

Focus on applications !

Over 2,000 people from all over the world attended the 2003 Fuel Cell seminar in Miami which ends today. The diversity of energy supplier needs for the future leaves room for hundreds of companies to expand their businesses and for laboratories to support the creation of new companies. Fuel cell development is an excellent application field for micro and nanotechnologies especially in two market segments: the micro fuel cell segment (a few Watts) and the mini fuel cell segment (a few dozen Watts).

As a matter of fact, the development of portable fuel cells for laptops, PDA's, PC's, and so on, requires the conception, miniaturization, and assembly not only of the cell itself but also of all the associated fluid handling components such as pumps, reactors, and reformers .

On the nanotechnology side, the knowledge accumulated in physics and chemistry at the nanoscale level is circulating and being used not only to develop micro and mini fuel cells, but also in all market segments where nanomaterials such as nanocomposites and catalysts are required in order to improve fuel cell technology in competition: PEMFC, SOFC, DMFC ...

It will take years before fuel cells are widely sold, but it is already a several billion euro R&D market supported worldwide by public authorities.

Pascal BOULON
Deputy Manager

MEMS

MEMSCAP acquires Opsitech, a specialist optical subsidiary of CEA/LETI, for \$4.4 million

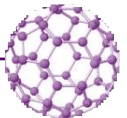
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Nanotechnology

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Bookham Technology buys Ignis Optics for \$15.5 million

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New telecom products from Pirelli

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Global Chip Sales Reach \$13.42 Billion in August 2003

IQE announces placing and open offer
ST plans to invest in Rousset, France

Motorola to separate its semiconductor business

IBM announced SiGe bipolar on thin SOI



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List of companies cited in Micronews:

MEMS MEMSCAP, Suss MicroTec, IMEC, Fraunhofer Institute, Tronic's Microsystems, Sercel, Phoenix BV, EV Group, Naomi Technologies **NANO** Nanosphere, NEC, Neturen, Applied Nanotechnologies, Suss MicroTEC, Tokuyama, NanoSystems Bristol-Myers, Konarka, EDF **OPTICS** ADVA Optical Networking, McData, Bookham Technology, Ignis Optics Infineon, Vitesse Semiconductor Corp., France Telecom R&D, Lucent Technologies, T-Com, Alcatel, Intense Photonics, Albis Transmode Systems, BlazePhotonics, Northlight Optronics, STM, Pirelli, Infineo **BIO** Aclara Biosciences, Affymetrix, Agilix, Aspira Biosystems, BioDiscovery, Debiotech, Eastman Kodak, Fluidigm, GlaxoSmithKline (GSK), Integrated Sensing Systems, (ISSYS), Intel, Micralyne, MicroCHIPS, Picoliter, SpectRx, Zeptos **SEMICONDUCTORS** Applied Materials, Austriamicrosystems, Carl Zeiss, Carsem, Dai Nippon Printing, ESEC, IBM, IMEC, Infineon, IQE, iSuppli, Motorola, Oxford Instrument, Philips, Schott Sematech, SIA, Sigma-c, ST Microelectronics, Thermo VG Semicon, TSMC, Unaxis, VLSI Research

Semiconductor equipment Book-to-Bill ratio at 1.02 in September

The Worldwide Semiconductor Equipment Book-to-Bill ratio reached 1.02 in September 2003 according to VLSI Research Inc.

The September B:B ratio represents a significant improvement from the revised figure of 0.94 for August. But the big picture shows it is holding flat. September's bookings were at the same level as March 2003 and August's bookings were below that of May, indicating that the order momentum is gone.

In contrast to equipment, IC orders show a completely different picture. Orders have risen steadily all year. The overall front-end capacity utilization rate broke the 90% mark in September and was close to the 95% level for 130nm and below.

<http://www.vlsiresearch.com>

Million USD

	Billings (Three-month avg.)	Bookings (Three-month avg.)	Book-to-Bill
August 2003 (final)	2116.9	1995.5	0.94
September 2003 (prelim.)	3391.5	3472.6	1.02
October 2003 (Forecast)	2315.1	2327.9	1.01

Source: VLSI Research, October 2003

Billion USD

	Billings (Three-month avg.)	Bookings (Three-month avg.)	Book-to-Bill
September 2003 (prelim.)	12.2	13.6	1.11

Source: VLSI Research, October 2003

NEW OFFERS FROM YOLE

Yole Développement is launching several new offers for its customers. With an adapted price, your company can have access to the following multi-customer actions :

1. World GaN markets : analysis of the GaN markets (from materials to devices) worldwide, open to the GaN market suppliers (materials and equipment manufacturers, services ...) and to the devices manufacturer (optoelectronic, RF devices). Start date : Nov. 2003. We still have place for 3 customers.
2. Polymer MEMS markets and technologies : analysis of the Polymer MEMS applications, markets and technologies trends, open to the suppliers of the MEMS industry and to the device manufacturers. Start date : December 2003.
3. World MEMS equipment and materials markets 2004 : after the success of the 2003 edition, Yole is re-launching the analysis of the world markets of MEMS (from materials to devices), open to the suppliers of the MEMS markets (materials and equipment manufacturers, services ...). Start date : February 2004.

For these 3 multi-customer actions, please contact directly Jean-Christophe Eloy at eloy@yole.fr or tel + 33 472 83 01 82

REPORTS & DATABASE

Yole is now launching as a stand alone product the MEMS Database : this product is the up to date database of the 360 MEMS manufacturers worldwide. Each company is described in a profile (2 to 4 pages) describing its technical and commercial activities, products, agreements and alliances and key contacts.

For 1400 Euro, you can have access to this valuable information.

Feel free to contact E. Domanski to have more information at domanski@yole.fr or tel +33 472 83 41 27

An overview of MEMS R&D institutes in Europe (part 2)

Europe has substantial know-how in MEMS research because of the presence of large R&D institutes. These institutes do not only focus on research, but also on strong partnerships with industrial companies. They also contribute to the creation of numerous spin offs. This article is a short overview of some of them.

IMM at Mainz, Germany (www.imm-mainz.de) was founded in 1990. Departments are chemistry, micro-reaction technology, fluidics and simulation/bio-technology, thin film technology, nanotechnology, optics, x-ray lithography, micro-molding, precision engineering and mechanical microfabrication. Since the founding of IMM, 15 spin-off companies have been created: CUBO, Mikroglass, thinXXS ...



Figure: Microreactor with integrated heat exchanger for liquid and liquid/liquid phase reactions made of stainless steel (IMM source).

Figure: Schematic representation of plastic lab-on-a-chip (IMM source).



IMT Neuchâtel, Switzerland (www-imt.unine.ch) was created in 1979. IMT focuses its educational and research activities on the following fields: microelectronics, sensors and actuators (Prof. Dr. Nico de Rooij), applied optics (Prof. Dr. René Dändliker), physical electronics (Prof. Dr. Arvind Shah), electronics and signal processing (Prof. Dr. Fausto Pellandini), and pattern recognition (Prof. Dr. Heinz Hügli).

The SAMLAB (Sensors, Actuators and Microsystems Laboratory) is part of the Institute of Microtechnology (IMT) of the University of

Neuchâtel. Samlab runs a 300 m² class 100 clean room and various characterization labs for its own research. These are operated as "walk-in" facilities, where the needs of other researchers from Switzerland and foreign institutions (EPFL, ETHZ, NTB, CSEM) can also be served. Many spin off companies have been launched: Microflow Engineering SA, Sensoptic SA, Sercalo Microtechnology SA, Seyonic SA ...

The LAAS in Toulouse, France (www.laas.fr) is a research unit of the CNRS (National Center for Scientific Research) and reports to the STIC (Department of Science and Technology for Information and Communication). It is associated with three university institutions in Toulouse: UPS (Paul Sabatier University), INSA (National Institute of Applied Science) and INP (Polytechnic National Institute). It was officially set up on 10 July 1967 and has now been renamed "Laboratoire d'Analyse et d'Architecture des Systèmes" (Analysis and Architecture of Systems). It employs 450 people and uses 11,400 m² of facilities. Regarding MEMS activities, LAAS has 2 research groups: MIS (Microsystems and Systems Integration) and TMN (Micro and Nanostructure Technology). At MIS, research is conducted in design, devices and systems integration. The TMN group (Technology, Micro and Nanostructures)

designs and develops processing technologies, components and specific devices for the fabrication of hybrid microsystems.

