



Half one thing and half another

Today, there is bad news and there is good news. The bad news is, of course, the telecom disaster which has led to 500,000 lay-offs in this sector. However, good news is coming back. Strangely enough, the fact that certain companies are disappearing makes up part of the good news. That's because it means that opportunities for new startups are currently opening up. Of course, times are tough and VCs are becoming more cautious, but they still have deep pockets. They now want projects with close-to-the-market products, good management teams, patents, etc.

Another opportunity is the transfer of competencies. In Canada, for example, events are organized in order to bring together people in optics and people in life science. This opens the way to biophotonics, as medical instrumentation uses optics in many ways.

Moreover, the latest figures released by the SIA show a promising increase in chip sales. It is not the PC market which drives this evolution, but rather the home appliance market (such as DVDs).

On the whole, when one market decreases, another one increases, and the overall IT market stays relatively stable. Maybe not in terms of stock prices, but in terms of end-users' needs.

Jean-Christophe ELOY

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List of companies cited in "Micronews"

SEMICONDUCTORS ABB Actel Aixtron AMD ASML Asyntis Communicant Semiconductor Cypress Semiconductor Debeers Earlybird Epigress IHP Infineon Technologies Intel Mosel Vitelic Nikon Okmetic Oxford University PVA Vakuum-Anlagenbau SEMI SIA Soitec STMicroelectronics Tepla Texas Instruments TSMC University of Magdeburg Virage Logic VLSI Research X-Fab **MEMS** Carlyle Group Colibrys Innovative Micro Technology Instat/MDR Intel JDS Uniphase L3-Communications Memscap Memsic Okmetic QinetiQ **BIO** Applied Biosystems Axiom Technologies Carsen Group Celera Diagnostics Cellomics Food and Drug Administration (FDA) GeneMachines Genescan Europe Greiner Labortechnik Hyseq Pharmaceuticals Illumina Ipsogen Luminex MetriGenix Micralyne MicroCHIPS Mirus Neuralstem Oxford GlycoSciences (OGS) RBM Sequenom Takara Bio **OPTICS** Agilent Technologies Alcatel Optronics BeamExpress Bookham Technology plc Cierra Photonics Colibrys Fibercore GalayOr Networks Ltd Intune Technologies Kamelian Memscap Modulight Inc NKT Integration OpsiTech SA Teem Photonics U2t Photonics

North American Semiconductor Equipment Industry Posts August 2002 Book-to-Bill Ratio of 1.14

The North American-based manufacturers of semiconductor equipment posted a book-to-bill ratio of 1.14, according to SEMI. "The decline in orders was anticipated considering recent announcements from chip and capital equipment manufacturers about the poor visibility for the semiconductor industry in the second half of this year," said Dan Tracy, Ph.D., director of Industry Research and Statistics for SEMI. "While bookings are considerably higher than one year ago, the overall order trend is not providing any signal of substantial further improvement this year."

	Billings (Three-month avg.)	Bookings (Three-month avg.)	Book-to-Bill
July 2002 (final)	969.1	1181.9	1.22
August 2002 (prelim.)	981.2	1121.7	1.14

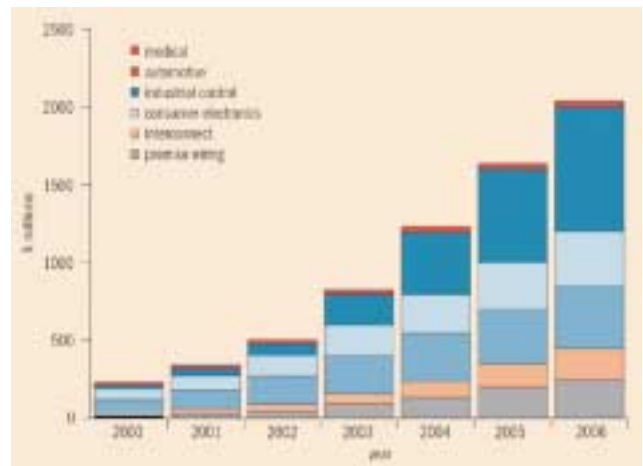
Source: SEMI

<http://www.semi.org>

POF Market

Based on trends in four major market sectors - automotive, consumer electronics, industrial controls and interconnection - the IGI Group, a US industry analyst, expects the POF market to grow from \$502 m (EUR 532 m) in 2002 to more than \$2 bn in 2006.

IGI says that a host of low-speed applications are missing out on the benefits of POE, including medical and consumer electronics, home wiring, security systems and industrial controls. What's more, IGI places the blame on POF suppliers, suggesting they are being seduced by the more glamorous high-speed applications such as local-area networks and fiber-to-the-home.



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

Wireless MEMS sector

The wireless MEMS sector is highly influenced by innovation, legislation and market needs.

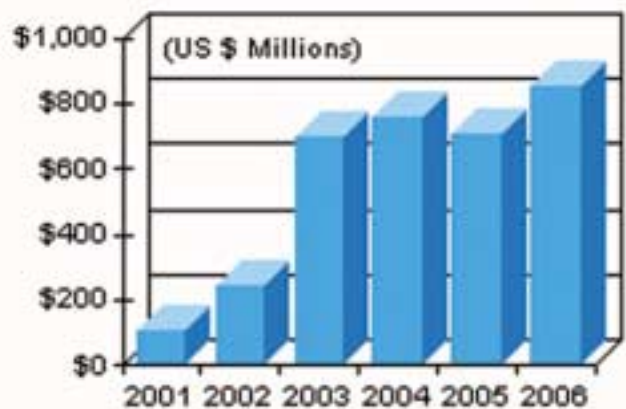
According to an In-Stat/MDR report, the RF MEMS sector is expected to grow from \$2.5 million in 2001 to \$200 million by 2006. The market research firm reports that worldwide revenues for wireless MEMS (in the form of RF MEMS components and wireless MEMS sensors) will experience a 37.2% CAGR between 2001 and 2006, with the cell phone, automobile, and industrial processing/condition monitoring markets benefiting most from what technology has to offer.

According to the market research firm, RF MEMS (switches/relays, filters, inductors, etc.) are expected to reach \$200 million by 2006, down from other previous forecasts.

Sales of wireless MEMS sensors are forecast to reach about \$700 million in 2006. But this segment is driven by government decisions and could be eliminated beyond 2006 or could provide for exceptional revenues.

<http://www.instat.com>

Worldwide Wireless MEMS Revenue Forecast



Source: In-Stat/MDR 8/02

EVGroup, a major company in the MEMS equipment field



EV Group (EVG) has been producing precision wafer processing equipment for more than 20 years. New emerging applications in MEMS, microfluidics, advanced packaging, SOI (Silicon-on-Insulator), compound semiconductor/MOEMS and power devices are the target markets of EVG.

Current and future miniaturized and multifunctional electronic devices for consumer and industrial applications require precision equipment to handle the manufacturing challenges in such small dimensions. For these applications, EVG supplies complete process solutions for the most critical steps of microfabrication. EVG's key competencies include wafer bonders, mask and bond aligners, photoresist coating systems and cleaners. These field-proven systems are utilized at prestigious universities, laboratories and high-volume production facilities around the globe. These systems work in high volume production as well as research and development environments.

