



Nanotechnology: myth or reality?

Today, nanotechnology is attracting attention even in the mass media. From Spielberg's latest blockbuster *Minority Report*, where reference to nanotechnology is made through a newspaper in the metro, to more generalist media, nanotechnology is seen as a technology which will have a strong impact on our everyday lives through innovation in life sciences, medicine, materials and electronics.

However, despite the wide diffusion of the "nanotechnology" term, it is still very difficult to give a strict definition of nanotechnology today. Currently, equipment to manipulate atoms is available (Scanning Probe Microscopy). But the paradox is that nanotechnology products are far from being industrially available. Extremely futuristic developments are forecasted but today, the most "mature" product - carbon nanotubes - is not expected to reach a subsequent market size before 2007. However, nanotechnology is a wonderful playground for scientists to discover new physical, chemical, and optical effects under the 100 nm limit.

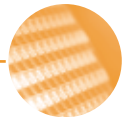
In this growing activity, it is important to have a look at this sector in order to distinguish between the numerous achievements which will have a real impact in the future. That is why Micronews is now opening a monthly column dedicated to nanotechnology. Because we think that this field is a natural extension of the semiconductor, MEMS, optic and biochip sectors, we will bring you the latest news in this field. Our objective is to offer you clear snapshots of the most relevant monthly facts and figures.

Jean-Christophe ELOY

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Two new optical telecom companies
GaN nanowire laser emits first light



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List of companies cited in "Micronews"

SEMICONDUCTORS AMD CEA-Leti EVG Group Fairchild Semiconductor Fujitsu Hitachi IMEC Infineon Intel IQE Plc. Lambda Physik Macrotron Process Technologies Mitsubishi Mosel Vitec Motorola Philips Picogiga Qinetiq Rockwell Automation SIA Soisic Soitec STMicroelectronics SZ Testsysteme Tower Semiconductor Products Sector Triquint UMC Umicore VLSI Research Wacker Siltronic Xintec **OPTICS** Alight Technologies A/S Blaze Photonics Bookham Technology CILAS Cube **MEMS** Analog Devices Coventor Epigem Generics L'Oréal LioniX Marubeni Solutions Memsic Microlab PHS MEMS Seika STMicroelectronics Triad Sensors Tronics Microsystems **NANO** Applied Nanotech Inc Cetek Hewlett-Packard's Labs Motorola Nanoco Nanomix Ohio State University Rensselaer Polytechnic Institute **BIO** Affymetrix Amic Aspira Biosystems Cepheid Metragenix Orchid Biosciences Oxford GlycoSciences (OGS) Sophion Bioscience Virtek **OPTICS** Helia Photonics Ltd Highwave Optical Technologies Intense Photonics Micro Managed Photons A/S Nortel Networks Opto Speed Schott Group Transmode Systems AB ULM Photonics

September's semiconductor equipment book-to-bill ratio at 0.90

VLSI Research announced a worldwide book-to-bill ratio for semiconductor equipment at 0.90, compared to 0.92 a month later. According to the market research group, September came in weaker than expected while it is typically a strong month for equipment makers. With the current investment climate, the equipment book-to-bill ratio is expected to drop further to 0.86 in October.

	Billings (Three-month avg.)	Bookings (Three-month avg.)	Book-to-Bill
August 2002 (final)	2234	2129	0.92
September 2002 (prelim.)	2906	2602	0.90
October (Forecast)	2179	1873	0.86

Source: VLSI Research, October 2002

VLSI Research added that preliminary data for ICs also showed a lower than expected performance, with a drop in the book-to bill ratio for chips at 0.91 in August.

<http://www.vlsiresearch.com>

Third quarter results for Affymetrix

Product revenue increased from \$47.2 million to \$ 62.9 million this year. The increase, reaching 33%, is due to the GeneChip® array shipment and instrument placements. The revenue represents more than 98,000 GeneChip® arrays (+27% compared to the previous year).

Revenue due to license fees, royalties, and research revenue reached the same amount as in 2001: \$5 million

Total costs and expenses increased from \$63.4 million for the third quarter 2001 to \$71 million for the same period in 2002.

Breakdown of expenses are the following:

In \$ millions	Three months ending September 30	
	2002	2001
Net income	0.6	(4.8)
Total revenue	72.8	55.36
Research & Development expenses	16.7	16.6

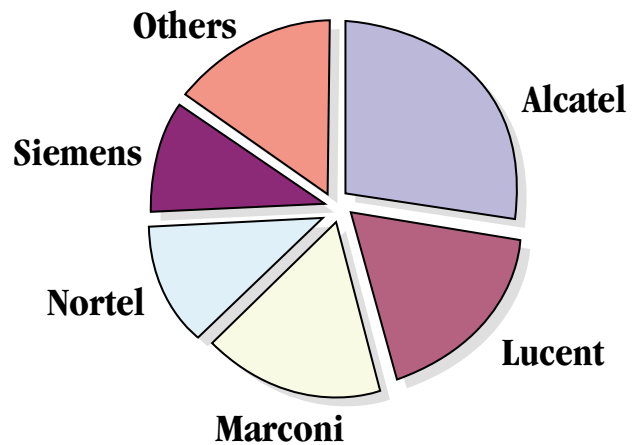
<http://www.affymetrix.com>

Affymetrix is expected to penetrate the Japanese market in fiscal year 2003.