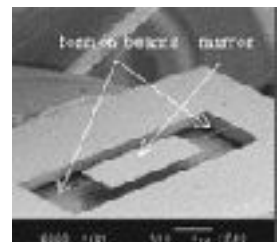


Figure : micro mirror developed at LAAS

LETI in Grenoble, France, (www-leti.cea.fr/) is working on the following microsystem technologies: sensors (MEMS on SOI, gyrometers, magnets on Si), magnetic mass storage, components for telecom circuits (integrating millimetric volume filters on silicon, reconfigurable MEMS-based architectures for 3G and 4G telecommunications, CMOS-on-SOI enhancing RF components, assessing above IC microbatteries). Other fields are Si technology, optical components and multimedia, transmission and telecom systems, health care and biological systems, and design. Of course, many spin-offs have emerged from LETI: Tronic's, SOITEC, Opsitech, Apibio ...



Figure: sensor on SOI developed at LETI

MIC in Lyngby, Denmark (www.mic.dtu.dk) was founded in 1990. Its projects are: bio-array, bio-probes, cell particle handling, micrototal analysis systems, molecular electronics, microfluidics theory and simulation, nano hands, prototyping, polymeric environmental microsystems, MEMS activities, and science and education activities. The clean room covers 560 m² and is class 100. The spin-offs from MIC are Capres (new technology for direct nano- and micro-scale electrical characterization of materials), Chempaq (medical point-of-care diagnostic tests), Hymite (optoelectronics integration).

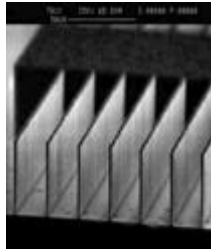


Figure : MIC is working on ICP etching. The photo above shows a Scanning Electron Microscope picture showing 30 x 1.5 mm silicon walls (from STSystems).

SINTEF in Oslo, Norway (www.oslo.sintef.no) was created in 1996. Sintef has over 1800 employees and an annual turnover of 1.83 billion euros. The areas of expertise of Sintef ECY are the following: microsystems technology, advanced measurement and advanced control system process development and small scale production of MEMS, optical MEMS, radiation detectors and bio systems. The microsystem department has the following characteristics: 800 m² clean room for manufacturing of silicon based microsystems and 20 scientists and 9 engineers. Annually about 4000 silicon wafers (150mm) are processed in the clean room. The department's offer ranges from concept studies for new products through design, prototyping to small-scale manufacturing, ASIC and packaging. Main application areas are: radiation detectors for scientific instrumentation, microsystems in demanding environments, sensors for

automotive applications, sensors for environmental monitoring, medical and biomedical systems.

VTT Information Technology at Espoo, Finland (www.vtt.fi) is carrying out research and development on sensors and measurement methods. Devices based on VTT's designs are used for example in microphones, pressure and flow measurements in industry, surface chemical measurements, optical space instruments, and metrology. Research takes place at Micronova (total net area is approximately 15,000 square metres, of which 2,600 square metres is clean room). Research groups work on biosensors, MEMS, optical sensors, quantum electronics, nanoelectronic components, optimised and integrated readout electronics for precision measurements and RF sensing.

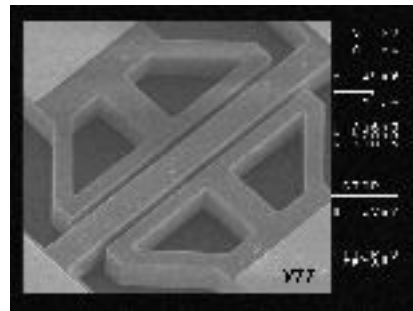


Figure : Micromechanical RF oscillator. SEM-picture of a Si-microbridge fabricated at VTT. The bridge is 4 μ m wide and 44 μ m long, with a resonance frequency of 14 MHz. The electrodes on both sides of the bridge are used for capacitive actuation and detection of the mechanical motion (VTT source).

Newspaper advertising

The ambition of Micronews is also to serve your projects by letting you post announcements in the sections of the magazine. You can order advertisement in full page, 1/2 page or 1/4 page.

For more information, contact **Sandrine Leroy**, leroy@yole.fr.



MINANET: the European gateway for information on micro and nanotechnology.

Since last year, all you ever wanted to know about micro and nanotechnology in Europe is accessible just a mouse click away on www.minanet.com. The MINANET project is supported by the European Commission under the Growth programme and aims at both providing an up-to-date list of all publicly funded R&D projects in Micro- and Nanotechnology in Europe, and achieving a wider distribution to enable a broader use of the results.

MINANET stands for the Miniaturisation and Nanotechnology Network. Its objective is to harmonise access to information on micro and nanotechnology in Europe. The last 10 years have seen a large number of initiatives instigated by the European Commission (ESPRIT, BRIT, IST, Growth), Eureka, Euclid and national or local public authorities (ANVAR and MINEFI in France, CNR in Italy or indeed BMBF in Germany). The substantial experience and information contained in these projects are scattered across a series of specific and unconnected databases. The aim of the MINANET programme is to merge the information on all the projects in this field in Europe on a single database, for the benefit of industry and research. Thanks to the MINANET web site, one Internet address provides access to the micro and nanotechnology sites in Europe.

After having set up this comprehensive database, MINANET's second objective was to organise workshops to distribute the information and analyse the database. The first workshop was held at the Hanover Fair in Germany at the beginning of April. The second one was in Amsterdam during COMS, and the latest one was held in Grenoble (France) during the MINATEC conferences; the latter two were held in September. Attendees overwhelmingly appreciated the initiative of these workshops as they gave them the opportunity to learn more about this European programme; and it also started some fruitful business relations. Furthermore, these workshops presented the analysis of more than 700 publicly funded micro and nanotechnology projects in Europe, and the status of the research in these fields worldwide.

MINANET successfully organised these 3 workshops to distribute information on European projects and their results. The programme of these workshops was set up using the same structure:

- General presentation of MINANET by CEA/LETI,
- Orientation of Framework Programme 6 with a

speaker from the European Commission,

- Presentation of the analysis of publicly funded projects and worldwide status of micro and nanotechnology activities,
- Various testimonies of industrial players and R&D project leaders on their experience in publicly funded projects. During these sessions, numerous projects and technologies were presented:

In Hanover:

- EADS (Akom project),
- SUSS MicroTec (Manufacturing solutions for nano-imprinting),
- PHS Mems (Wafer Level Packaging),
- Kiev National University (Smart gas sensor),
- Laser Zentrum Hanover and TU-Madelung

In Amsterdam:

- III V Photonics
- UMC

In Grenoble:

- Quinetic (Optronics Centre activities and European projects)
- IMT-Bucharest (Distribution, training and networking in Eastern Europe)
- IMT FZK (Development of Micro Powder Injection Moulding funded by the German Federal Ministry of Education and Science)
- ASML (Innovative Alignment Strategies for MEMS and IC Applications)
- EVG (Nanoimprint Lithography)
- Alcatel MMS (IST Project: I-Speeder programme in partnership with Bosch and Perkin Elmer)

The presentations of all the workshops are available on the MINANET website (www.minanet.com).

Discover the 700 projects contained in the MINANET database on www.minanet.com

For further information on the MINANET project, contact minanet@cea.fr, for information on the workshops contact jourdan@yole.fr



MEMSCAP announced its reorganization

MEMSCAP announced a reorganization complementary to its general restructuring initiated earlier this year in order to further the efforts already engaged towards return to profitability in 2004.

In parallel to the capital increase and the acquisition of GalayOr and Opsitech, both of which were finalized this month and contributed to a 5 million dollar cash increase, the company has engaged in reorganizing itself in order to better the efficiency and productivity at group level.

The measures apply to all business segments of the MEMSCAP group throughout the world and include:

- concentrating the company around three core activities through business units, each having a dedicated production center and specialized sales

teams:

- 'Standard products', including sensors for medical and aerospace/defense applications; products for optical communications and the skin station for dermatology and cosmetics.

- 'Custom-made foundry services', based in North Carolina.

- 'Software'

These three core activities will be supported by a central research team and a G&A team based in France.

- centralizing its Egyptian activities around the software and skin station business.

- Suspending production and development operations in Bernin (France), leading to a headcount reduction of 25 people.

As a result, the total worldwide headcount of the company would go below 165 employees, a number which takes into account the GalayOr team.

<http://www.memscap.com>

TRONIC'S inaugurates new production site and unveils its collaboration with Sercel

TRONIC'S Microsystems, a company which develops and produces custom Micro Electro Mechanical Systems (MEMS) for high-end applications, has just inaugurated its new production site located in Crolles, near Grenoble, France. The new facility will be equipped with 4- and 6- inch compatible equipment (production on 6-inch wafers expected at the end of 2004) to satisfy high-tech market and user needs. The new state-of-the-art facility will at first encompass a production area of 7,000 square feet with 4,300 square feet of clean room and will be fully dedicated to the production of high-end MEMS-based custom

components. It will have a 10,000 wafer per year capacity. TRONIC'S has invested 6,5M€, 2M€ for clean room and 4,5M€ for equipment.