A continued growth since 1980

Founded in 1980 as an engineering partner for the semiconductor industry, EVG has grown into an international manufacturer of innovative precision systems. Among the innovations and industrial milestones pioneered by EVG are bottom-side alignment and wafer-level aligned bonding. These technical improvements have greatly advanced volume manufacturing of advanced MEMS devices.

EVG is an organization committed to global support with subsidiary companies in Europe, America and Japan, as well as selected representatives in Europe and Asia. The company headquarters currently employs 250 people and over 300 more worldwide. Close proximity to the customer and on-site service is assured by a strong field service organization. Process qualification and application labs supported by technology teams have been established in all subsidiary locations. Highly innovative and experienced engineers are involved in production and contribute to EVG's leading position as a precision wafer processing equipment supplier. The continued growth of the company is featured by two recent headquarter plant extensions finished within one year in early 2002. This has led to more than 100 new jobs in R&D, manufacturing, and customer support at this location. The new building includes a world-class production floor, additional clean room facilities, application and process qualification labs and an expanded warehouse. The company also maintains a second production plant near the headquarters containing a high-tech CNC mill center. Moreover, EVG has expanded its worldwide customer support network by hiring and training a significant number of new field engineers worldwide.

A tradition of innovation

In 1985, EVG created the world's first double side mask aligner with a bottom-side microscope, a decisive milestone for the marketing of MEMS products. Their design provided the advanced method required to successfully manufacture new products such as airbag sensors and electronic vehicle stabilizing systems, thus allowing the automotive industry to make major advances in driving safety, improved motor management and fuel reduction.

The process separation between wafer alignment and wafer bonding which was developed by EVG revolutionized wafer bonding technology and has since become a worldwide industry standard. Delivery of the first high performance production wafer bonding systems for automated volume production of micromachined products took place in 1992 providing economical, automated production of micromachined components.

The double side aligner and process separation are only two of the innovations that contributed to establishing EVG as a technology leader.

When the first SOI wafer bonder was installed in 1994, a fully automated production process for high-quality, low-cost SOI wafers was implemented. This technology has proven to be critical in producing the components required for the latest generation of fast computers and state-of-the-art products for telecommunications. Further innovation highlights emphasize EVG's strong position and technology leadership:

- Revolutionary OmniSpray® cavity coating technology for uniform photoresist layers on highly contoured surfaces in 1998
- New applications in the area of hot embossing: EVG manufactures systems for structuring polymers for medical applications as well as systems for nano-imprinting
- New precise alignment systems with SmartView® face-to-face alignment technology for wafer-level packaging and 3D interconnects in 1999
- First integrated lithography track system (coat-bake-align-develop) in 1999
- First integrated production wafer bonding system (4" to 8", align-bond) in 2001
- First automated temporary bonding/debonding system for compound semiconductors in 2001
- First 12" automated SOI production wafer bonder in 2001

EVG's technological expertise enables customers to develop and successfully market their innovations by providing advanced and proven production solutions. EVG's precision wafer processing systems meet the demands of a broad base of users ranging from research institutions to large scale manufacturing facilities.

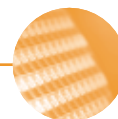
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Are you interested to have an article on your company in Micronews ?

Precision wafer processing equipment for emerging applications in MEMS, microfluidics, packaging, SOI (Silicon-on-Insulator), compound semiconductor/MOEMS and power devices are important markets in the component industry. Aside from EVG, other players are Süss Microtec, Qunitel, Ultratech Stepper ...

In its future issues, Micronews will provide its readers more company profiles. If you are interested in obtaining an article, please contact: edet@yole.fr





Bernin II, a new SOI wafer fab for Soitec

In order to meet its customer demand, Soitec has revealed its 300mm SOI plant located in Bernin, France.

The dedicated 300mm fab contains 12 production lines and has a total production capacity of 1.2 million wafers per year. The plant is also set up to manufacture 200mm wafers with a production capacity of 2 million wafers per year.

Soitec will start production before the end of this year.

Concerning the patents battle between Soitec and American Silicon Genesis (SiGen), the French company announced that Silicon Genesis has failed in an attempt to have Soitec's Smart Cut® patent invalidated by the US Federal Court in Massachusetts.

The Court also rejected Silicon Genesis' motion for a reduction in the USD 3 million damages payable to Soitec.

Soitec will appeal to have all the patent's claims validated.

<http://www.soitec.com>

TI unveils SiGe manufacturing process

Texas Instruments has developed a new process called "BioCom-III". This process is a SiGe complementary bipolar CMOS manufacturing process 3 times faster than other complementary bipolar processes, according to TI. Advantages of this process is a 50% noise reduction for operational amplifiers and other high-performance mixed-signal products.

The qualification of the process was scheduled for the third quarter of 2002. TI plans to develop analog components that operate at 100MHz, with a distortion level of -100 dB, and will first make voltage feedback and variable-gain operational amplifiers that outstrip the performance two-fold compared with today's amplifiers.

<http://www.ti.com>

ASML seeks an injunction against Nikon

ASML has filed a patent infringement complaint against Nikon Corporation in Japan. ASML seeks an injunction against Nikon to cease the manufacture and sales of lithography systems that infringe on an ASML patent, a technical device known as the wafer handler that moves silicon

wafers through the lithography system. ASML seeks damages from Nikon totaling more than YEN 11 billion (approximately EUR 97 million).

The current patent infringement claim in Japan represents the third complaint ASML has filed against Nikon over the past five months.

<http://www.asml.com> - <http://www.nikon.com>

X-Fab introduced new 0.35- μ m mixed-signal CMOS processes

The German foundry X-Fab Semiconductor Foundries has expanded its technology offer to include a new 0.35 μ m mixed-signal CMOS process with low-voltage and non-volatile memory capability. In addition, the process for highly integrated SoC (system-on-chip) solutions includes a series of optional features such as the use of a fourth metal layer, highly resistive polysilicon resistors, Schottky diodes, and embedded EEPROM blocks.

With this new offer, X-Fab expects that its customers will expand design possibilities and improve analog behavior for a wider spectrum of application areas.

<http://www.xfab.com>

Techno News

ST, Philips, Motorola introduced First 90-nm CMOS design platform

Since April 2002, Motorola, Philips and STMicroelectronics have jointly been developing future generations of CMOS technology from the 90nm node at their new R&D center in Crolles, France. At the end of August, they announced that the first 90-nm CMOS design platform was available. These cell libraries and design platforms for system-on-chip (SOC) solutions allow designers to start next generation SoC product development for low-power, high-speed, wireless, networking, and consumer applications. The advantages are multiple features and modularity (multiple threshold-based library elements can be selected at the design level and used in the same design block). According to all three companies, this capability enables faster development of chips for use in high-performance and power-sensitive products.

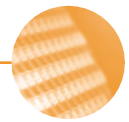
<http://www.st.com> - <http://www.philips.com>

<http://www.motorola.com>

ABB and Debeers have grown high purity diamond using CVD

Sweden's ABB group and Debeers Industrial Diamonds business based in the UK announced that scientists have jointly grown high purity diamond layers on industrial synthetic diamond substrates using a chemical vapor deposition (CVD) process. Electron and drift mobilities were measured at 4500cm²/Vsec (1400cm²/Vsec for Si) and 3800cm²/Vsec (450cm²/Vsec for Si) respectively.