Sales of optical networking systems in Europe

The latest research of RHK shows that sales of optical networking systems in Europe dropped 30% in the second quarter of 2002 to \$662m compared with \$949m posted in the first quarter. The sectors that were hit the hardest were digital cross connect systems (down 52%), add-drop multiplexers(down 31%) and long haul DWDM (also down 31%)

The top five equipment vendors



These vendors saw their combined market share drop from 90% in the first quarter to 85% in the second quarter. Alcatel's market share grew from 25% to 27.4% thanks to acceptance of its next generation SDH and DWDM products at both incumbent and alternative carriers. Siemens was up from 9% to 10.6%, owing to much backbone deployment in Europe. Marconi fell from 23%, due in part to nervousness on the part of customers about the firm's long-term viability. Nortel's share dropped from 14% to 11.5% although it is still well positioned in DWDM.

<http://www.rhk.com>

Microreaction technology: On the track of production

Today, the microreaction market is still in its infancy. It is characterized by a number of R&D and university institutes on the one hand, which push the technology and supply prototype hardware and R&D services, along with some companies, mainly big chemical production enterprises on the other hand which spend moderate amounts of their research budget to buy the services offered by the institutes. However, the industrial interest is high, as new production modes need to be developed.

New modes of production are an opportunity for MRT development

The spread of chemical processes is not at all limited to the classical production of inorganic and organic chemicals or pharmaceuticals. Taking into account the production of manifold consumer products such as cosmetic products, modern food and dairy products as well as the ubiquitous plastic items relying on chemical processing, the importance of chemical processes for many kinds of industries becomes obvious. If one adds the petrochemical industry, heat and power production, as well as fossil fuels for mobile applications such as motor vehicles, one can easily grasp that an interaction between these branches and chemical processing itself is likely to exist.

As can easily be seen from the many mergers, acquisitions or outsourcing over the past few years, these industries have already undergone unprecedented restructuring, and as far as anyone can see, this process is far from being finished. All of these industrial sectors will, according to a recent AIChE study, be faced with rapidly evolving markets that will require them "to shift to new modes of production and an intensified role as environmental caretakers."¹ As a consequence, enhanced flexibility will become a major prerequisite: "Process intensification and miniaturization

are likely to contribute to the portability of chemical process functions, allowing production facilities to be made more mobile and market-responsive."²

High industrial interest but few concrete examples of applications

Process intensification and miniaturization is where microreaction technology comes into play. The first prototype microreactors for chemical processing were built and tested in the early 1990s. Over the last ten years, numerous R&D projects have proven that microstructured components and systems for process engineering are suited to increasing the yield and selectivity of chemical processes as well as to optimizing transport processes of heat and matter. Microreaction technology is expected to enhance process safety and to reduce development times. Without intending to detract from the high potential of microreaction technology, however, it should be mentioned that this concept cannot be applied to every kind of reaction. Ever since the first prototypes, interest from industry has been remarkably high, yet concrete examples for application in production has been low. Is this a contradiction?

¹ American Institution of Chemical Engineers (AIChE): *The Global Environment for Chemical Engineering*, 2001, p. 27.

² AIChE: *The Global Environment...*, p. 26.

Different market segments

Today, the MRT market is split into 4 segments (see Figure 1).

Segments	Tools for R&D	Complete production equipment	Part of a production system	Energy production	Analytical systems
Functions	Process intensification ...	Full dedicated production equipment (HCN, COCl ₂) ...	For a specific process step (optimizing dispersion) ...	Energy production for portable systems (laptops, cars...)	Management of small volumes of fluids
MRT components	Any micro devices	Complete miniaturized MRT systems	Components such as micromixers, micro heat exchangers	Fuel cells, reformers ...	Components for lab-on-chips

Figure 1: MRT application segments

In the “pure” production application, we have the following applications: R&D tools, complete production equipment, MRT as a part of a production system and energy production. The analytical systems segment is different, since we find MRT components which can be implemented on integrated labs-on-chips for biomedical applications.

One example of a complete production system for molecule production is the Merck case. Merck uses microreactors for the Grignard ketone reduction reaction since they offer better process control along with an increase in process safety. The Axiva company, on the other hand, has integrated a micromixer as part of a production process for acrylate polymerization. The micromixer is used to re-mix monomers and the initiator prior to radical polymerization, which leads to a uniform distribution of the reactants. This avoids fouling effects in the static tube reactor. MRT is used as a toll for process development by the BASF company to synthesize a vitamin precursor.

Besides numerous R&D institutions and universities developing, characterizing or testing microreaction components in new applications, there are, to date, only eight commercial companies that offer microstructured components for chemical applications and appropriate services. This number includes companies that are rather specialized as well as those that have only announced their activities.

The following figures (2 and 3) show the components/R&D service providers with an industrial offer and the R&D labs working in the MRT field. Germany definitely has a strong position in this activity.

