsui's OECB with optical waveguides.

The OECB technology uses light instead of electricity to transmit signals at very high frequencies in printed circuit boards (PCB), which enables more data to be transferred from one integrated circuit (IC) to another in a PCB.

As part of this one-year project, IME will develop a 10-Gbps optoelectronic module to transmit and receive the data and also design the associated test boards to make the developed technology easily adaptable to industrial applications. Mitsui Chemicals will develop the optical waveguide, fabricate the OECB demonstrator test board and assemble the waveguide onto the OECB to be further assembled and tested by IME.

This latest collaboration marks another milestone in the growing relationship between A*STAR and Mitsui. In mid-August this year, Mitsui had announced the establishment of its first overseas R&D centre in Singapore in October 2006, to be sited within ICES in its initial stage. Mitsui has been partnering A*STAR research institutes - the Institute of Chemical and Engineering Sciences (ICES), and the Institute of Materials Research and Engineering (IMRE) - on joint projects in chemical and materials research since 2004.

Dr. Akihiro Yamaguchi, Senior Managing Director of Mitsui Chemicals, said, "The scientific collaborations between Mitsui Chemicals and A*STAR represented some of

the new frontiers in materials and chemical sciences so far. With strong growth and demand for electronic products, we have decided to start a new R&D collaboration in this field. Mitsui Chemicals has excellent strengths in developing optical polymer materials and process technologies while IME has expertise in design, assembly and testing. We hope that through this partnership, Mitsui and IME will solve the board level interconnect problems and provide solutions for high frequency interconnects on conventional PCBs.”

Collaboration with SII in MEMS and IC design

In addition, IME and Seiko Instruments Inc (SII) have signed a Master Research Collaboration Agreement which will encompass a broad range of collaborations in Micro-Electro-Mechanical Systems (MEMS) design and fabrication, as well as integrated circuit (IC) design.

IME will provide its expertise and integrated capability for MEMS design, fabrication and packaging along with signal conditioning circuit design which is critical to the successful design of MEMS products. SII will use IME’s R&D foundry for prototype fabrication of its novel MEMS devices, and subsequently go to a Singapore foundry partner to manufacture these devices when ready.

In May this year, Seiko had established its first corporate R&D centre outside of Japan to drive collaborative research with A*STAR research institutes. They include Data Storage Institute (DSI), Institute of High Performance Computing (IHPC), Singapore Institute of Manufacturing Technology (SIMTech) and IME. Research areas ranged from technologies in storage to production process innovation.

Mr. Masao Kasuga, VP and SGM of Corporate Technology Division, SII, said, “With the establishment of our R&D centre in Singapore in May 2006, we are embarking on collaborative research with A*STAR research institutes like IME. Through this international industry-government partnership, we hope to strengthen our technological development capability by fostering global R&D resources, recruiting local developers, and understanding global technology trends and needs.”

Said Professor Dim-Lee Kwong, Executive Director of IME, “We are excited to engage in such high level, cross-border research with these leading Japanese companies. This shows IME’s integrated capabilities in the various areas of microelectronics research. We hope that as a result of these collaborations, we are able to attract even more multinational companies to do research in Singapore.”

Mr. Boon Swan Foo, Managing Director of A*STAR and Deputy Chairman of A*STAR’s Science and Engineering Research Council (SERC) commented, “Through the different capabilities in A*STAR’s many research institutes, we are able to engage these Japanese companies on multiple fronts, covering a wide spectrum of the value chain from research to proof of concept to assembly and testing. These research collaborations with top-tier Japanese companies like Mitsui, Fujikura and Seiko are a strong testimony to the value our research institutes can bring to the table and provides an excellent route to commercialisation of our research work. These collaborations

also help anchor companies in Singapore, presenting further opportunities to benefit our local industries.