At the same time, TRONIC'S unveiled its collaboration with Sercel to produce MEMS-based seismic sensors.

Sercel is a player in the seismic acquisition industry, supplying the geophysical industry with a full range of high-tech integrated equipment to meet the requirements of current oil exploration projects. After the research phase jointly led by the CEA-LETI and Sercel, the technological know-how has been transferred to the MEMS manufacturer. TRONIC'S Microsystems industrialized the process and today, the company manufactures miniaturized geophones to be integrated into Sercel digital systems.

<http://www.tronics.mst.com>

<http://www.sercel.com>

Techno News

SUSS installs MEMS test system at IMEC and substrate bonder at the Fraunhofer Institute

The larger European Research Institute, IMEC, (Interuniversity MicroElectronics Center) has recently installed a SUSS PAV150 at its Leuven (Belgium) facility to test MEMS devices

(in particular RF MEMS) in a high vacuum environment. The system enables reliability tests of MEMS under real-life conditions and is a valuable asset to IMEC's reliability center. To meet consumer needs, SUSS MicroTec and IMEC closely collaborated to develop the SUSS PAV150 system into a unique custom-made RF MEMS test system. SUSS MicroTec also announced that the Fraunhofer Institute, a leading research organization located in Itzehoe, Germany, has chosen its SB6e

substrate bonder to develop more commercially viable MEMS applications. The SUSS tool was selected for its process control and extensibility. Designed for a laboratory environment, the SB6e enables processes to be easily transferred from lab development to volume production because it shares key components with SUSS volume-production bonders ABS150e and ABS200.

<http://www.suss.com>

<http://www.imec.be>

<http://www.fraunhofer.de>



MEMSCAP acquires Opsitech, a specialist optical subsidiary of CEA/LETI, for \$4.4 million

MEMSCAP of Bernin, France announced a definitive agreement to acquire Opsitech of Grenoble, France - a spin-off from LETI, the R&D subsidiary of the French Atomic Energy Authority - for around \$4.4 million in new MEMSCAP stock. Opsitech specializes in integrated optics that can be associated with MEMS. MEMSCAP noted that in addition to the products and technologies, the patent portfolio and the strategic relationship with CEA-LETI, this acquisition reinforces MEMSCAP's net cash position by \$2.35 million. Moreover, the acquisition, being complementary to the activities of recently acquired GalayOr, will increase MEMSCAP's optical business activity and patent portfolio. The acquisition, realized with the active support of CEA-LETI, provides MEMSCAP access to the CEA-LETI intellectual property in silicon integrated optics technologies and team expertise, specifically through a license and R&D agreement. This is regarded as a key element of the transaction. In addition, MEMSCAP reported third quarter revenues of \$2.1 million up 75% year on year compared to revenues of \$1.2 million in the third quarter of 2002, and split: \$1 million for sensor solutions; \$600,000 for foundry services; \$200,000 for

IMEC and EV Group announce development of new wafer-level packaging and MEMS wafer bonding techniques

The EV Group (EVG), manufacturer of MEMS and semiconductor wafer processing equipment, and IMEC, Europe's largest independent research institute on microelectronics and micro/nanotechnology, announced that they had signed a joint development agreement on wafer-level packaging and MEMS wafer bonding. Following this agreement, EVG will also become an official partner in IMEC's Industrial Affiliation Program (IIAP) on "wafer-level-packaging on Cu/low-k back-end-of-line" and will supply IMEC with new state-of-the-art mask alignment, spray-coating and wafer bonding tools. In this collaboration, roadblocks in the further downscaling of IMEC's thin film multilayer technology below 5µm wide line and space interconnects will be tackled. Furthermore, electroplating of solder bumps with ultra-fine pitches below 40µm will enable IMEC to be ahead of the peripheral I/O pad pitch road map. Additionally, novel 0-level packaging techniques for MEMS devices will be develo-

wireless communications; \$200,000 for software; and \$100,000 for optical communications. The company confirmed that MEMSCAP's next capital increase, for a minimum of \$1.5 million, as announced by the company in its press release of August 28, 2003, would take place before the end of fiscal year 2003.

<http://www.memscap.com>

PhoeniX invests in microsystem software

PhoeniX develops software for Micro System Technology to provide the bridge between the design team and the real clean room environment. The software is intended to facilitate the communication from design to production and back. Developing software modules that span from numerical solutions to database systems for clean room management, PhoeniX will introduce its first products soon. The products include various applications in the MST field, offering customers a reduction in operational costs by enhancing the efficiency in process management, said the company.

The team at PhoeniX includes experienced application engineers, software developers and MST designers in-house. PhoeniX' strategy is to actively search for key partnerships with universities and companies in the MST area.

<http://www.phoenixbv.com>

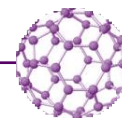
ped jointly, aiming at achieving simple and cheap polymer bonding processes on 200 mm wafers.

<http://www.evgroup.com>
<http://www.imec.be>

An innovative wafer line in Europe

Naomi technologies AG, a leader in XMR (Magneto Resistance) technology offers a new generation of GMR (Giant Magneto Resistance) sensors. Based in Mainz, Germany, the company owns a 4,500m² clean room class 100 and proposes a most innovative non semiconductor wafer line. Its activities are focused on the development, the production and the commercialization of magnetic sensors, protective coatings and nanosurfaces. The manufacturing capacities of Naomi are thin layer technology, lithography and coating. The company also proposes access to advanced production facilities and services particularly adapted for small and medium sized enterprises (foundry). naomi technologies closely co-operates with IBM E&TS EMEA and IMM Institut für Mikrotechnik Mainz GmbH, both companies also located in Mainz, Germany.

<http://www.naomi-mainz.de>



Business News

\$4.5 million raised for Five Star Technologies

Five Star Technologies, US, has raised \$4.5 m in Series C investment funding. According to the company, the cash will be used to develop applications for hydrodynamic cavitation processes to make nanoscale materials. The technology uses the formation and implosive collapse of gas bubbles in a liquid to create nanoparticles. Five Star says its early target markets include materials for pharmaceuticals, emission control catalysts, speciality chemicals and advanced polymers. <http://www.fivestartech.com>

ASML and Nantero partnership

Nantero, US, has announced its collaboration with ASML Holding of the Netherlands to show that its nanotube materials and processes are compatible with ASML's semiconductor equipment. Initial results show that ASML's equipment is fully capable of handling nanotubes using Nantero protocols and of carrying out Nantero's new manufacturing steps without any modifications. Nantero's non-volatile random access memory (NRAM) chip design uses suspended nanotubes as memory bits. As part of the project, the companies have created a wafer that incorporates 10 billion suspended nanotube junctions, with each junction containing multiple nanotubes.

<http://www.nantero.com>

<http://www.asml.com>

Alliances & Mergers

NEC and Tokuyama Develop Material for 8 nm Circuits

NEC Corp. and Tokuyama Corp. have jointly developed a low-molecular-weight material that can form circuits as narrow as 8 nm on large-scale integrations (LSIs). The material is first applied to the surface and then exposed to electron-beam irradiation.

The reported width is much smaller than the 130 nm circuits now used on today's LSIs. In addition to making it possible to boost the level of circuit integration over 15-fold, the narrow circuit is likely to help development of microprocessors with clock-speed multiples of 10 GHz, an order of magnitude faster than today's fastest microprocessors.

NEC and Tokuyama plan to make the material widely available to semiconductor makers. They believe that the new material will find demand in fabrication and testing of prototype LSIs, particularly 45 nm LSIs, which are expected to be commercialized by about 2010.

<http://www.nec.co.jp/>

Nanotechnologies in U.S. science classrooms

The NanoBusiness Alliance, based in New-York, signed a partnership with the educational organization in order to introduce nanotechnologies in science classrooms.

This alliance will build new programs. Its objective is to develop new nano-related careers for students. Participants will include students, educators, and industry.

NanoBusiness Alliance's activities include: Research and Education; Public Policy; Public Relations; International Cooperation Activities, Trade Missions ...

<http://www.nanobusiness.org>

Deal between Nanosys and In-Q-Tel

Nanosys Inc. announced that it had signed a multi-million dollar strategic development deal with In-Q-Tel, a private non-profit group funded by the Central Intelligence Agency. Launched in 1999, In-Q-Tel's mission is to identify and invest in companies developing cutting-edge technologies that serve United States national security interests. Nanosys' novel and patent-protected nanotechnology-enabled systems are based on inorganic semiconductor nanostructures. These nanostructures integrate functional complexity directly into each individual nanoparticle, enabling the low-cost fabri-

cation of high-value, high-performance applications.