Companies	Country
CPC	D
Mgt Mikroglass	D
Accoris	D
Ehrfeld Mikrotechnik	D
Synthesechemie	D
Innova Tek	US
Mesosystems	US
Technology	
Heatric	UK
R&D Institutions	Country
IMM	D
FZK	D

Figure 2: Component and R&D service providers

Institutions	Country
PNNL	USA
MIT	USA
ACA Berlin	D
FhG ICT	D
EPFL	CH
CNRS-LGPC Lyon	F
CNRS-ENSIC Nancy	F
Oakridge	
National Lab	USA
Companies	Country
Axiva	D
MicrComp eV	D

Figure 3: R&D service providers

PAMIR, a study to clear your vision

In order to evaluate the economic potential of microreaction technology as well as existing application barriers, the Institut für Mikrotechnik Mainz GmbH (IMM) and the French consulting company YOLE Développement joined forces. A compendium of the major results is now available with the international market survey PAMIR (Potential and Applications of MicroReaction technology). Microreaction technology, in the scope of this study, refers to the design, simulation, manufacture and application of chemical process engineering devices (typically representing unit operations such as reaction, mixing or heat exchanging) for production purposes. The characteristic structure sizes are in the

range of a few micrometers to several millimeters. In summing up, microreaction technology is defined as all the strategies and techniques used to introduce the advantages of microstructures to chemical process equipment and production, whatever the scale of the latter may be.

The PAMIR study confirms the fact that industrial interest in microreaction technology is high. Each of the top 30 companies from the chemical industry is willing to invest, on average, a sum of 50,000 euros per year in order to buy components and systems of micro process engineering. For 2002, the study anticipates the sales volume for microreaction technology to be 36 million euros as a result of its application in R&D as well as process optimization. Although the technology is already being established as a laboratory tool for process development in chemical industries, the interviewed parties do not expect the application of microreaction systems for mass production of chemicals within the near future (see Figure 4). According to the results of the PAMIR study, the first applications for production are expected to be in the pharmaceutical and fine chemical fields, that is to say where small improvements of the process lead to high added value.

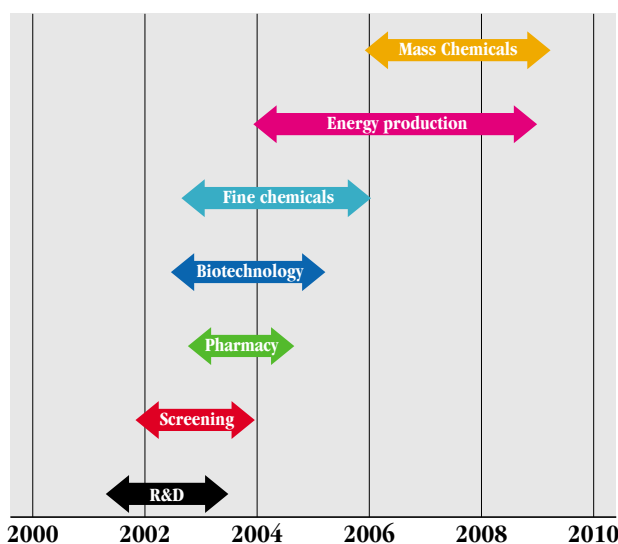
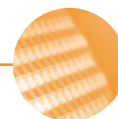


Figure 4: Roadmap for microreaction technology

The PAMIR study, published in English, was partially funded by the European Commission through the GROWTH program. The complete study is now available at the Institut für Mikrotechnik Mainz GmbH. Further information can be obtained at the Yole web site www.yole.fr



European R&D Center opened for Intel

As announced, Intel has opened a micro-processor R&D center in Barcelona, Spain. The facility is to be located at the Universitat polytechnica de Catalunya and will be called ILB (Intel Labs Barcelona). The center is co-chaired by Antonio Gonzalez (microarchitecture researcher), Roger Espasa and Toni Juan (experts on high-performance 64-bit processors). ILB will study micro-architectures and compilers to support enterprise, business and consumer platforms. Intel expects that ILB will find methods to increase processor performance while reducing power consumption and heat generation.

However, Intel did not disclose how much the company is investing in ILB and over what period of time.

<http://www.intel.com>

Wacker announced a new plant in Germany for 300-mm wafers

The German silicon wafer manufacturer, Wacker Silternic AG, announced it is moving ahead with its previously-stated plans to

build a 300-mm silicon wafer factory. After a series of false starts, Wacker plans to produce wafers at its Freiberg plant in Saxony, Germany, in August 2004.

The investment, totaling EUR 340 million, will create 600 new jobs and the Freiberg factory will triple the large wafer production capacities of the existing fab in Burghausen, Germany, and Hikari, Japan, according to Peter-Alexander Wacker, President and CEO. Production capacity is expected to reach 150,000 wafers per month (60,000 per month at the beginning).

The construction planned in 2001 was delayed because of the slowdown in the chip industry. With the new plant, Wacker will reinforce its worldwide manufacturing network for the 300-mm technology to work in close proximity with its customers.

<http://193.18.249.201/internet/noc/WackerGroup/Divisions/Silternic>

SZ testysteme files for bankruptcy

After negotiations with banks which have not yet led to a satisfactory outcome regarding a sufficient financing framework, the managing board of SZ Testysteme AG has filed for bankruptcy as a precautionary measure, despite far-reaching agreements with key suppliers and the company's employees. The bankruptcy is due to the company's inability to pay. But SZ is not recognized as over-indebted. It is able to continue its operations under its own responsibility despite the bankruptcy proceedings and the fact that the creditors receive 50% of their receivables within a period of two years. SZ still hopes that negotiations with banks will lead to a positive outcome in order to reverse the situation.

<http://www.sz.com>

IMEC's 300-mm research plant

The European microelectronics R&D center IMEC, located in Leuven, Belgium, is setting up a 300-mm silicon research platform initiative to perform advanced process research at least 2 generations ahead. The aim of the research platform is to demonstrate novel device architectures and to perform research on process steps and modules. Only a few companies will be able to afford a full process research facility. The local government has invested EUR 37.8 million to build the clean room near the current IMEC facilities, in order to share common facilities, infrastructure and metrology tools and human resources. The current 200-mm clean room will be available for research on a broad range of nanotechnology domains to prepare the post-silicon era.