<http://abb.com> - <http://debeersgroup.com>



AMD and TSMC reported tiny FinFETs

AMD has manufactured the smallest double-gate transistors using standard CMOS technology. The transistors measure 10nm - six times smaller than the smallest transistors currently in production.

In comparison, 1 billion transistors could be placed on the same size chip that currently holds 100 million transistors.

Double-gate transistors double the electrical current that can be sent through a given transistor. The fin field effect transistor (FinFET) design relies on a thin vertical silicon "fin" to help control leakage of current through the transistor when it is in "off" mode. The 10nm transistor is the result of joint research between AMD's laboratory demonstration, the University of California Berkeley, and support from the Semiconductor Research Corporation (SRC).

TSMC also reported its own FinFET research at the Symposium on VLSI Technology in Honolulu, Hawaii, in June. The company demonstrated devices with 35nm gate lengths and was moving beyond 25nm in its research.

TSMC researchers simulated a 9nm gate length structure showing it could operate within generally acceptable parameters.

<http://www.amd.com> - <http://www.tsmc.com>

Communicant Semiconductor and IHP announced the fastest SiGe:C BiCMOS

Communicant Semiconductor Technologies, a German high performance BiCMOS foundry start-up, and its technology partner Innovations for High Performance Microelectronics (IHP) announced best-in-class SiGe:C BiCMOS. A ring oscillator constructed in the technology has achieved a 4.2ps gate delay, better than IBM which reported SiGe ring oscillators with measured time delays of 4.3ps in February. The heterojunction bipolar transistor (HBT) module offers an f_T of 200GHz and an f_{max} of 170GHz at a breakdown voltage (BV_{ceo}) of 2.0V. IHP's modular BiCMOS technology eliminates complex

processes such as subcollector epi and deep trenches, giving what Communicant/IHP believe to be the lowest number of additional lithography levels. The benchmark circuits manufactured include 53-stage CML ring oscillators, static and dynamic dividers, and LC oscillators.

<http://www.communicant.de> - <http://www.ihp-ffo.de/>

Infineon developed SOLID package

Scientists at Infineon Technologies have developed "SOLID" packages, a technique to solder different types of chips together to form a "sandwich" chip system.

The technique uses standard chip-making and packaging machinery.

For its first sample, Infineon produced the upper and lower modules of the sandwich chips. Upper and lower sides were coated with a very thin layer of copper to which a 3- μ m thick solder was applied. Both chips were soldered together at a temperature of 270°C and 3-bar pressure to create a permanent bond. To produce a chip no higher than usual, Infineon used thinned silicon wafers. A compound plastic material was used for the outer layer of the packages. A SOLID product can achieve clock rates of up to 200 GHz (100 times faster than today's fastest desktop PC processors) and support more communication lines between the chips in the package.

In comparison, a smartcard controller - the current controller - has only a limited memory capacity of 32-Kbytes while Infineon's prototype has 160-Kbytes of non-volatile memory. The technology promises both to speed up chip performance, and to help reduce the price of current chip solutions by up to 30 percent.

<http://www.infineon.com>

Benefits of spin transistors

Scientists in Oxford University's Physics Department have developed a version of "spin transistors" that significantly reduces spin depolarization, and increases device consistency and sensitivity. The spin transistor was first described in 1993 as a device that distinguished two populations of charge carriers thanks to the orientation of their spin. The spin ratio can be modified by introducing a

ferromagnetic material as a carrier source. The advantage of this new transistor compared to a traditional transistor is that the current gain is dependent on the local magnetic field.

The improved version of the spin transistor is the subject of a patent application from Isis Innovation, Oxford University's technology transfer company. This device has potential applications in magnetic fields or position sensors and non-volatile memory chips.

<http://www.ox.ac.uk>

Intel gives more details about its most advanced chip making process

Last August, Intel unveiled more details about its 90-nm process used to build record-breaking silicon structures and memory chips.

Volume manufacturing with a 90-nm process using 300-mm wafers is expected to start in 2003.

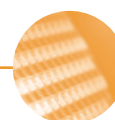
This new advanced process combines higher-performance, lower-power transistors (transistors measuring only 50 nm in length), strained silicon, high-speed copper interconnects (The process also integrates a new carbon-doped oxide (CDO) dielectric material) and a new low-k dielectric material.

According to Intel's senior vice president and general manager, Dr Sunlin Chou, this process allows Intel to make advanced products and reduce manufacturing costs.

In February, Intel unveiled 52-Mbit SRAM chips manufactured using the 90-nm process. In a chip pack, 330 million transistors are included and the area measures only 109-mm².

The process integrates seven layers of high-speed copper interconnects, which increase processor performance. A combination of 248 nm and 193 nm wavelength lithography equipment is used for this process. The giant company expects to reduce equipment costs reusing 75% of its 0.13- μ m tools on 300-mm wafers. Intel will transfer the 90-nm process to 300-mm manufacturing fabs starting next year.

<http://www.intel.com>



Second quarter results for semiconductor chip suppliers and semiconductor equipment suppliers

Semiconductor chip suppliers:

Company	Q2 Sales	Q2 %change Q-1	Q2 Y2001 Sales	Q2 Y2001 %change Y-1
STMicroelectronics	\$1.53 billion	13%	\$1.59 billion	- 3.77%
Infineon	\$1.29 billion	1%	\$1.17 billion	10%
Motorola	\$1.2 billion	9%	\$1.25 billion	-3%

Source: Yole Développement, September 2002

Semiconductor equipment suppliers:

Company	Q2 Sales	Q2 %change Q-1	Q2 Y2001 Sales	Q2 Y2001 %change Y-1
Okmetic	\$14.6 million	6,5%	\$14.71 million	- 0.6%
IQE	\$9.30 million	12%	\$19.24 million	- 52%
Suss Microtec	\$25.29 million	-5%	NA	NA

Source: Yole Développement, September 2002

In brief :

The positive development in the demand for silicon wafers continued and the Okmetic Group's order book is still filling up, though more slowly.

World IC and semiconductor equipment Book-to-Bill in July

Semiconductor Equipment:

	Billings (Three-month avg.)	Bookings (Three-month avg.)	Book-to-Bill
July 2002 (prelim.)	\$ 2.39 billion	\$ 1.85 billion	0.77

Source: VLSI

IC Manufacturing:

	Billings (Three-month avg.)	Bookings (Three-month avg.)	Book-to-Bill
July 2002 (prelim.)	\$ 9.82 billion	\$ 9.29 billion	0.95

Source: VLSI

VLSI reported that a soft end demand for electronics, sluggish chip prices, a weakening US economy and a stock market crash had frozen orders in July .

<http://www.vlswiresearch.com>

Worldwide July Chip Sales up 2.9% from June

"The July data, and the year-on-year increase, confirm that a moderate but sustainable recovery continues, putting us on track for 7-9% sequential growth in the third quarter," said SIA President George Scalise.

According to SIA, the digital consumer market, including DVDs, video games and digital cameras, continued to grow in September as reflected in the increased demand for standard cells, consumer ASPs, optoelectronics and flash memory chips. Wireless communications also recorded an increase, while the PC sector grew modestly this month.

Regionally, Japan is once again the fastest growing market due to higher demand for digital consumer products, recording an 8.5% increase in chip sales in July. The Asia Pacific market registered 2.3% growth, as the strength of consumer electronics and demand for wireless handsets outweighed continuing weakness in the PC sector. Chip sales in the Americas and Europe were essentially flat, reflecting weak PC demand in both markets, and continued outsourcing to the Asia Pacific region.