In addition, the upcoming move of the SERC research institutes to Fusionopolis commencing in 2007 will bring together capabilities in infocomm research with complementary advanced materials, electronics, engineering and manufacturing research capabilities. We expect to cement many more of such opportunities to engage companies through the integration of the research capabilities at the research institutes at Fusionopolis. ”

BACKGROUND INFORMATION

About A*STAR, IME and Fusionopolis

The **Agency for Science, Technology and Research (A*STAR)** is Singapore’s national agency for science and technology, supporting the development of industry clusters. Its mission is to foster world-class scientific research and talent for a vibrant knowledge-based Singapore. The Agency comprises the Biomedical Research Council, the Science and Engineering Research Council, A*STAR Graduate Academy, Policy and Personnel, and Corporate Planning and Administration Divisions, and a commercialisation arm, Exploit Technologies Pte Ltd. The two research councils fund and oversee 12 public research institutes engaged in cutting edge research in the physical sciences, engineering and biomedical sciences. Our institutes build up intellectual capital and trains research talent to deepen Singapore’s scientific capabilities.

(website: www.a-star.edu.sg)

The **Institute of Microelectronics (IME)** is a research institute of A*STAR. Positioned to bridge the R&D between academia and industry, IME's mission is to increase value-add to the electronics industry in Singapore by engaging in relevant R&D in strategic fields of microelectronics; supporting and partnering the electronics industry; and developing skilled R&D personnel. Its key research areas are in integrated circuits and systems; semiconductor process technologies and microsystems, modules and components.

(website: www.ime.a-star.edu.sg)

Fusionopolis is Singapore's physical sciences and engineering hub of the future. Slated for launch in 2008, Fusionopolis will be home to the research institutes under A*STAR's Science and Engineering Research Council, bringing together complementary capabilities in infocomm, advanced materials, electronics, engineering and manufacturing research capabilities. These public research institutes will be co-located with the private sector R&D labs at the Fusionopolis complex. It will features state-of-the-art facilities and technology test-bedding infrastructure built with the aim of fostering innovation, experimentation and collaboration between public sector research institutes and private sector labs.

About Fujikura Ltd

Fujikura Ltd commemorated the 120th anniversary of its founding, in 2005. Today the scope of its business has broadened beyond core cable products for the electrical power industry and plants, and encompasses the electronic equipment, auto and telecommunications industries. Fujikura relentlessly strives to create novel solutions through R&D and has delivered leading products, such as optical fibers and flexible print circuits.

(website: www.fujikura.co.jp/ie_e)

About Seiko Instruments Inc.

Seiko Instruments Inc., based on more than six decades of dependable precision timepiece design, development and manufacturing, has extended its business domains by developing advanced micro mechanical, low power consumption, and nano-scale technologies leveraging its precision instrument manufacturing expertise.

(website: www.sii.co.jp/corp/eg/index.html)

About Mitsui Chemicals, Inc.

Headquartered in Tokyo, Japan, Mitsui Chemicals, Inc. is a diversified chemical company with offices in Europe, China, Singapore and America. A worldwide leader in the chemical industry, the company is actively engaged in numerous industry segments including Functional Chemicals and Engineering Materials, Functional Polymer Materials, Basic Chemicals and Petrochemicals.

(website: www.mitsui-chem.co.jp)

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Photonic crystal (PC)-based chromatic dispersion compensator (CDC) device

IME and Fujikura will jointly develop a photonic crystal (PC)-based chromatic dispersion compensator (CDC) device to compensate for chromatic dispersion in optical signals, which causes data distortion over long distances in high-speed telecommunication networks. In optical fibers, waveforms or light signals broaden over long distances, making the signals difficult to interpret by the receiver. Chromatic dispersion in particular poses a major challenge as the effects increase non-linearly at the rate of the square of the increased speed of the transmission. The developed CDC device provides a robust solution to this challenge by providing smooth, continuously adjustable tuning of the chromatic dispersion at the optical receiver.

The partnership with Fujikura will bring this CDC project to the next level as the company targets to bring this device to commercialisation in the near future. In the project, Fujikura will mainly take charge of the design of novel optical devices. The device fabrication and wafer dicing will be carried out at IME's advanced 8-inch silicon wafer processing and packaging facility, where deep ultraviolet lithography will be utilised to produce the photonic crystal structures for the CDC devices.

IME is one of the few organisations in the world with such capabilities. The fabrication process uses silicon-on-insulator wafers and is fully CMOS-compatible, paving the way for Fujikura to offer a "plug and play" solution while ensuring low cost and high yield in its production.