<http://www.imec.be>

Alliances & Mergers

Tower Semiconductor licenses 0.13µm CMOS

Motorola Semiconductor Products Sector (SPS) and Tower Semiconductor entered into an agreement to transfer and license Motorola's all-copper, 0.13µm HiPerMOS7 (HiP7) technology to Tower's Fab 2 facility. Product prototyping by Tower customers could begin on this 0.13µm CMOS technology as early as first quarter 2003.

Tower plans to use HiP7 as the 0.13-micron technology platform for its analog, digital and mixed-signal processes, as well as for its proprietary CMOS Image Sensor and microFLASH technologies.

<http://www.motorola.com> - <http://www.towersemi.com>

Infineon announced difficulties in its agreement with Mosel Vitelic

Infineon Technologies announced it had cancelled its shareholder agreement with Taiwan's Mosel Vitelic on its ProMOS joint venture in Hsinchu effective January 1, 2003. This announcement could indicate the end of a 6 year relationship between the two companies. The cancellation is due to repeated material breach of contract by Mosel Vitelic despite prior warning in accordance with the terms of the shareholder agreement. At the same time, the product purchase agreement between both companies to acquire products from ProMOS will terminate.

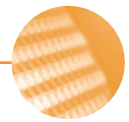
Infineon is strongly represented on the board of directors of ProMOS which enables Infineon to support ProMOS' interests.

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

AMD and Fujitsu in a joint Flash Memory agreement

AMD and Fujitsu are discussing integration of their Flash memory operations. The deal would give AMD a 60% stake in the joint venture and the new company would start operations in January 2003. It is the second joint Flash-producing facility between AMD and Fujitsu (the first is called FASL). This new initiative would create a Flash operation larger than Intel's. Fujitsu is reported to be in favor of an initial public offer, but AMD opposes this.

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



Hitachi and Mitsubishi to merge chip operations; Elpida making a deal with Mitsubishi and Powerchip

Hitachi and Mitsubishi electric have agreed to merge their chip operations, excluding DRAM memories, into a \$7 billion semiconductor company to be called Renesas Technology Corp. Hitachi is expected to own 55% of Renesas with Mitsubishi holding 45%. This merger could mark a departure from a vertically-integrated corporate business model by two major Japanese companies, and Renesas would probably appear in second position in the world wide semiconductor rankings. Renesas is expected to start activities in April 2003.

Mitsubishi and Hitachi will move their semiconductor operations to Renesas, including microcomputer, logic, analog and discrete devices and memory (Flash and SRAMs) with the exception of DRAMs.

At the beginning of October, Mitsubishi and Elpida Memory (joint venture between NEC and Hitachi) entered into an agreement to start discussing the integration of Mitsubishi electric's DRAM operations with Elpida. This new agreement will allow Elpida to form an alliance with Powerchip Semiconductor that would serve as a foundry for Elpida's DRAM production. Elpida will be the major DRAM supplier in Japan, thanks to this alliance

Soitec reinforces SCEALAB partnership with CEA-Leti

The French SOI wafer manufacturer, Soitec, has extended its collaboration with the French research institute CEA – Leti (Laboratoire d'Electronique de Technologies et d'Instrumentation) in Research and Development beyond SOI substrates. Under the terms of the agreement (SCEALAB, Smart Cut Enabling Application Laboratory agreement) Soitec and the Leti will enhance their existing collaborative R&D efforts and Soitec will gain exclusive rights to Leti's Intellectual property-related Smart Cut technology to target applications beyond silicon and SOI substrates.

SCEALAB's R&D activity will be conducted in Leti's facilities, as well as in Soitec's new facility located in Bernin.

<http://www.soitec.com> - <http://www-leti.cea.fr>

IMEC and UMC signed foundry service agreement

IMEC, Europe's largest independent research center in the field of microelectronics, and UMC, a semiconductor foundry, announced the signing of a foundry agreement between UMC and IMEC's Europractice IC Service. This agreement, which follows several years of close collaboration between UMC and Europractice, offers access to UMC's Silicon ShuttleR Multi Project Wafer (MPW) platform for prototyping and production services. This will be of particular interest to European-based organizations with low-volume manufacturing needs, such as universities, research centers, start-up companies, and companies with small niche markets.

Europractice IC Service is coordinated by IMEC and offers companies ASIC services to help them bring their products to market quickly and cost-effectively.

With this new agreement, Europractice's customers will have easy access to UMC's most advanced technologies for low-volume production, including 0.13 micron CMOS Logic and Mixed-Mode/RF, and low cost prototyping.

Under the terms of the three-year agreement Europractice and UMC have the possibility to extend their cooperation towards other advanced technologies in the future.

<http://www.imec.be> - <http://www.umc.com>

Xintec expands CSP technology with EVG Group's systems

EVG Group, manufacturer of innovative MEMS and semiconductor wafer processing equipment announced the completion of another equipment purchase agreement with the Taiwanese company XinTec. XinTec is an exclusive joint-venture of Shellcase and offers advanced Wafer Level Chip Scale Packaging (CSP) technology and services to its customers. The order contains a full production line including an EVG@640 8-inch production mask aligner and an EVG@150 automated resist coating system for advanced wafer level CSP.