<http://www.nanosysinc.com/>

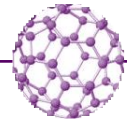
C Sixty and Merck for fullerene medical applications

The biotech start-up C Sixty announced that it was partnering with the pharmaceutical company Merck & Co. to develop drugs based on buckyballs, formally known as buckminsterfullerenes. C Sixty modifies fullerenes to make them biocompatible and to enhance their therapeutic properties. C Sixty is focu-

sing on the antioxidant properties of fullerenes. Fullerenes soak up cell-damaging free radicals, a by-product of oxygen reacting with other chemicals in the body. Free radicals likely play a role in aging and fatal degenerative diseases such as Alzheimer's and amyotrophic lateral sclerosis, or Lou Gehrig's disease. C Sixty will supply Merck with its fullerene compounds, license its research for animal studies and give Merck an exclusive licensing option to market and sell the drugs. The commercial option will kick in only if a fullerene drug meets U.S. Food and Drug Administration standards.

<http://www.csixty.com/>

<http://www.merck.com/>



Japan team reports quantum computing breakthrough

A research team in Japan says that it has successfully demonstrated one of the two basic building blocks of a solid-state device that will be needed to construct a viable quantum computer. This is the first time that such a building block has been demonstrated. The team built a controlled NOT (CNOT) gate, a fundamental building block for quantum computing, in the same way that a NAND gate is for classical computing. Research into quantum computers is still in its early stages and experts predict it will be at least 10 years before a viable quantum computer is developed. The team reporting the breakthrough is headed by Tsai Jaw-Shen and jointly funded by NEC Corp. and Japan's Institute of Physical and Chemical Research (RIKEN).

<http://www.nec.co.jp/>

STMicroelectronics for solar cell development

Franco-Italian semiconductor manufacturer STMicroelectronics is to develop low-cost solar cells. The company will focus on solar cells that may have lower efficiency (for example 10% instead of 15-20%) but are cheaper to manufacture. ST researchers will work on two approaches: a nanostructured organic solar cell that uses C₆₀ as the electron acceptor and an organic copper compound as the electron donor, and the dye-sensitized solar cell developed by Michael Graetzel at the Swiss Federal Institute of Technology. The dye-sensitized cell employs an organic dye to absorb light and create electron-hole pairs, a nanoporous metal oxide layer to transport the electrons and a hole-transporting material. ST plans to explore using conductive polymers instead of liquid electrolytes as the hole-transporting material.

<http://www.st.com>

Proteins to assemble quantum dots

Researchers at the National Renewable Energy Laboratory and Brookhaven National Laboratory, US, have employed a genetically modified protein to make unique quantum-dot structures. Researchers used colloidal quantum dots consisting of a cadmium selenide (CdSe) core with a zinc sulphide (ZnS) shell roughly 0.5 nm thick. They incubated the quantum dots with genetically engineered cohesin (a bacterial cellulosomal protein that naturally self-assembles). According to the scientists, it is unclear whether the quantum dot structures were assembled by the protein or if the proteins caused the quantum dots to aggregate and then stuck to their surface. The assemblies could find a use in novel electronic devices.

<http://www.nrel.com>

Nanocatalysts from Cerulean tested in the UK

Oxonica, a subsidiary of Cerulean International, UK, is to test its nanocatalyst Envirox across the UK in up to 1000 buses belonging to transport operator Stagecoach. The catalyst sits in the diesel fuel, and Cerulean says it delivers a more complete burn in the combustion chamber, produces reduced carbon deposits, has a 10% better fuel economy and releases lower emissions. Field testing of Envirox has already taken place in the Asia-Pacific region.

<http://www.oxonica.com>

Nanowires Boost Plastic Circuits

The move is on to develop flexible, cheap, plastic electronics, but so far organic circuits have fallen far short of silicon chip performance. Researchers from the Hahn-Meitner Institute in Germany have moved the field forward with a new way to make flexible transistors. The method causes forests of vertical semiconductor nanowires to grow inside a plastic film. The researchers' thin film contains as many as 100 million nanowires per square centimetre. The researchers made the array of transis-

tors first by using an ion beam to etch pores as small as 50 nanometers into a sandwich of metal surrounded by polymer layers, then by using electrical current to cause nanowire material dissolved in a solution to solidify into a nanowire at each hole. The semiconductor nanowires served as transistor channels, the metal layer served as the gate electrode, and the researchers added source and drain electrodes to the top and bottom of the stack to complete the transistors.

<http://www.hmi.de>



ADVA Optical Networking and McData complete interoperability testing, announce partnership

Storage networking provider McDATA Corp. and ADVA Optical Networking have announced that McDATA's Intrepid Directors and Spheron Fabric Switches had successfully completed testing with ADVA's Fiber Service Platform (FSP) systems. The live testing of numerous storage applications, including Fibre Channel and FICON, was completed at McDATA's Systems Integration Lab in Broomfield, CO, as part of the company's OPENready Interoperability Partner Program. Joint deployment of ADVA FSP systems and McDATA's multi-capable switching solu-

tions address multi-site business continuity, disaster recovery, remote storage access, and similar storage applications in metro areas for medium- and large-size enterprises. Growing awareness of the benefits of distributed storage connectivity has resulted in an increasing number of comprehensive storage solutions amongst enterprises. Deployment of these multi-vendor storage solutions mandates closer alliance partnerships between vendors and the formation of more strategic partner programs, such as McDATA's OPENready Solutions Partner program and ADVA's ADVantage Qualification Program.

<http://www.advaoptical.com/>

Bookham Technology buys Ignis Optics for \$15.5 million

Bookham announced that it had entered into an agreement under which it will acquire Ignis Optics, Inc ("Ignis"), a provider of optical modules for communications networks, based in San Jose, CA. Ignis designs and manufactures small form-factor pluggable (SFP and XFP) single-mode optical transceivers for current and next-generation optical datacom and telecom networks. Bookham says Ignis' transceiver design skills complement Bookham's position in optics and electronics design. The combined team will accelerate Bookham's move to provide

a full XFP and SFP product set at multiple speeds and different reaches in order to address the majority of new datacom optics opportunities. This represents a large new market for Bookham with significant growth opportunities. Under the terms of the agreement, Bookham will acquire Ignis Optics, Inc in consideration for USD 15.5 million which is to be satisfied at completion by the issuance of new Bookham shares having this value, as determined on a 20 day rolling average based on the 15 trading days prior to today's date including today and the five trading days thereafter.

Additionally, Bookham shares up to a value of USD 1.5 million (the number to be determined on the same basis as the shares issued at completion) will be issued in early 2005, should Ignis

meet certain performance criteria during the 2004 fiscal year. Application will be made to admit the new ordinary shares in Bookham to the Official list of the UK Listing Authority and to trading on the London Stock Exchange's market for listed securities. Admission of the new shares is expected to take place following completion of the acquisition, expected in early October 2003.

<http://www.bookham.com>

<http://www.ignis-optics.com>



Figure: Small Form Factor OC-48/STM-16 Single Mode Pluggable Optical Modules for SONET and SDH Applications from Ignis

Lucent and Deutsche Telekom's T-Com team up to launch optical Ethernet service for LANs

Lucent Technologies and T-Com, the fixed line business unit of Deutsche Telekom, joined forces to develop an Ethernet-over-optical service to enable T-Com's customers to connect their local area networks (LANs) across Germany. The T-Com DDV-M Ethernet100 service offers speeds of 10, 50 or 100 Mbits/sec, allowing resources and information to be shared across all locations. The service launch follows the completion of a successful customer pilot phase.

<http://www.lucent.com/>



Infineon and Vitesse announce interoperability of SONET/SDH framer and Time Slot Interchange ICs

Infineon and Vitesse Semiconductor Corp. have announced a collaboration to establish interoperability of currently available and future-generation SONET/SDH framer integrated circuits (ICs) and Time Slot Interchange ICs (TSIs). Working together, Infineon and Vitesse intend to provide system designers with a complete end-to-end solution of critical silicon content for SONET/SDH systems. Interoperability between the Infineon framers and the Vitesse TSIs includes products from each company's SONET/SDH roadmap for 160 Gbits/sec, 320 Gbits/sec and 640 Gbits/sec SONET/SDH systems, as well as system-level reference designs that are useful for rapid development and deployment of next-generation systems. The first result of this collaboration is the proven interoperability between the Infineon Tethys SONET/SDH Multi-Rate Framing IC and the Vitesse VSC9185 TSI. Achieving interoperability with the VSC9185 is important from an industrial perspective because it is part of the Vitesse TSI product family that, according to industry analysts, has captured 30% of its market, making it one of the most widely used TSI product lines in the industry.