Worldwide chip sales are expected to exceed 2001 levels by 3%, said SIA.

July 2002

Billions

Month-to-Month Sales			
Market	Last Month	Current Month	% Change
Americas	2.58	2.60	0.5%
Europe	2.15	2.16	0.5%
Japan	2.45	2.66	8.5%
Asia Pacific	4.17	4.26	2.3%
Total	11.35	11.68	2.9%

Year-to-Year Sales

Market	Last Year	Current Month	% Change
Americas	2.69	2.60	-3.4%
Europe	2.25	2.16	-4.3%
Japan	2.77	2.66	-4.0%
Asia Pacific	3.10	4.26	37.4%
Total	10.82	11.68	8.0%

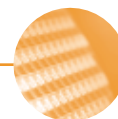
Sources: SIA

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

Earlybird invested in Asyntis

Asyntis GmbH, a German manufacturer of plasma etch equipment for semiconductor manufacturing, raised € 2 million in the first round of financing with venture capital company Earlybird. The financing will allow the company to complete its product portfolio and to penetrate targeting markets, according to Dr Berthold Kegel, CEO and co-founder of Asyntis. He added that the financing will also help the company achieve a leadership position in plasma processing for the growing thin wafer market.

<http://www.earlybird.com> - <http://www.asyntis.com>



Aixtron and University of Magdeburg planned research collaboration

Germany's Aixtron, specialized in CVD, has announced the installment of an Aixtron Tricent® Reactor at the University of Magdeburg's new clean room facility. The university is also located in Germany.

Joint research activities are planned by the 2 entities on new precursors and related physical properties for the materials strontium bismuth tantalate (SBT), and lead zirconium tantalate (PZT) for future Non-Volatile Memory (FeRAM) applications. Using the Tricent® MOCVD Reactor unit for basic research, both partners should concentrate fundamental R&D efforts directly on a well-accepted standard industrial platform.

Such non-volatile FeRAM are expected to substitute the many different memory types used today, combining the ultra-fast read/write times of DRAMs with the non-volatile properties of EEPROMs.

<http://www.aixtron.com> - <http://www.uni-magdeburg.de>

Okmetic and Epigress announced a letter of intent

Swedish Okmetic Oyj and Epigress AB (member of Aixtron Group, headquartered in Germany), jointly announced a letter of intent to enter into a license agreement, which would enable Epigress to develop, market and sell equipment used to manufacture Silicon Carbide (SiC) material, where the HTCVD technology based on Okmetic's proprietary technologies will be used exclusively. This announcement was issued at the European Conference of Silicon Carbide and Related Materials, currently taking place in Linköping, Sweden. The agreement stated that Okmetic was to enjoy preferential customer status in regard to Epigress.

Through the intended agreement, Okmetic and Epigress will take advantage of the HTCVD (High Temperature Chemical Vapor Deposition) technology developed by Okmetic with Linköping University for the growth of SiC. SiC has a very significant market potential when

used to manufacture SiC-based semiconductor components for advanced high-frequency, high-power and high-temperature applications.

The two companies will work in close collaboration to secure the long term growth of the SiC wafer market for the benefit of both companies.

<http://www.okmetic.com> - <http://www.epigress.com>

Multi-year and multi-generation agreement between ST and Virage Logic

Building on a successful alliance with STMicroelectronics and its Area, Speed and Power™ (ASAP) high-density (HD) embedded SRAM memories, Virage Logic had its entire portfolio of embedded memory technology and embedded software tools licensed by STMicroelectronics for its future 90nm, 65nm and current 0.13micron logic processes

This operation is the result of a multi-year and multi-generation agreement signed between STMicroelectronics and Virage Logic. Virage will expand its embedded SRAMs, ROMs and non-volatile memory platforms of 90nm (and 65nm in the future) products for ST's 300mm fab "Crolles II" in France.

<http://www.viragelogic.com> - <http://www.st.com>

CellularRAM memory agreement

A co-development agreement has been signed between Cypress Semiconductor, Infineon Technologies and Micron Technology to develop specifications for CellularRAM memory.

CellularRAM is a new family of low-power pseudo SRAM (PSRAM) components based on one-transistor (usually 6 for a SRAM cell) DRAM technology aimed at the market of 2.5G and 3G wireless handset designs.

Infineon and Micron plan to design and produce several CellularRAM devices over the next 12 months starting with a 32Mbit in late 2002.

Cypress also signed a PSRAM development agreement with ProMos Technology, a joint venture between Infineon and Mosel Vitelic.

<http://www.cypress.com> - <http://infineon.com>

<http://moselvitelic.com>

Actel and Infineon in a flash-based solutions at 0.13-micron agreement

Actel and Infineon Technologies announced they are to jointly develop Flash memory field-programmable gate array (FPGA) solutions for 0.13-µm processes. The co-development is an expansion on a 1997 Flash process development and manufacturing agreement between the two companies.

The FPGA solutions will run on Actel's Flash-based ProASIC FPGA family and Infineon's process technology. Possible applications and markets are automotive, smartcards, industrial controls and mobile communications, according to the companies.

<http://www.infineon.com> - <http://www.actel.com>

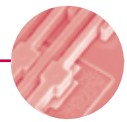
Tepla shareholders approved merger with PVA

Shareholders of Tepla AG, the German manufacturer of plasma systems for the semiconductor industry and for industrial surface treatments, approved the future merge between Tepla AG and PVA Vakuum-Anlagenbau GmbH, located in Asslar, Germany, to form PVA TePla AG.

PVA, as the transferring company, will be merged with TePla AG retroactively to December 31, 2001. PVA will transfer its entire assets to TePla, as well as all rights and obligations in return for the issuance of TePla shares to PVA shareholders. The valuation ratio of TePla to PVA is 1:4.5.

To realize the merger, Tepla is issuing new shares to increase its share capital by EUR 17.5 million, from EUR 3.9 million to EUR 21.4 million.

<http://www.tepla.com> - <http://www.pva-gmbh.de>



EV Group to start operations in Taiwan through a joint venture

The Austrian manufacturer of MEMS and semiconductor wafer processing equipment, EV Group (EVG), announced it will start operations in Taiwan under a newly formed joint venture company EVG-Jointech Corp., which will be created with the successful former regional team and members from EVG, as well as the representative company for EVG equipment in Taiwan. Operations will start in October 2002.

For the Austrian company, this is a logical step in order to get closer to the Taiwanese customer base which ranges from industrial MEMS foundries to advanced packaging production companies. This new company, located in Taoyuan, Taiwan, will be a core site for technology transfer and customer support.

<http://www.evgroup.com>

Intel and the nanotechnology

At the Intel developer Forum, the semiconductor giant revealed plans to apply nanotechnology and MEMS devices across a range of projects, including sensor networks and optical "building blocks" that will advance the integration of computing and communications.

Intel also said that it is running a field test of "sensor net" technology deploying a wireless network of MEMS sensors to record temperature, humidity, barometric pressure and infrared information to study an ecosystem without disturbing the wildlife.

Intel is collaborating with universities on long-range nanotechnology projects including carbon nanotubes and silicon nanowires, but cautioned that computing devices built with these components may be at least 10 years away.