Wafer Level CSP package technology allows manufacturers to package ICs at wafer level, produce miniaturized chip packages and eliminate further wire bonding, lowering costs.

According to EVG, this cooperation gives the company a major position in the Asia/Pacific area. XinTec announced that EVG's tools provide the capabilities needed by XinTec to supply the latest design in chip packages to industry, allowing various substrates and materials to be processed without reconfiguration.

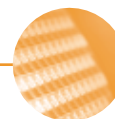
<http://www.evgroup.com> - <http://www.xintec.com>

Qinetiq and Triquint in IC service agreement

An agreement to use QinetiQ's Microwave and Millimetre-wave IC design services in conjunction with TriQuint's GaAs IC foundry services was announced at the beginning of October, and provides customers with a UK based turnkey Microwave and Millimetre-wave IC services and design presence.

The aim of this partnership is to provide its customers under contract with Triquint access and support from QinetiQ's Monolithic Microwave Integrated Circuit (MMIC) design team. After the design phase, Triquint will move to production, providing wafer manufacturing and IC test. The deal includes 0.25- μ m mmw-pHEMT and 0.15- μ m LN-pHEMT processes. Triquint is establishing a worldwide network of independent, authorized design centers to support GaAs foundry services.

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



Worldwide Chip Sales up 2.2% in August from July

Chip sales totaled \$11.9 billion in August, a 2.2% sequential increase over the \$11.7 billion level reached in July, the SIA announced. On a year-to-year basis, chip sales in August were up 14% from August 2001, the first double-digit increase from the industry's cyclical low in 2001.

According to George Scalise, President of the SIA, "The August data confirm that the semiconductor industry is in the midst of a broadly-based upturn". Worldwide chip sales are expected to rise by 3% to \$143 billion. The industry continues to forecast accelerated growth rates exceeding 20% in both 2003 and 2004.

August 2002

Billions

Month-to-Month Sales			
Market	Last Month	Current Month	% Change
Americas	2.58	2.60	0.5%
Americas	2.60	2.58	-0.7%
Europe	2.15	2.21	2.8%
Japan	2.66	2.75	3.5%
Asia Pacific	4.26	4.38	2.7%
Total	11.68	11.93	2.2%
Year-to-Year Sales			
Market	Last Month	Current Month	% Change
Americas	2.60	2.58	-0.8%
Europe	2.11	2.21	4.9%
Japan	2.57	2.75	7.1%
Asia Pacific	3.16	4.38	38.4%
Total	10.45	11.93	14.2%

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

Picogiga in a project of re-capitalization with Umicore

The French epiwafer supplier, Picogiga, unveiled a decline in revenues for the third quarter. The first 6 months of 2002 recorded sales of about EUR 4.62 million, a decline of 46.2% from the same period one year ago.

Picogiga is currently negotiating with the Belgian materials company, Umicore, for a rescue package that would result in Umicore acquiring 40–47% of Picogiga's stock in return for a cash injection of around 5.5 million Euros. As of June 30, Picogiga's total indebtedness was in excess of 43 million Euros. Trading in shares of Picogiga on the Paris stock exchange has been suspended.

Umicore's advanced materials strategy is to broaden its expertise in substrate technology by entering the market for the most advanced generation of wafers, as well as to develop downstream opportunities such as epitaxy.

<http://www.picogiga.com> - <http://www.umicore.com>

IQE and Rockwell settle patent lawsuit

IQE plc and Rockwell Automation have settled a lawsuit relating to the MOCVD process patent held by Rockwell, which was part of a licensing agreement between the companies during the period from October 1991 to January 2000, according to IQE.

The settlement agreement includes a cash payment by IQE and the issue of 300,000 IQE ordinary shares of 1p to Rockwell Automation.

Rockwell Automation has agreed to release and discharge IQE and all of its customers from any obligations under any Rockwell MOCVD process patents in relation to wafers purchased from IQE.

<http://www.iqep.com> - <http://www.rockwell.com>

Third quarter results for semiconductor chip suppliers and semiconductor equipment suppliers

Semiconductor chip suppliers:

Company	Q3 Sales	Q3 %change Q-1	Q3Y2001 Sales	Q3Y2001 %change Y-1
AMD	\$500 million	-17%	\$765 million	-33.5%
STMicro-electronics	\$1.63 billion	7.5%	\$1.38 billion	17.5%
Intel	\$6.5 billion	2.8%	\$6.55 billion	-0.76%
Philips	\$978 million	-12%	\$908 million	8.5%

Source: Yole Développement, October 2002

In Brief:

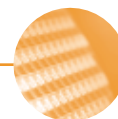
- AMD recorded a second loss in sales for the second consecutive quarter. According to AMD, the loss is due to a weak PC market.
- STMicroelectronics reports sequential and year-over-year increase in the third quarter. According to Pasquale Pistorio, ST's president and CEO, strong revenue performance is the combination of "organic growth" and the benefits of Alcatel Microelectronics acquisition.

Semiconductor equipment suppliers:

Company	Q3 Sales	Q3 %change Q-1	Q3Y2001 Sales	Q3Y2001 %change Y-1
Applied Materials	\$1.46 billion	26%	\$1.58 billion	-7%
ASM International NV	\$124.6 million	-0.63%	\$106.8 million	37.3%
Novellus	\$230.5 million	3.8%	\$303.7 million	-24.1%

Source: Yole Développement, October 2002

Semiconductor equipment supplier suffered from weak macroeconomic conditions and weak demand have had a negative impact on this sector.