<http://www.infineon.com>

<http://www.vitesse.com>

France Telecom R&D evaluates Riverstone's Ethernet VPN

Riverstone Networks today announced that France Telecom R&D is starting a lab trial of its carrier-class Multiprotocol Label Switching technology at the France Telecom R&D research centre in Paris. The trial involves extensive testing of Riverstone's Layer 2 MPLS technology, which is used to create transparent Virtual Private Network (VPN) services. France Telecom R&D will test Martini draft point-to-point tunnels and Lasserre-vkompella draft multipoint-to-multipoint tunnels, which will enable them to deliver advanced voice, video and data services to their customers. France Telecom R&D will investigate Layer 2 VPN services over Ethernet, first within the Metropolitan Area Network (MAN), and then extending across disparate regional and national networks over time.

<http://www.rd.francetelecom.fr/>

<http://www.riverstonenet.com/>

Business News

Transmode Systems AB completes \$10 million financing round

Transmode Systems AB, a supplier of transmission equipment, announced that it had closed an additional \$10 million (USD) round of funding, led by Pod Holding. Existing investors, Amadeus Capital Partners and European Equity Partners (EEP), also participated in the round. "This additional capital injection will be used to further strengthen our product portfolio, develop new markets and reinforce Transmode's overall organization," says Isaac Olasoko, chief executive officer. "We now want to focus on augmenting our customer value proposition, and subsequently create enhanced value for our existing and new shareholders." The financing round was completed on October 8, 2003 with a major share carried by Pod Holding, bringing the

total funds collected to \$28 million (USD) since 2000. Pod Holding was attracted to Transmode based on the company's strong business concept, its management, and its track record. Transmode has grown over the past two years despite turbulent and tight market conditions, adding 25 new customers since Q1 2003. These developments further establish Transmode as a supplier of cost-effective, pay-as-you-grow optical access solutions. Additionally, the company recently strengthened its product portfolio releasing a family of aggregators and a next-generation transmission system based on managed pluggable transponders. Existing investors Amadeus and EEP have again demonstrated their confidence in Transmode's business plan and the company's ability to execute its strategies by participating in this supplemental round.

<http://www.transmode.se>



Intense Photonics becomes 'Intense', CFO leaves due to lack of M&A projects

The Scotsman newspaper in the UK reported some changes at Intense Photonics of High Blantyre, Scotland. According to the report, the company has changed its name to Intense, having dropped the 'Photonics' part of the name, which it felt was typically associated with telecommunications, to reflect the fact that its activities have broadened significantly, and that, according to CEO David Lockwood, the printing and defence sectors are now providing as many customers as telecom.

The company's CFO Gillian Hastings, a former Ernst & Young corporate finance partner, left the firm because the deals on which she was expected to work did not materialise - notably related to M&A projects. A company announcement said that her work on funding had been very successful but market conditions are "preventing M&A activity across the sector".

Hibernian Football Club chairman Ken Lewandowski and Intense founder Craig Hamilton have also left the company's board, "as part of a streamlining effort".

<http://www.intensephotonics.com>

Techno News

Ex-Ericsson Northlight Optronics' PGE60850 intelligent amplifier offers excellent transient control

Northlight Optronics of Kista, Sweden, a former Ericsson company, announced the introduction of the company's PGE60850 intelligent optical amplifier offering "leading edge" transient control and variable gain performance. The device is designed for use in long-haul and metro DWDM optical networking systems, typically deploying OADMs and varying link budgets, where the ability to respond to changing conditions with no impact on system performance is a key requirement.

<http://www.northlightoptronics.com>



Figure: Amplifier from Northlight Optronics

Albis Optoelectronics re-launches the photodiode product line of former Opto Speed

Following the acquisition of the photodiode business line of former Opto Speed, Albis has re-launched a product portfolio of photodiode chips and receiver subassemblies. Swiss optical component manufacturer Albis Optoelectronics AG was founded in August 2003 by Dr. Markus Blaser (former product line manager, photodiodes, of Opto Speed) and Dr. Joerg Wieland (president and CEO of Helix AG). The company took over all assets associated with the photodiode business line of former Opto Speed, including intellectual property, key employees, equipment and clean room facilities located in Rüschnikon near Zurich, Switzerland. In this way, the supply of high quality photodiode chips is secured, say company representatives. The chips will be available for former Opto Speed customers as well as for newly interested parties.

<http://www.albisopto.com>

New telecom products from Pirelli

Italian manufacturing giant Pirelli launched a range of next-generation telecom products based on the research of Pirelli Labs in Milan, Italy. Pirelli Labs was set up to provide a focal point for the firm's worldwide research activities in optics, fibres and innovative materials. "We are very proud to introduce our new solutions just 18 months after Pirelli Labs was established," said Giorgio Grasso, Pirelli Labs' chief executive officer. Pirelli unveiled its Dynamically Tuneable Laser (DTL), a continuous-wave external cavity laser for advanced optical network systems. The DTL provides high optical output power and wavelength tunability over a wide frequency range, with high spectral purity and frequency stability. This makes the laser ideal for applications ranging from metro to ultralong-haul transmission systems at 2.5 and 10 Gbit/s. The DTL is designed to provide fast switching on the ITU-T 50 GHz channel grid. No wavelength locker is needed to achieve frequency stability compatible with 25 GHz dense wavelength-division multiplexing channel spacing. Among its new modules, Pirelli presented radio-over-fibre modules that enable the transmission of radio signals directly over optical fibre. The firm also introduced its new P-MAS metro access system, designed to cope with the issues of metropolitan scenarios, where synchronous traffic and asynchronous (or packet) traffic are mixed.

<http://www.pirelli.com>



ST moves towards all-silicon optocouplers

ST Microelectronics has made further progress with its light-emitting silicon devices, and expects to have a commercial, all-silicon optocoupler product within six months. At a recent technical seminar, European silicon IC manufacturer ST Microelectronics disclosed further significant advances in its work towards commercially viable silicon light-emitters. Last October, the company announced silicon emitters with an efficiency some two orders of magnitude better than the best previously achieved results with silicon. Now, the team has increased the external quantum efficiency of its light-emitting devices by a factor of 1.5, as well as increasing the maximum emitted power by a factor of 50. As a result, ST is now able to produce more than 1 mW of emitted light power for each square millimetre of silicon. ST's trick is to use a structure in which ions of rare-earth metals such as erbium or cerium are implanted in a layer of silicon-rich oxide (SRO) -

silicon dioxide enriched with silicon nanocrystals measuring 1-2 nm in diameter. The nanocrystals are coupled with the rare-earth ions in the silicon dioxide matrix. Recombination of electron-hole pairs in the nanocrystals causes excitation of the rare-earth ions, which then emit light at a frequency which depends on the choice of rare-earth dopant. Already, ST has produced fully working prototypes of a completely silicon-based optocoupler that demonstrate that all-silicon devices can deliver similar performance to that of traditional devices while offering the cost benefits of silicon manufacturing. Traditional optocouplers use compound semiconductor emitters and silicon detectors, while ST eventually aims to produce the whole circuit on a single silicon chip. The company also expects to develop entirely new types of products that exploit the ability to integrate all three functions - light emission, waveguiding and detection - on a single silicon chip that can be manufactured at low cost on high-volume production lines.

<http://www.st.com>

Alcatel core DWDM offers 1 92-channel X 10 Gbit/s, 4,500 km, tuneable transponders, reconfigurable OADM/DXC

October 2nd global communications equipment supplier and DSL and optical specialist Alcatel of Paris announced that it had reinforced its family of DWDM products with the introduction of Alcatel's 1626 Light Manager, a new core DWDM platform. Alcatel said the 1626 Light Manager was designed to address LH to ULH terrestrial network applications as well as unrepeated submarine applications in the core network, provide a migration path to network operators who want to improve their core networks while optimizing cost savings and offer an efficient solution to operators who want to extend and modernize their national or pan-continental optical networks, while lowering the overall transmission cost-per-bit, by deploying new links or upgrading current DWDM systems.

<http://www.alcatel.com>

BlazePhotonics cuts price of 12 high nonlinearity PCFs and 3 hollow core PCFs by 40%

BlazePhotonics at the Department of Physics, University of Bath, UK, stated that the price of fifteen of its most sought-after photonic crystal fibres had been reduced by up to 40%.