<http://www.intel.com>

Alliances & Mergers

The termination of supply agreement between Okmetic and JDS Uniphase

At the beginning of September, Okmetic Oyj announced the mutual termination of a three-year

Supply Agreement and associated contracts originally signed in March 2001 with JDS Uniphase Corporation for MEMS related products. This occurred as a consequence of JDS Uniphase's pending sale of its Cronos MEMS business unit to Memscap as announced on August 1, 2002. Terms of the termination agreement were not disclosed. JDS Uniphase will retain their option rights to purchase Okmetic's shares according to the terms of the agreement signed in March 2001.

Okmetic Oyj invested about 9 million euros in the SOI wafer production line in keeping with the agreement signed within the growing optical MEMS components market. However, SOI wafer sales were 1.1 million euros in 2001. The short-term expectations have not been realized, but Okmetic's management believes that medium and long-term prospects in this area remain good. The company has also focused its SOI wafer market towards other device applications such as advanced sensors, RF-MEMS, and high-voltage applications, with a growing number of active customer relationships.

<http://www.okmetic.com> - <http://jdsu.com>

IMT and L3-communications on defense-related project

Innovative Micro Technology (IMT), a prototyping and sub-micron 6" wafer manufacturing service provider for MEMS, has secured a \$5 million equity investment from defense company L-3 communications. L-3 will receive 935,000 shares of IMT, a stake of 17% post-investment.

The two companies will collaborate on defense-related projects including weapon guidance systems and communications technologies, both using MEMS products.

IMT remains diversified with ongoing projects in microfluidics, communications, microwave, biomedical, biotechnology and other applications.

<http://www.imtmems.com> - <http://www.l-3com.com>

Carlyle Group as "preferred bidder" for Qinetiq

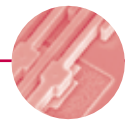
At the beginning of September, the UK Ministry of defense (MOD) chose the Carlyle group as a "preferred bidder" in its search for a strategic partner to invest in Qinetiq, the MOD-owned scientific research organization.

The Carlyle Group is a private global investment firm that acts as lead equity investor in management-led buyouts, strategic minority equity investments, equity private placements, consolidations and buildups, and growth capital financing. It also initiates and structures these actions.

The intention of seeking a strategic partner to help develop the company was announced earlier in 2002.

The MOD will initially retain a significant financial interest in the company to ensure that the taxpayer shares in any early growth of QinetiQ's value. It will also keep a special share to protect the UK's wider defense interests over the longer term.

<http://www.qinetiq.com> - <http://www.thecarlylegroup.com>



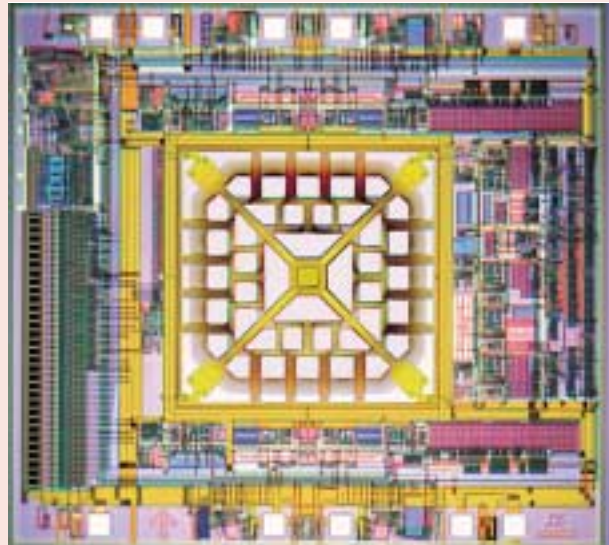
Memscic unveiled new CMOS MEMS accelerometer

Memscic, located in Massachusetts, is a semiconductor company specialized in MEMS ICs that supplies CMOS-based MEMS accelerometers/sensors. It has recently unveiled its accelerometer with temperature sensitivity compensation that is pin-for-pin compatible with analog devices' 14-lead CERPAK (ADXL202JQC/AQC), cutting costs up to fifty percent and shortening lead times.

MEMSIC's pin-for-pin compatible accelerometer, a dual axis accelerometer manufactured using a standard, submicron CMOS process, provides shock survivability of 50,000 g and eliminates stiction issues because it has no moving parts.

In addition, the new accelerometer has a tighter initial offset, a tighter initial sensitivity error, and is factory programmable at the end of the manufacturing cycle.

<http://www.memscic.com>



Memscap scientist found a new high-k material

Memscap's chief scientist, Lionel Girardie, claims to have found a new high-k candidate suitable for silicon-dioxide replacement in gate-stack applications, an area of research currently occupying many researchers in the largest semiconductor companies.

The high-k material has an oxide thickness equivalent to 9 Angstroms, the best level of performance today.

The material is based on alloying nano-laminates laid down by atomic layer deposition (ALD). The multi-layer material is composed of aluminum and hafnium oxides together with some lanthanide and praseodymium atoms.

Lionel Girardie said: "The trick is to find the best stoichiometry for each layer and the pre-cursor material is important. Most people are struggling with chloride contamination" even if hafnium oxide and the method of deposition are common for chemistry and material engineers.

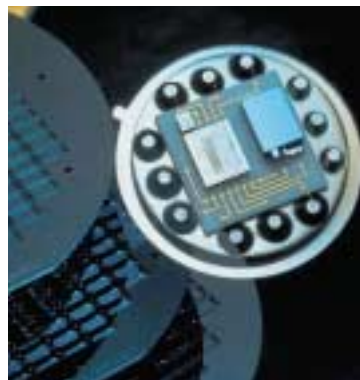
Memscap is interested in metal-insulator-metal capacitor applications.

<http://www.memscap.com>

Colibrys unveiled its new MEMS capacitive accelerometer

In mid-September, Colibrys, an independent silicon MEMS and MOEMS manufacturer based in Switzerland, announced the availability of its new capacitive accelerometer (MS7000 MEMS).

This product was created for guidance, navigation and other industrial applications, thanks to the bulk capacitive micromachined technology used by Colibrys.



MS7000 MEMS

This accelerometer could be used in extreme environments. It is composed of three components mounted on a hybrid substrate (a bulk micromachined capacitive sensor, a low power signal conditioning IC and a micro-controller).

<http://www.colibrys.com>

Suss MicroTec offers a fully automatic probe for Surface Acoustic Wave (SAW) substrates

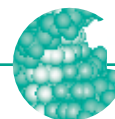
Suss MicroTec, a supplier of production and process technology in the advanced packaging MEMS and semiconductor markets, unveiled its new AP200SAW at the end of September. This is a wafer test system capable of reliably probing Surface Acoustic Wave (SAW) substrates in a production environment.

The AP200SAW is a fully automatic probe offering a range of software solutions, including software tailored to specific SAW requirements. SUSS IZI probes complete the system and are configured for up to 10 GHz ground signal (GS) probing, which is required for surface acoustic waves. According to Suss MicroTec, the result for customers is an effective, high-volume production solution with high flexibility and low cost for testing wafers of up to 200 mm diameters.

Earlier, Suss MicroTec received one of the 10 BEST VLSI Research customer satisfaction awards. It should be highlighted that this was the ninth time that Suss MicroTec was among the 10 Best, and it was the seventh consecutive year.