Soisic offers CMOS/SOI-Xpert as the first commercially designed kit

The SOI design specialist, Soisic, based in Grenoble, France, has produced CMOS/SOI-Xpert. According to the French company, it is the first commercially available characterization product integrating all SOI structures.

Soisic's kit is optimized for SOI applications including all test structures traditionally used in CMOS technology for debugging technology in the R&D phase or for characterizing in a more mature phase.

According to Soisic, CMOS/SOI-Xpert is an answer to the industrial needs both to facilitate the transition from bulk silicon to SOI products, and to assist in defining design rules for SOI.

Motorola improved its SiGe:C process

Motorola has improved its silicon germanium carbon (SiGe:C) process technology to be used in wireless handsets. Motorola has improved its heterojunction bipolar transistor (HBT) in a BiCMOS process and in this way has reduced the power consumption by a factor of four from the latest performance enhancement of its 0.18 and 0.35 micron SiGe:C HBT. Peak frequency performance improved by 60% compared with the existing process. Motorola's process integrates an HBT with CMOS analog and digital functions on a single chip. Motorola designers used existing models for the latest development. Cutoff frequencies have been improved from 50-GHz to 80-GHz in 0.35- μm and to 120-GHz in 0.18- μm BiCMOS. The noise has been reduced from 0.9-dB to 0.3-dB.

The first production is planned at the beginning of 2003.

<http://www.motorola.com>

ST first 0.13- μm Flash memories

STMicroelectronics' first 0.13- μm Flash memories are to be supplied in engineering sample quantities and will move to volume distribution in Q4 of 2002.

Each memory cell has been reduced to 0.16- μm^2 , representing a 50% size reduction from the previous generation.

The on-chip peripheral CMOS circuitry has been optimized for the 1.8V power supply range used in wireless applications. Using a new surface channel transistor design featuring cobalt salicide and a triple-metal interconnect scheme, transistor driving currents have more than doubled compared with the devices used in the current 0.15- μm technology. 0.15- μm Flash memories are currently mass produced at Agrate, Catania and Singapore.

The 0.13- μm Flash memory was developed in Agrate, Italy, in ST's center of excellence, and the first 0.13- μm products will be a 1.8V, 64Mbit (before future 128Mbit) device featuring multiple bank architecture and synchronous burst read mode.

Applications targeted are in the 3G cellular phone market.

<http://www.st.com>



0.13 μm Flash memories compared with 0.15 μm

Lambda Physik invests in the 157nm technology

Germany's Lambda Physik announced it will invest up to EUR 5 million by 2004 to develop a 157nm laser technology for microlithography. Lambda's first results for the 157nm technology and prototypes were unveiled in 1999. Dirk Basting, Lambda's CEO, said that "In addition to the semiconductor industry, we see interesting applications for the 157nm laser technology in the micromachining and life sciences areas".

The European consortium is composed of industrial partners such as ASML, Carl Zeiss, Jenoptik, Schott and Infineon. Universities and research institutes are also participating in the initiative.

The 157nm technology is expected to be used to produce microchips from 2005-06 on target 50-70nm range.

<http://www.lambdaphysik.com>

ST offers smallest packages for non-volatile memories

ST unveiled two new tiny packages, the MSOP8 (or TSSOP8 3x3 according to JEDEC standards) and MLP8 (or VQFPN8 according to JEDEC standards), in its serial non-volatile memory portfolio, for applications where space for components is limited in consumer, computer, communications and industrial markets.

MSOP8 is 23% smaller compared to its predecessor, the TSSOP8. It has a body width of 3mm, and a length of 3mm. Its thickness is $+0.85 \pm 0.1\text{mm}$. Samples and production are expected during Q4 of 2002 and the MSOP8 will be available from EEPROM I²C bus, SPI bus and Microwire[®] bus portfolios.

MLP8 has a body width of 5mm, a body length of 3mm and an overall thickness of 0.85mm. Samples and volume production are planned for Q4 of 2002 and the MLP8 will be available from serial Flash SPI portfolio.

<http://www.st.com>



MSOP8 and MLP8

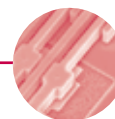
Additional structures are provided to develop standard cell libraries and circuit blocks.

<http://www.soisic.com>

Macrotron extended its product portfolio

Macrotron process technologies GmbH, a distributor of production and inspection systems for the semiconductor field, announced it has extended its product portfolio with a solder ball mounter (SBM-series) from Shibuya Kogyo Co., Japan. The solder ball mounters comprise manual and fully automatic systems for both substrate and wafer level applications as well as complete in-line solutions.

<http://www.macrotron-pt.com>



ST and L'Oréal into R&D for SkinChip®

STMicroelectronics, the world's largest semiconductor company, and L'Oréal, a world leader in cosmetics, announced the first use of semiconductors in the development of next-generation skin care.

The SkinChip® sensor, being jointly developed by the two companies, is based on ST's TouchChip®, developed for use in biometric fingerprint recognition applications. ST's TouchChip® silicon image sensor technology is used by L'Oréal through an innovative research project to develop methods to quickly and easily provide detailed hydration analysis of human skin.

SkinChip® captures 500 dot/inch (dpi) images of the skin in less than one-tenth of a second, under any skin or environmental condition. The sensor will be integrated into a compact device with low power consumption.

The 90,000 active cells of the sensor provide high-quality image definition with a resolution of 50-microns, to provide a detailed image of the micro-relief of the skin.