<http://www.blazephotonics.com>

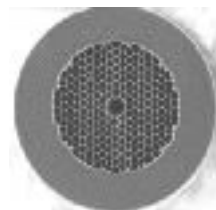


Figure: Hollow core PCF from Blaze

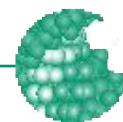
New transceiver from Infineon

Infineon, Germany, announced a new 4 Gigabit Fibre Channel (FC) transceiver in a small-form-factor pluggable (SFP) module with digital diagnostics. The modules, which exploit Infineon's 850 nm and 1310 nm vertical-cavity surface-emitting laser (VCSEL) diodes, provide a multirate capability to allow for use in both Gigabit Ethernet and Fibre Channel applications. The rate-select autonegotiation feature (from 1x to 2x and 4x Fibre Channel) also ensures backwards compatibility with existing Fibre-Channel-based equipment, facilitating the migration to next-generation standards for storage-area networking.

<http://www.infineon.com>



Figure: 4 Gigabit Fibre Channel (4GFC) transceiver from Infineon



Intel is working on cancer-detection technology

In collaboration with a US cancer research center, Intel has tried to adapt its technology focused on detecting microscopic imperfections on silicon chips to identify the earliest signs of disease. Intel is building a Raman analyzer at the Fred Hutchinson Cancer Research Center in Seattle. This system will beam lasers onto samples such as blood serum to create images that determine the chemical structures of molecules. This project is described as "discovery-based research" by Intel officials.

<http://www.intel.com>

Collaboration between Fluidigm and GlaxoSmithKline (GSK)

The two companies announced that they would co-develop a high-throughput protein crystallization platform. GSK purchased the prototype Topaz AutoInspeX™ workstation used to optimize crystallization operations in a prototype environment. The company also signed an agreement to supply Fluidigm's disposable Topaz microprocessors. This partnership gives Fluidigm the opportunity to finalize its definitive high-throughput system for protein crystallization.

<http://www.fluidigm.com>

Business News

BioDiscovery relocates its corporate headquarters

The provider of software solutions for microarray research announces plans to move its corporate headquarters to a new office space in El Segundo, California, USA. Approximately 6,000 square feet will be occupied by BioDiscovery.

<http://www.biodiscovery.com>

€ 2 Million for Issys

Integrated Sensing Systems (ISSYS) received a € 2 Million federal grant from the National Institute of Standards and Technology's Advanced Technology Program for developing MEMS based multi-drug infusion systems. These systems should be able to deliver 12 drugs in units of nanoliters and microliters.

<http://www.mems-issys.com>

Zeptosens raises capital in series C financing round

Zeptosens is a Swiss bioanalytics company that develops high sensitivity DNA and protein microarray platforms.

Investments will help the company to extend the application scope of its DNA and protein platforms and thus provide efficient and high performance tools that investigate and monitor cellular processes in life sciences.

<http://www.zeptosens.com>

New spin-off company for Debiotech

The Swiss medical device company Debiotech, announced that it would spin-off one of its leading products into a novel company. Located in Switzerland, the spin-off will be in charge of the commercial development of CT Express™ Contrast Media Injector for CT Scan. This injector presents multiple advantages for hospital technical staff (time-savings, cost-savings) and an increase in safety for the patients.

The list of investors has not yet been finalized, but the company will be self financed. Round tables are expected to be closed in November 2003.

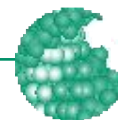
<http://www.debiotech.com>

Techno News

Microfluidic patent for Eastman Kodak

The company has received US patent No. 6,622,746 regarding "Microfluidic systems for controlled fluid mixing and delivery". Eastman Kodak has developed a microfluidic system providing controlled delivery and mixing of thermally responsive fluids. This system uses valves associated with each of the inlet channels to control the flow of fluids through them.

<http://www.kodak.com>



eTag™ assay for microfluidic platforms (Aclara's web site)

Aclara expands eTag™ assays

Aclara BioSciences announces the availability of an expanded set of eTag™ gene expression assays which include eleven different preformatted and validated panels of genes that range from 6 to 24 genes monitored. The company has also assembled a substantial collection of assays for other individual genes involved in drug toxicity. "This is a significant expansion of Aclara's library of genes for ADME/Tox testing ..." says Sharat Singh, Senior VP for eTag™ Technology. This innovation will allow Aclara BioSciences to expand on its current offer of eTag™ assay for drug metabolism and toxicity studies. A few days ago, the company also announced the issuance of a US patent covering the use of Aclara's eTag™ technology for the measurement of populations of proteins such as receptors on cell surfaces (No. 6,627,400).

<http://www.aclara.com>

Four additional patents on acoustic droplet ejection for Picoliter

The company Picoliter, Inc. announced that it had been awarded four US patents. It will extend its intellectual property to use focused acoustic ultra sounds to create miniaturized assay arrays. Ultra sound allows particles to be generated for pharmaceutical and other applications, and samples to be prepared for mass spectrometers. The reduction of costs in industrialized biology is linked to the development of reliable systems for small volume transfers: Picoliter is working on the transfer of 0.1 picoliter droplets with no contact between the device and the solution being transferred.

<http://www.picoliterinc.com>

Key patent for Aspira Biosystems

The company has presented its US patent No. 6,458,599 entitled "Compositions and methods for capturing, isolating, detecting, analyzing and quantifying macromolecules". This patent strengthens Aspira's proprietary position in capture agents for proteins and other macromolecules. This technology applies to drug discovery and life science research.

<http://www.aspirabio.com>

Strategic R&D partnership between Micralyne and MicroCHIPS

The agreement for the development of MicroCHIPS' innovative drug delivery and biosensing devices has been expanded between the two companies. MicroCHIPS' technology is based on microfabricated devices containing hundreds of micro-reservoirs for combining drugs, reagents or other chemicals.

Mr. Chris Lumb, President and CEO of Micralyne, explained that, since the beginning of their collaboration, Micralyne had been able to deliver the first stages of MicroCHIPS' development program on time and within the budget. Micralyne plans to continue meeting MicroCHIPS' manufacturing requirements.

<http://www.micralyne.com>

<http://www.mchips.com>

Commercial launch of single arrays for Human Genome Expression Analysis

Affymetrix is taking orders for its new GeneChip® brand Human Genome U133 Plus 2.0 Array.

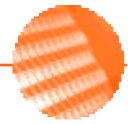
This new biochip offers researchers the protein-coding content of the human genome on a single commercially available catalog microarray. It analyzes the expression level of nearly 50,000 RNA transcripts and variants with 22 different probes per transcript providing superior data quality unmatched by technologies using a single probe per transcript.

<http://www.affymetrix.com>

Clinical evaluation for SpectRx' glucose sensor

The company has started a new clinical study of its interstitial fluid (ISF) continuous glucose monitoring technology. This study is the latest step in the integration of commercially available sensors with SpectRx' interstitial fluid (ISF) collection technology. Organized in two phases, SpectRx has to evaluate sensor technology and to discuss potential strategic partnerships with several qualified companies. ISF is the clear, fluid under the skin through which glucose and other nutrients travel from the blood stream to the cells.

<http://www.spectrx.com>



Motorola to separate its semiconductor business

Motorola, Inc. Chairman and Chief Executive Officer Christopher Galvin announced at the beginning of October that the company intended to separate its semiconductor operations into a publicly traded company. This action reflects Motorola's intention to increase its focus on communications and integrated electronic systems, as well as create an exciting opportunity for the company's Semiconductor Products Sector (SPS) as an independent semiconductor company with its own focused strategy. Motorola has not finalized details of the transaction.

Motorola is considering an initial public offering (IPO) of a portion of SPS, followed by a distribution of remaining shares to shareholders in a tax-free manner, subject to Motorola board approval, favorable market conditions, regulatory approvals and other customary conditions. Motorola's worldwide semiconductor sales were \$4.8 billion in 2002.

<http://www.motorola.com>

Five world leading semiconductor manufacturers join IMEC's sub-45nm research platform

IMEC, one of Europe's largest independent micro- and nanoelectronics research centers, announced that five of the world's leading semiconductor manufacturers – Infineon, Intel, Philips, Samsung Electronics and STMicroelectronics – have boosted their collaboration with IMEC by joining IMEC's sub-45nm research platform. These core partnerships are a major step in the implementation of IMEC's 300mm center of excellence. IMEC's collaborative research program targets technology generations two to three nodes ahead of state-of-the-art IC production. The activities are organized as a coherent cluster of programs enabling very advanced research at reduced cost. Based on its long-standing track record and expertise, IMEC's central focus in these programs is on advanced process module and device research, with several programs being devoted to the exploration of new materials. This research platform allows companies to collaborate during the research phase of a project and reduce individual risk and costs, while deriving results more quickly by working together in a state-of-the-art facility.