According to Franz Richter, Suss MicroTec's President and CEO, the rank is a result of Suss MicroTec's close cooperation with customers, focusing its resources on high quality services, delivery and prompt response to customer requests.

<http://www.suss.com>



Luminex sells its RBM project

Luminex Corporation (NASDAQ : LMNX) has begun the sale of its Rules Based Medicine (RBM) research and development project to a new company named RBM. This company, managed by Dr. Mark Chandler, will use and develop the Luminex xMAP technology to analyze proteins, metabolites, and so on in the blood. In connection with the sale, Luminex and RBM signed a development and supply agreement. In July, Luminex Corporation announced its financial results for the quarter ending June 30. Mark Chandler, CEO and Chairman of Luminex Corporation said : "We are encouraged by positive trends that emerged this quarter, confirming the potential long term success of our business model ... "

In € millions	2Q, 2002	2Q, 2001
Sales	3.29	4.83
Net Loss	6.27	4.53
R&D expenditures	2.21	1.86

<http://www.luminex.com>

Alliance & Mergers

Strategic partnership between Micralyne and MicroCHIPS

The two companies have entered an agreement to develop MicroCHIPS' silicon chips for drug delivery.

Micralyne is a developer, OEM and manufacturer of BioMEMS and other MEMS components for telecommunications, automotive and bio-analysis applications. Founded in 1999, MicroCHIPS, a fabless company, continues to develop the device and will proceed to clinical trials.

<http://www.micralyne.com> - <http://www.microchips.com>

Co development between MetriGenix and Neuralstem

The two companies announced that they will launch their first product, a neuro-degeneration chip. The collaboration started in 2001 and the objective was to develop chips with markers of CNS diseases and disorders. The commercial launch is expected during the fourth quarter of 2002.

The neuro-degeneration chips will be based on gene content obtained through disease paradigms modeled from Neuralstem's human neuronal assays. The chip platform will be used with MetriGenix' patented 4D Array System TM. Contrary to major companies in Biotechnologies that develop DNA chips on glass, MetriGenix designs DNA chips on silicon.

<http://www.metrigenix.com> - <http://www.neuralstem.com>

OGS and FDA signed a collaboration agreement

Oxford GlycoSciences Plc and the Center for Drug Evaluation and Research of the US Food and Drug Administration have entered a Cooperative Research and Development Agreement (CRADA).

The objective of this agreement is to identify serum protein bio-markers that could be useful across species during the development of a drug in order to predict and evaluate drug induced toxicity early on. This could help minimize the risk of serious adverse events in clinical trials as well as after drug approval.

<http://www.ogs.com> - <http://www.fda.gov>

SNP genotyping contract for Illumina

Illumina, Inc. has entered a commercial agreement with the University of Cambridge (UK) to provide single nucleotide polymorphism (SNP) genotyping services on a sample collection. The sample collection comes from the University Cambridge Institute for Medical Research (CIMR). Under the terms of the contract, Illumina will design functional assays for the SNP loci provided by CIMR, and then use its BeadArray technology to genotype specified SNPs in the set of roughly 3,000 samples.

<http://www.illumina.com> - <http://www.cam.ac.uk>

Distribution agreement between GeneMachines and Carsen Group

GeneMachines signed an exclusive agreement for OmniGrid® and OmniGrid Accent micro arrays. The Carsen Group is headquartered in Toronto, Ontario, Canada. This company is an important player in the market of digital microscopy and scientific imaging in Canada. The aim of this agreement is to better serve the Canadian market.

<http://www.genemachines.com> - <http://www.carsengroup.com>

Licence agreement between Celera Diagnostics and Hyseq Pharmaceuticals

The two companies entered the contract at the beginning of this month. The contract grants Celera Diagnostics non exclusive access to a large scale patient sample collection (over 12,000 DNA samples and accompanying clinical data). Celera Diagnostics is a joint venture between the Applied Biosystems Group (NYSE : AB), the Celera Genomics Group (NYSE : CRA) and the University of California.

Financial terms were not disclosed.

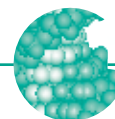
<http://www.applera.com/celeradiagnostics>
<http://www.hyseq.com>

Acquisition of Axiom Biotechnologies

Sequenom, Inc. (NASDAQ : SQMN) has completed the acquisition of Axiom Biotechnologies. Axiom is a privately held company and is located in San Diego.

Created in 1995, Axiom has approximately 25 employees, a cellular biology laboratory, and a biological research capability in medical chemistry. The company collaborates actively with UCB Pharma in Belgium, Sosei Co. in Japan, and with Biacore (Sweden).

<http://www.sequenom.com> - <http://www.axiombio.com>



New round of financing for Cellomics, Inc.

Cellomics, Inc. announced a € 15.43 million round of financing led by Carl Zeiss Jena GmbH. Other investors include : Oxford Bioscience Partner, Interwest Partners, Vector Fund, Atta Partners and Axiom Ventures. Cellomics, Inc. is a pioneer in the field of cellular knowledge extraction.

<http://www.cellomics.com>

New gene profiling service

Ipsogen, a French biotechnology company, has launched a new service for clinical centers with expertise in cancer treatment that want to offer their patients state-of-the-art molecular analysis.

Located in Marseille, France, Ipsogen was created in 1999. The company has 18 employees. The manager is Mr Vincent Fert.

<http://www.ipsogen.fr>

New production hall for Greiner Labortechnik

The German company invested € 328.80 million in its new plant: 8,000 m² and 40 new employees. With this production hall, Greiner Labortechnik expects to increase its market share from 10 to 15%.

This site is dedicated to developing and producing devices made of plastic for the medical sector. The staff of Greiner has increased from 190 to 230 employees.

<http://www.greiner-lab.com>

Business sale for Genescan Europe AG ?

In August, the company announced a drop of its sales figures compared to the same period last year : from € 8.2 million to € 7.2 million in the first half of 2002. This decrease was due to the weak demand for capital goods produced by the Science Business Unit: almost no revenue was registered during the second quarter of 2002.

Consequently, Genescan Europe could be willing to consider having partners to rescue its business. Joint ventures, the sale of Genescan or parts of the business could be the answer according Genescan's CEO, Ulrich Birsner.

<http://www.genescan.com>

Two new versions of sequencing kits by Applied Biosystems

Applied Biosystems Group announced the launch of its new versions of sequencing kits. With these new products, the company should be able to provide systems for all types of DNA sequencing applications.

The first product, BigDye® Terminator v3.1 Cycle Sequencing Kits is designed for the majority of applications including de novo sequencing and resequencing.

The version v1.1 is designed for specific applications such as sequencing PCR products.

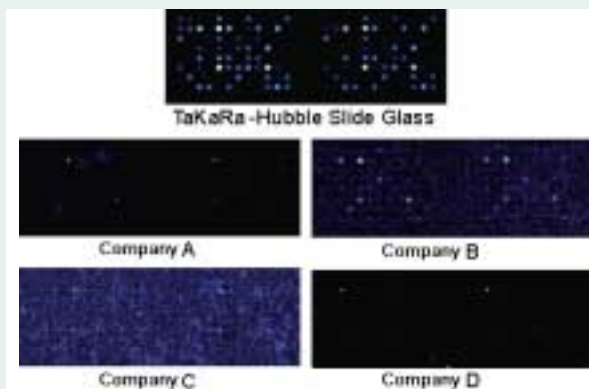
www.appliedbiosystems.com

Development of "Hubble Slide" for DNA micro-array production

Takara Bio Inc., the Japanese company, has a cooperative agreement with Mirus Corporation, a U.S. based company. Under the terms of this contract, they will develop the "Takara Hubble Slide", a high sensitivity glass slide for DNA micro-arrays that can immobilize DNA fragments by means of a covalent bond.