ST's TouchChip® is a capacitive sensor that uses active capacitive pixel sensing technology.

When used in conjunction with specially developed image capture software, the sensor will generate a 'capacitance' map that can easily be converted into a hydration or dryness map.

Several months were needed to adapt existing TouchChip® software to work on areas of human skin.

Today, the SkinChip® is only used in cosmetics, but other dermatological applications will be investigated in the future

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

Generics forms alliances with Coventor, Epigem and Lionix

The Generics group, provider of full business development and turnkey product design and development services from concept to volume manufacture in the field of health care, medical products, and life sciences, has formed an alliance in microsystems technology (MST).

This alliance includes Coventor, Epigem and Lionix, and its goal is to develop its MEMS technology services, called MST-charged™. MST-charged™ creates a link between novel MEMS technology and mainstream product developers looking to enhance and develop their existing product portfolio. The MST-charged alliance allows a client to access Generic's expertise in MST, product development and business strategy in combination with the partner company's competence.

The alliance makes it possible to bring MST-enabled products to market, creating real opportunities for the rapid growth of MST-enabled products to reach both industrial and consumer markets by introducing microsystems into everyday products.

<http://www.generics.co.uk> - <http://www.coventor.com>
<http://www.epigem.co.uk> - <http://www.lionixbv.nl>

Tronic's announces agreements with Japanese distributors

Tronic's Microsystems, a French manufacturer of custom Micro Electro Mechanical Systems (MEMS) devices for high-end applications, announced that it has reached agreements with two Japanese companies, Marubeni Solutions Corporation and Seika corporation, to represent Tronic's Microsystems' silicon-based microsystems foundry services in Japan.

These agreements are expected to allow Tronic's to penetrate key segments of the Japanese market.

According to Stéphane Renard, Tronic's Microsystems' president, agreements with companies such as Marubeni Solutions and Seika are expected to transform opportunities into profitable business.

<http://www.tronics-mst.com> - <http://www.msol.co.jp>
<http://www.seika.com>

PHS MEMS and Microlab entered a volume manufacturing agreement

At the end of September, PHS MEMS and Microlab announced a volume manufacturing agreement for one of the first RF MEMS switches on the market.

PHS MEMS, based near Grenoble, France, designs and manufactures microsystems for the wireless and optical communications market.

Microlab, based in Phoenix, AZ, develops RF MEMS solutions for a variety of wireless devices, test equipment, and telecommunication systems.

Microlabs has selected PHS MEMS to produce its first magnetic latching RF MEMS after shipping beta samples to its customers in automated tests, wireless communications, automotive and consumer electronics areas.

According to Microlab, PHS MEMS will allow the company to quickly ramp production volumes starting 1st quarter 2003.

<http://www.phsmems.com> - <http://www.microlab.net>

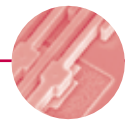
Starting € 6,000, get this invaluable tool to know what's essential on the worldwide MEMS manufacturing activity and market.

Available on a CD-ROM, **WORLD MEMS FAB** delivers :

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- a description of more than 340 MEMS Fabs in the World (North America, Europe and Asia)
- a electronic database
- the monthly magazine **Micronews** for free



Direct inquiries to : **Emmanuel Domanski** - TEL (33) 472 83 41 27
domanski@yole.fr



Memsic secures \$1.9 million in venture funding

In a third round of financing, the CMOS-based MEMS accelerometer/sensor manufacturer, Memsic, announced \$1.9 million in funding from Asian investors. Memsic will use the initial investment to expand its manufacturing capacity in anticipation of rapid expansion.

Memsic's second round of financing was led by Celtic House and included funds from Ironside Ventures, Still River Fund and Investar, both of which participated in Memsic's initial round of funding.

<http://www.memsic.com>

Techno News

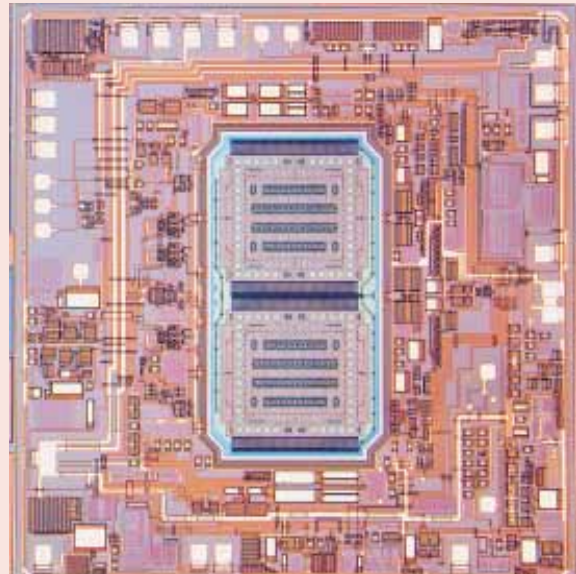
Analog Devices announced the first integrated Gyroscope

Analog Devices introduced a MEMS-based Gyroscope that is the first commercially available device to integrate both an angular rate sensor and signal processing electronics onto a single integrated circuit called iMEMS® ADXRS.