<http://www.imec.be>

Alliances & Mergers

Carsem and ST agreed on packaging technology development

Carsem, provider of turnkey packaging and test services to the semiconductor industry announced they had recently signed a Memorandum of Understanding (MOU) with STMicroelectronics' Discretes and Standard ICs Group (DSG) related to the development and implementation of a "bond-less" interconnect packaging technology whereby a small metal slab attached to the die surface replaces bonding wires.

The process connects the active area of a die to the package lead-frame using a specially designed copper conductor rather than making the connection with multiple thermo-sonically bonded gold wires. The technology is typically used for MOSFET devices in various package types including System-in-

Package (SiP)

The advantage of the bond-less technology is that it provides a significantly improved electrical performance when compared to using multiple gold wires, according to both companies.

The MOU states that ST's Discretes and Standard ICs Group (DSG) will advise and provide technical support to Carsem in order to develop copper clip interconnect technology for the Micro Lead-frame Package (MLP) family.

<http://www.carsem.com>

<http://www.st.com>

Oxford Instruments acquired the assets of VG Semicon

Oxford Instruments plc., the UK's instrumentation company, announced that its wholly owned subsidiary, Oxford Instruments Plasma Technology, had acquired the assets of Thermo VG Semicon ("VG

Semicon"), a supplier of Molecular Beam Epitaxy (MBE) equipment. MBE technology is used in a variety of design and manufacturing processes including the mass production of electronic devices for the latest generation of mobile and cellular phones.

Oxford Instruments is paying a cash consideration of US\$0.3m upon completion plus a deferred consideration of US\$0.2m payable in two equal installments on the first and second anniversaries of completion. Further contingent payments may also be made in 2005 and 2006, if exceptional sales growth targets are met, taking the maximum consideration to US\$1.3m. In the six months to 28 June 2003, VG Semicon reported sales of US\$4.0m and a break even operating result before restructuring costs. The acquisition is expected to enhance earnings in the current financial year.

<http://www.oxinst.com>

<http://www.vgsemicon.com>

Preliminary injunction against commercial-register entry of ESEC's merger with Unaxis

The presiding judge of the Zug Cantonal Court has temporarily prolonged the ban secured by Classic Fund Management AG, Vaduz, against entry of the merger of ESEC Holding SA with Unaxis Holding SA into the commercial register. By means of a preliminary injunction, the commercial registrars of the cantons of Zug and Schwyz have been instructed not to record the merger until further notice. As already announced at the October 7, 2003, extraordinary general meeting of ESEC shareholders, completion of the merger will be delayed.

The Cantonal Court judge ordered that the status quo be maintained until both parties have been fully heard. Classic Fund Management AG was given a period of 20 days to state its position on ESEC's response to the petition. Furthermore, Classic Fund Management AG must furnish security to cover court costs and potential

damages.

A final ruling by the Cantonal Court of Zug with regard to the precautionary prohibition of entry of the merger into the commercial register is to be expected in approximately two months time.

<http://www.esec.com>

<http://www.unaxis.com>

STMicroelectronics and Dai Nippon Printing inaugurate joint photomask plant

Japan's Dai Nippon Printing Co. (DNP) and STMicroelectronics have opened a joint photomask plant in Agrate. This is a result of a collaboration announced in May 2003. The facility, 81% owned by Dai Nippon Printing, will produce photomasks for 0.13-micron process technologies, with future plans to adopt 90nm processes. The venture will initially provide photomasks to STMicro but eventually will also supply other firms in Europe. So far, the venture has installed one laser writer and one e-beam tool, with a capacity of 250 to 450 masks/month, and projected annual sales of \$30

million in 2004. By 2005 the companies plan to expand to three e-beams and four laser tools, with annual sales of \$60 million.

<http://www.st.com>

<http://www.dnp.co.jp>

Carl Zeiss SMS

Carl Zeiss Microelectronic Systems GmbH (MES), Jena, will trade under the new name Carl Zeiss SMS GmbH (Semiconductor Metrology Systems). The subsidiary of Carl Zeiss SMT AG will combine activities of former MES and LEO Electron Microscopy.

Jena, Oberkochen, October 1, 2003 saw the launch of Carl Zeiss SMS GmbH. With over 80 employees, the company, a subsidiary of Carl Zeiss SMT AG, will focus on inspection, defect analysis and defect repair systems for semiconductor manufacturers. These systems are based on light optics of the former MES and on electron and ion optics from LEO. They are used for wafer and mask inspection, defect analysis and photomask repair.

<http://www.zeiss.de>

Business News

Global Chip Sales Reach \$13.42 Billion in August 2003

The Semiconductor Industry Association (SIA) announced that worldwide sales of semiconductors increased 4.0 percent to \$13.42 billion in August 2003, up from the \$12.90 billion in revenue reported in July 2003 - the sixth consecutive monthly increase.

"August sales confirm the broad-based strength of the semiconductor market, lead by demand in the consumer, computer and wireless sectors," stated SIA President George Scalise. "This rise in end-market demand is generating stronger third quarter sales than normal seasonal patterns."

<http://www.sia-online.org>

August 2003 (Billions)

Month-to-Month Sales

Market	Last Month	Current Month	% Change
Americas	2.51	2.57	2.5%
Europe	2.47	2.56	3.8%
Japan	3.12	3.17	1.6%
Asia Pacific	4.81	5.12	6.4%
Total	12.90	13.42	4.0%

Year-to-Year Sales

Market	Last Year	Current Month	% Change
Americas	2.58	2.57	-0.5%
Europe	2.21	2.56	15.6%
Japan	2.75	3.17	15.0%
Asia Pacific	4.38	5.12	17.0%
Total	11.93	13.42	12.5%

Source : SIA, September 2003



Sigma-c receives \$2.87 Million in Funding from DVC

SIGMA-C, a leading provider of applied simulation software for the semiconductor industry, announced that it has raised \$2.87 million in a first round of financing from DVC Deutsche Venture Capital. In conjunction with the financing, Dr. Wolfgang Krause, partner at DVC, will join the board of directors of SIGMA-C.

This financing round will allow SIGMA-C to accelerate the launch of new design-to-manufacture software products for the semiconductor industry. Leveraging its in-depth technical and market expertise, SIGMA-C is developing a line of solutions that more closely link electronic design automation (EDA) software, photomask production and wafer fabrication.

<http://www.sigma-c.de>

Philips announced possible offer of TSMC shares

At a board meeting of Taiwan Semiconductor Manufacturing Company Ltd. (TSMC), the board of directors approved TSMC sponsoring the conversion of up to 500 million common shares to American depositary shares ('ADSs') on behalf of Royal Philips Electronics. Subject to all necessary regulatory approvals, Philips is considering offering up to 500 million common shares, which, when converted, equate to 100 million ADSs.

Philips plans to use the proceeds to reduce the level of net debt on the company's balance sheet and for general corporate purposes. Currently, Philips holds 21.5% of TSMC shares, which would decline to 19.1% if the full 500mn shares were to be placed. This consideration of an offering follows on a strategic review of Philips' holding in TSMC that Philips conducted in collaboration with TSMC.

<http://www.philips.com> <http://www.tsmc.com>

ST plans to invest in Rousset, France

According to the news from Les Echos, STMicroelectronics plans to invest 200 million euros in its 8-in. wafer plant in Rousset, France, to increase production by 25%. The funds will boost production at the site from 4000 to 5000 wafers/month.

Depending on demand, STMicro may also increase the investment to 400 million euros in order to double production to 10,000 wafers/month by the end of the year.

<http://www.st.com>

Third quarter results for semiconductor chip suppliers and semiconductor equipment suppliers

Semiconductor chip suppliers:

Company	Q3 Y2003		Q3 Y2002	
	Sales	%change Q-1	Sales	%change Y-1
Intel	\$7.8 b	14.7%	\$6.5 b	20%
Philips	1.29 b euros	12%	1.30 b euros	-
Infineon	1.47 b euros	-	1.32 b euros	11%

Source: Yole Développement, October 2003

Semiconductor equipment suppliers:

Company	Q3 Y2003		Q3 Y2002	
	Sales	%change Q-1	Sales	%change Y-1
ASM*	147,4 m euros	-3,7%	140 m euros	5,3%
SEZ	25,3 m euros	7,2%	34,9 m euros	-27,5%
ASML	370 m euros	12,4%	352 m euros	5,1%

*ASM also announced a \$4.5 million multi-project order for leading US semiconductor company's new China facility.