Sales will start in September 2002. Takara's development is to be noted because there are not very many consumable products currently being produced in the field of biotechnology.

<http://www.takara-bio.co.jp> - <http://www.genetransfer.com>



Comparison with other suppliers' glass slides

(DNA fragments are spotted by following the recommended protocol for each slide respectively.) – source : Takara Bio, Inc.



ECOC 2002: Back to realism

The mood at this year's European Conference on Optical Communications (ECOC) would have been a lot brighter if the focus had been on academic research (considering the number of papers), rather than on the woes of industrial players. There were plenty of wide open spaces and hardly any visitors (fewer than 1,000) registered for the exhibit only, according to the organizer.

Today, the trend is to develop new technologies which will be needed when business picks up again. Interests have moved from the Long Haul network to the

Metropolitan and the FTTH; this market is well linked to component costs. Everybody seems to agree that among key technologies are tunable components, amplification (EDFA and Raman), integration and the problem of packaging. That's why there is a lot of work in the way of optical micro-benches, assembling and wafer level packaging processes in order to reduce final component costs. This trend is confirmed by the presentations of the exhibitors and their component offers. For example, Alcatel Optronics unveiled a new AWG-based product (cal-

led hybrid combiners) made by Kymata Ltd, GigaTera demonstrated a new development of its pulsed laser, BeamExpress exhibited its 1550nm tunable VCSEL...



ECOC 2002, Copenhagen

Alliances & Mergers

Bookham and Cierra form optical-integration partnership

Bookham Technology plc and Cierra Photonics (Santa Rosa, California) have formed a two-part technology and commercial partnership to bring the benefits of high integration-based functionality to WDM products, such as optical add/drop multiplexers (OADMs). The partnership, which runs initially for two years, allows both companies to take advantage of the strengths of their respective and complementary optical-integration technologies. Bookham Technology is contributing its well-established ASOC design and manufacturing technology to manufacture integrated optical circuits on a silicon substrate, together with its leading range of integrated GaAs and InP tunable lasers and modulators. Cierra Photonics brings to the partnership its outstanding range of thin-film filters based on the company's Advanced Energetic Deposition (AED) technology, a unique process of wafer-scale integration that results in lower costs, high yields and leading optical performance.

<http://www.cierraphotonics.com> - <http://www.bookham.com>

Modulight joins XFP MSA Group

Modulight Inc., a manufacturer of high-performance optical components for datacom and telecom applications, has joined the 10 Gigabit Small Form Factor Pluggable (XFP) Multi Source Agreement (MSA) Group. Modulight joined the

group as a "contributor" with the intention of supporting the work of the MSA Group by providing module manufacturers with a direct connection to a (sub)component supply-chain. The goal of the MSA Group is to create specifications for a module, cage hardware, and IC interfaces for a 10 Gb/s hot pluggable module that would convert serial electrical signals into external serial optical or electrical signals. The technology is intended to be flexible enough to support OC192/STM-

64, 10 G Fibre Channel, G.709, and 10 G Ethernet, usually using the same module.

<http://www.modulight.com>



Modulight chip

Teem Photonics and NKT Integration sign EDWA MSA for a 4-port optical gain block

Teem Photonics and NKT Integration (Cisilias and Ionas merger) announced a multi-source agreement (MSA) to develop a 4-port fully-integrated gain block made up of four separately controlled gain blocks in a 110 x 95 x 12mm³ module. The agreement sets common product standards for form, fit and function in mechanical, optical and electrical interface parameters to be integrated into next-generation optical networks, offering system integrators supply-line security from compatible EDWA manufacturers. Product samples should be available by Q1 2003.

<http://www.teemphotonics.com/> - <http://www.nktintegration.com/>

Colibrys Makes GalayOr's MEMS

GalayOr Networks Ltd., an Israeli/American-based hi-tech company that develops and produces on-chip integrated Micro Opto-Mechanical Systems (MOMS) for a variety of applications at the core of optical networks, based on unique moving-waveguide technology, announced a development partnership with Swiss-based Colibrys S.A., Europe's largest independent manufacturer of silicon MEMS, and Micro-optical components. The agreement will enable GalayOr to provide its customers with a single source for advanced MEMS-based components, providing lower cost per component, higher performance and reduced circuit size thanks to tighter integration. Under the terms of the agreement, after an initial process migration phase, Colibrys will manufacture GalayOr's MEMS SOI waveguide-based products in its manufacturing unit, providing GalayOr with more than 20 years of MEMS manufacturing expertise. The first of such products is the world's most compact VOA (Variable Optical Attenuator), which integrates electronic circuitry.

<http://www.galayor.com/> - <http://www.colibrys.com>



Fibercore has commissioned a EUR1.65 million clean room facility

Specialty fiber manufacturer Fibercore has commissioned a EUR1.65 million clean room facility at its UK headquarters in Southampton. The new building, which includes a class 10,000 suite of clean rooms and associated offices, will house the company's fiber manufacturing facility and is expected to be completed by October. ABB Climate Systems has been awarded a turnkey contract to design and build the unit.

<http://www.fibercore.com>

Alcatel Optronics is to accelerate its restructuring plan

Alcatel Optronics has issued a statement saying that the continuing recession in the optical communications sector and persistent inventories held by its customers could result in a drop of up to 50% in revenue for the third quarter ending September 30, 2002.

The company is to launch what it is calling a strategic refocus plan that will include rationalizing its manufacturing facilities with the loss of two thirds of its workforce. According to CEO J.C. Giroux, they want to reach a streamlined business model, with their Nozay (France) manufacturing facility focusing on active components, and their Livingston (Scotland) plant on passives. From 1550 staff today, they expect to reach approximately 1000 before year's end, and ultimately below 500 by the end of 2003. The company's strategic refocus plan includes reducing the Nozay site to approximately 300 employees.

<http://www.alcatel.com/optronics/>

Business News

Intune completed round 2

Intune Technologies, an Irish-based global leader in the development of test and calibration applications, and specialized in optical sub-systems for the telecom industry, has completed its latest multi-million Euro round of financing. The investment was led by ICC Venture Capital and also included new and existing investors. Having developed two critical optical product lines, test and calibration systems and bespoke packaging for fast tunable laser switching, Intune is now well placed to accelerate its commercial growth and market capture rate. This round will allow the company to increase its sales and support capability, and expand its business development program into additional target markets.

<http://www.intune-technologies.com/>

Modulight awarded a government contract to develop next generation components

Modulight, Inc. (Tampere, Finland), manufacturer of high-performance optical components for telecommunications,

announced government contracts to develop next generation optical components for high performance telecommunication systems. Part of the funding comes from the National Technology Agency of Finland (Tekes). 18 and 24 month programs have a total budget of about Euro 0.8M.