Source: Yole Développement, November 2002

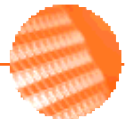
IQE announces placing and open offer

The Board of IQE announced proposals to raise £18.75 million (before expenses) by placing 125,000,000 new Ordinary Shares ("New Ordinary Shares") at a price of 15p per share.

99,804,848 of the New Ordinary Shares have been placed firm, primarily with institutional investors and the balance of 25,195,152 New Ordinary Shares has been placed subject to clawback under the Open Offer whereby Qualifying Shareholders are invited to apply for New Ordinary Shares on the basis of 2 New Ordinary Shares for every 15 Ordinary Shares held.

Of the 25,195,152 New Ordinary Shares which are subject to clawback under the Open Offer, 6,572,202 New Ordinary Shares, representing 86.1 per cent of the Directors' total aggregate entitlement under the Open Offer and which they have irrevocably undertaken not to take up, have been placed firm with institutions, making a total firm placing mainly with institutions of 106,377,050 New Ordinary Shares. The purpose of the Placing and Open Offer is to provide the Group with additional working capital resources to respond to the anticipated upturn in demand for its products.

<http://www.iqep.com>



iSuppli announced 2003 DRAM market up 8.3% from last year

The market research company iSuppli announced that worldwide DRAM revenue will rise by 8.3% to reach \$16.7bn in 2003. In 2004, an increase of nearly 27% is expected to reach \$21.2bn. Bit shipments will rise by 41% percent in 2003 and by 50% in 2004, iSuppli predicts.

iSuppli is maintaining a cautious stance regarding near-term DRAM market prospects since corporate PC purchasing is only slowly recovering. In 2004, supply will increase at a faster rate than in 2003, helping to keep prices down.

<http://www.isuppli.com>

Techno News

IBM announced SiGe bipolar on thin SOI

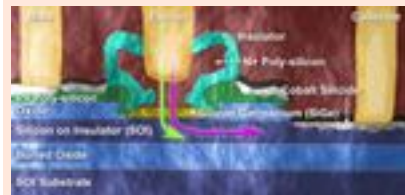
IBM claims to be the first to build SiGe bipolar devices using thin layer SOI wafers.

This innovative chip design is expected to improve performance fourfold or to reduce power consumption fivefold in wireless devices compared to the state-of-the-art thin-silicon bipolar technology, said research department.

CMOS computing chips show higher performance when built atop a thin silicon on insulator (SOI) wafer. But traditional SiGe bipolar transistors cannot be built on a thin SOI wafer. Until now, no one had been able to find a technique to combine CMOS and SiGe bipolar onto one wafer that would maximize the performance of both, announced IBM.

re, photomask production and wafer fabrication.

<http://www.research.ibm.com>



IBM's bipolar transistor with silicon-germanium base built on CMOS-compatible SOI wafer

ISMT and Schott Lithotec sign an agreement on EUV mask blanks

International SEMATECH (ISMT) and SCHOTT Lithotec AG announced the signing of an agreement in which Schott Lithotec will supply ISMT with advanced mask blanks for use in extreme ultraviolet (EUV) lithography. Under the one-

year agreement, Schott Lithotec will follow a defined roadmap for quality improvement of the blanks, which will also enable the company to improve its EUV activities and products in general. In EUV lithography, which some see as the next technology step after optical lithography, a shorter wavelength of 13.5 nm enables the production of advanced semiconductors with structures less than 45 nm wide.

<http://www.schott.com/lithotec>

<http://www.sematech.org>

Infineon and the Regensburg University of Applied Sciences Optimises Chip Production with Test Chip

Infineon Technologies has produced a new test chip that allows the production processes of complex semiconductors to be tested and improved. This new development is the outcome of a close cooperation spanning several years with the Regensburg University of Applied Sciences. Using this test chip, it is now possible to test process sequences with a previously unsurpassed degree of precision and to optimise the performance of the microchips by making measurements even during the manufacturing process, said the company. This allows faults to be detected more quickly, whilst boosting productivity and reducing production costs. What is more, the test chip offers the high statistical accuracy required in order to record even those production problems that seldom occur. The development, production and also the practical deployment of the test chip were performed at

Infineon's site in Regensburg. The test chip is based on an innovative circuit concept developed by the Regensburg University of Applied Sciences. It is now possible to demonstrate the full capabilities.

<http://www.infineon.com>

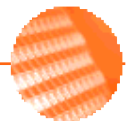


Integrated single-wafer vapor drying technology on the Applied ReflexionA® LK CMP system

Applied materials integrates single-wafer vapor drying technology

Applied Materials, Inc., the leading supplier of chemical mechanical polishing (CMP) systems to the semiconductor industry, announces that it has obtained an exclusive patent license from SCP Global Technologies to integrate single-wafer vapor drying technology on its Applied Reflexion(R) LK CMP system. Applied Materials claims that Reflexion LK is the world's first and only production CMP system to offer this advanced post-CMP cleaning technology, which eliminates watermark defects and enables an order of magnitude improvement in device reliability in leading-edge copper/low k chips. The system's full immersion rinse bath for vapor dry is critical in preventing watermarks, as it provides a stable interface between water and vapor on the wafer surface. The Reflexion LK system also provides low down-force polishing that reduces mechanical damage on low k films and eliminates copper pull-outs.

<http://www.appliedmaterials.com>



Zeiss delivered first AIMS™ fab 157 system to International Sematech

Carl Zeiss Microelectronic Systems, a Carl Zeiss SMT subsidiary, announced the delivery of the first Aerial Image Measurement System (AIMS™) for 157 nm optical lithography to International SEMATECH (ISMT), Austin (TX).

By introducing the AIMS™ fab 157, Carl Zeiss SMT has extended its line of AIMS™ systems with a new tool dedicated to developing and exploiting cutting-edge 157 nm photomask technology. As indispensable tools for the global semiconductor industry, Carl Zeiss SMT's AIMS™ systems emulate the wafer printing characteristics of photomasks during optical lithography and are broadly used for the development, quality control, repair verification and defect classification of photomasks. By featuring Carl Zeiss SMT's proprietary AIMS™ technology and using state-of-the-art Calcium Fluoride lens technology, the AIMS™ fab 157 targets photomask manufacturers and chip-makers to accelerate mask development and improve mask quality control for the 65-

nm node and beyond. Additional AIMS™ fab 157 systems are currently in final production and will be delivered to end customers within the next few months.

<http://www.zeiss.de>

Experts in Clean Room and Contamination Control, Surface and Thin Film Analysis

With over three decades of experience in the support of IBM's HDD component production as well as field support of finished magnetic storage products, the IBM Engineering & Technology Services (E&TS) Laboratory now offers its services to external customers. The portfolio of chemical and physical analysis methods is suited to answer almost any question in the fields of surface and thin film analysis and clean room and contamination control. In line with IBM's new 'business on demand' concept, short cycle times are guaranteed to help customers improve their technology processes in a timely and economic manner.

The IBM E&TS Laboratory in Mainz combines the skill / expertise of 25 employees – physicists, chemists, materials scien-

tists and electrical engineers – with a unique portfolio of analytical methods: microscopy, thermal analysis, organic and inorganic chemistry, surface and thin film analysis and environmental testing.

<http://www.ibm.com>

Austriamicrosystems offers SiGe performance for its SiGe-BiCMOS process family

Austriamicrosystems Business Unit Full Service Foundry announced the availability of its new SiGe HV-HBT transistor module for its SiGe-BiCMOS process family, which is based on the proven 0.35µm CMOS mixed signal base technology licensed from TSMC.

The company's advanced RF-process offers 5V (BVCEO) high-voltage npn-transistors with $f_{max} (> 35\text{GHz})$ and high-speed npn-transistors with $f_{max} (> 70\text{GHz})$ on the same chip. The modular integration of SiGe HBT, linear resistors, high quality varactors and thick Metal 4 spiral inductors makes this process ideally suitable for a wide range of high performance RF applications, according to austriamicrosystems.

<http://www.austriamicrosystems.com>

The new CD-Rom "World of Microsystems" is now available !

After the success of the first edition of the CD-ROM "introduction to the World of Microsystems", a second edition has been realized including:

- 230 illustrated description screens
- over 70 animations with spoken comments (total 2 hours)
- description of 10 industrial products
- presentation of 8 key markets
- description of 27 microfabrication processes
- glossary with over 150 entries
- edition of slideshow sequences for presentations
- all in English, French and German languages

For more information, please contact Sandrine Leroy at + 33 472 83 01 14 or Leroy@yole.fr or go to the following website <http://extranet.yole.fr/wmst>