<http://www.modulight.com>

Kamelian wins order, and partners with u2t

Kamelian of Oxford, UK, has begun shipping an order worth \$1 million for one of its semiconductor amplifier (SOA) products. The order, from an undisclosed customer, is for Kamelian's new 1310 nm optical amplifier product which was recently added to its 1550 nm optical power booster and optical pre-amplifier products. This is important since such amplifiers fulfill a need for amplification that can not be met by EDFAs at 1310 nm. Kamelian has also collaborated with u2t Photonics of Berlin, Germany, on the production of a 40 Gbit/s receiver. The two companies successfully combined u2t's ultrafast photodiode with Kamelian's high-gain, low-noise SOA to demonstrate a 40 Gbit/s receiver with better than -17 dBm sensitivity at a bit error rate, BER, of 10⁻⁹.

<http://www.kamelian.com>

Bookham Technology debuts GaAs MMICs

Following its acquisition of Marconi's Caswell foundry, UK, earlier this year, Bookham now plans to establish itself as a leading European manufacturer of gallium-arsenide monolithic microwave integrated circuits (GaAs MMIC). Bookham is due to sample a 5W GaAs X-band power amplifier later this year - the first new product resulting from its investment in the Caswell foundry. The amplifier will complement the company's existing X-band Low Noise Amplifier (LNA) and driver products. The Caswell foundry has the longest continuous history of GaAs development in the world, going back to 1962, and has over 100 man-years of experience in GaAs MMIC design.

<http://www.bookham.com>



OpsiTech unveils its EVOA array at ECOC

OpsiTech SA expanded its product portfolio by unveiling its high-port Electrically tunable Variable Optical Attenuator (EVOA) array in Copenhagen at ECOC 2002. OpsiTech's 8-, 10-, and 12-port EVOA arrays are based on integrated Silica-on-Silicon planar technology. They feature 20-dB of attenuation, high stability, low insertion loss, low polarization dependent loss and small footprints. Available for C- and L- bands, the EVOA array can be applied to a variety of modules, such as multiplexers/demultiplexers, optical add/drop modules and erbium-doped fiber amplifiers.

<http://www.opsitech.com>

Agilent sampling 40 channel x 100 GHz glass on Si: AWG for LH/metro applications

Agilent Technologies announced that, as a result of last year's acquisition of Silicon Micro Systems in Italy and the expertise it represents, it was combining this with existing in-house expertise in high-volume packaging to develop a new family of arrayed waveguide grating (AWG) multiplexers/demultiplexers for DWDM long-haul and metropolitan network applications. The products will be based on chemical vapor deposition (CVD) of glass on silicon, enabling high-volume, low-cost manufacturing and the integration of other components in order to lower costs for network equipment manufacturers. The announcement said that Agilent's earliest product development was a 40-channel, 100GHz AWG which was being subjected to Bellcore GR1221 and GR1209 qualifications. At the same time, it is in the process of selecting DWDM manufacturers, with a view to volume manufacturing by the end of 2002.

<http://www.agilent.com>

Memscap ships first products from Bernin fab

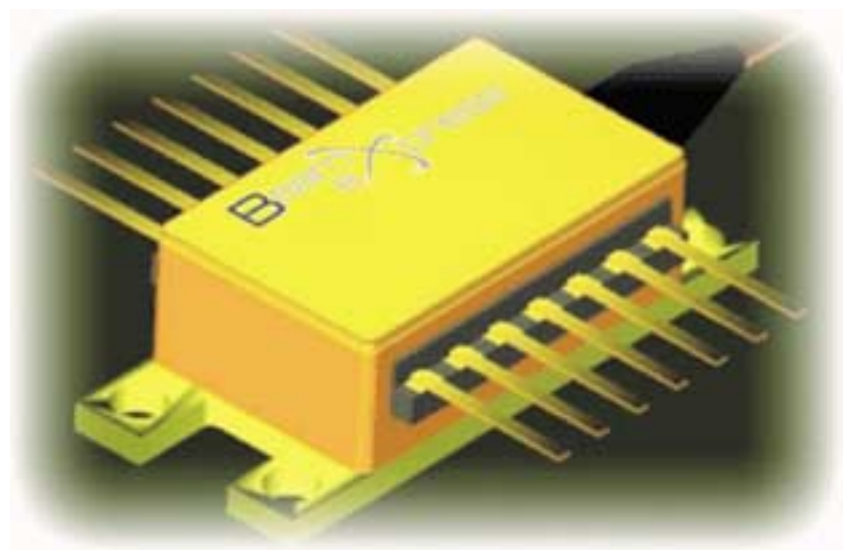
MEMSCAP of Bernin, France, near Grenoble, has recently announced the takeover of JDS-Uniphase's Cronos MEMS unit. It is currently shipping samples of low-port count photonic switches and variable optical attenuators (VOAs) aimed at the metro and access levels of the telecommunication network. The switch samples have already generated significant interest and are being evaluated at major customer sites. They are the first products to come out of MEMSCAP's fully automated, high-volume MEMS manufacturing facility in Bernin. The 1x2 and 2x2 port switches, which, unlike most MEMS-based switches, offer embedded electronics, are aimed at a variety of fiber optic applications including network and equipment protection, bypassing in FDDI and SONET, reconfigurable OADMs, network reconfiguration and monitoring, and redundancy for optical cross-connects. MEMSCAP's MEMS-based VOA is a robust, highly linear device that offers network equipment developers a reliable, low-cost solution for applications requiring gain equalization of optical input or output.

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

BeamExpress Tunes VCSEL

The recent Swiss start up, BeamExpress S.A., has demonstrated 1.5 μm waveband optically pumped tunable VCSELs with 38 nm tunability at tuning voltage values below 4 V. Devices with 5 μm apertures show 1 mW continuous-wave single-mode output power with a 40 dB side mode suppression ratio. Manufacturing is based on a proprietary technology including a modified wafer fusion technique. A simple and efficient process allows a high performance VCSEL to be monolithically integrated with a micro-electro-mechanical system (MEMS) tuning structure that can be electrostatically activated at a very low tuning voltage using standard low cost electronics. This demonstration of widely tunable VCSELs that can cover the whole C or L WDM bands at tuning voltage values below 4 V opens new perspectives in the quest for cost-effective, high performance tunable lasers for METRO optical networks.

<http://www.beamexpress.com>



BeamExpress Wavelength Tunable Source

INTEGRAM - SEMINAR AGENDA

- **Markets, applications, European fabs, INTEGRAM**
- **Expertise and facilities of INTEGRAM partners**
- **INTEGRAM project overview**
- **Applications + MEMS advantages (Opportunities, devices, case studies)**
 - RF-MEMS devices + switch
 - Inertial sensors + gyro
 - Ultrasonics + integrated transducer
 - Optical devices + VOA
- **CoventorWare Integrated Design Environment**
- **How INTEGRAM can provide solution to access MEMS technology**

INTEGRAM - *Designing Manufacturable MEMS for Product Integration*

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Free Seminar

10:00 - 15:00	
30 September 2002	Dortmund GERMANY
02 October 2002	Ifzehoe GERMANY
07 October 2002	Amsterdam NETHERLANDS
10:00 - 16:00	
29 October 2002	Augsburg GERMANY
30 October 2002	Grenoble FRANCE
01 November 2002	Malvern UK

Lunch and refreshments provided

COVENTOR

EUROPRACTICE

QinetiQ

YOLE DÉVELOPPEMENT