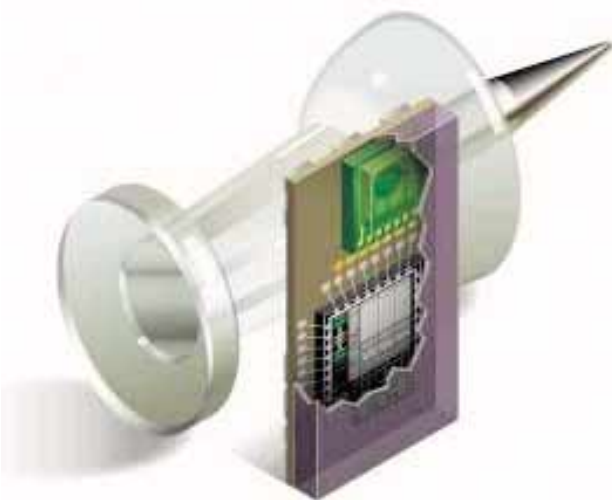
Analog spent 6 years developing the gyro, mounted on a ball-grid array package that is 7mm square and 3mm thick for low consumption.

The advantage of AD's Gyroscope is the low noise output which enables it to be used in many applications to augment GPS receivers where critical location information is required during temporary disruptions of GPS signals. This gyroscope can be applied in GPS/navigation systems, and in stabilizing moving platforms such as automobiles, airplanes, robots, antennas, and industrial equipment. ADXRS combined the gyro and the electronic sensor on one chip to make positional measurements and to interpret data. The result is a low cost gyroscope to be sold for as little as \$10.

<http://www.analog.com>



iMEMS Gyro Die showing the rate sensor and integrated electronics



Kaleidoscope™ Triaxial IMU core Module

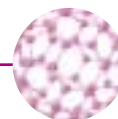
Triad Sensors unveiled a triaxial accelerometer module

Triad Sensors, a privately held corporation based in Minneapolis, MN, and creator of Kaleidoscope™ MEMS technology, announced its first product : a triaxial accelerometer module.

This triaxial MEMS sensor can measure acceleration in the 3 axial directions at the same time.

The device consists of Triad's unique single-chip triaxial sensor and custom ASIC, mounted on a ceramic substrate and encapsulated using conventional IC packaging technology. Triad Sensors used Kaleidoscope™ MEMS technology, that's to say proprietary thin-film piezoelectric materials and a hybrid manufacturing process, achieving high device performance, strong manufacturing yields and a level of application flexibility.

<http://www.triadsensors.com>

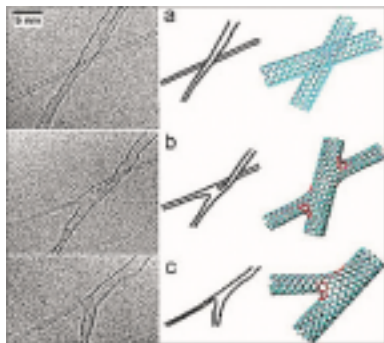


Tiny junctions using Nano-welding

Researchers led by Pulickel Ajayan, professor of materials science at Rensselaer Polytechnic Institute in Troy, N.Y., and his colleagues in Germany, Mexico, the U.K., and Belgium have discovered how to weld together single-walled carbon nanotubes. This is the first time single-walled nanotubes have been welded together, although multi-walled nanotubes with junctions have previously been created using growth techniques. Single-walled carbon nanotubes are perfect cylinders without any defects, but to create junctions between them, inter-tube carbon-carbon bonds need to be formed. The irradiation and heating process that was used created just enough defects for these bonds to form without damaging their electrical properties.

The discovery could pave the way for controlled fabrication of molecular circuits and nanotube networks.

<http://www.rpi.edu/dept/materials/>



Plastic shows promise for Spintronics

Researchers at Ohio State University have expanded the possibilities for a new kind of electronics, known as spintronics. Normal electronics encode computer data based on a binary code of ones and zeros, depending on whether an electron is present in a void within the material. But in principle, the direction of a spinning electron ("spin up" or "spin down") can be used as data, too. So spintronics would effectively let computers store and transfer

twice as much data per electron.

Spintronics uses magnetic fields to control the spin of electrons. Using a magnetic field to make nearly all the moving electrons inside a sample of plastic spin in the same direction is an effect called spin polarization. Achieving spin polarization is the first step in converting the plastic into a device that could read and write spintronic data inside a working computer. The researchers achieved spin polarization in a polymer, which offers several advantages over silicon and gallium arsenide. Plastic spintronics would weigh less than traditional electronics and cost less to manufacture. Currently, inorganic semiconductors are created through multiple steps of vacuum deposition and etching. Theoretically, inexpensive ink-jet technology could one day be used to quickly print entire sheets of plastic semiconductors for spintronics.

<http://www.physics.ohio-state.edu/%7Ecmr/>

Cascading CO molecules for smaller computer ?

A group of researchers at IBM's Almaden Research Center in California has developed a new kind of computing process using the motion of molecules rather than the flow of electrons. The researchers have demonstrated that the use of cascades of carbon monoxide molecules to transfer data could make logic gates. By using a pair of low-temperature scanning tunnelling microscopes, pairs of carbon monoxide molecules have been arranged on a copper surface. A single carbon monoxide molecule is moved alongside one of these pairs, so that the three molecules form a chevron. The molecule at the tip of the chevron therefore hopped to the next pair of molecules, creating a new chevron. This process cascaded throughout the pairs of molecules, in a similar way to the motion of falling dominoes. The IBM researchers used this principle to make AND, OR gates and even more complicated logic by joining several AND and OR gates together.

Unfortunately the molecular cascade devices made by the IBM researchers are

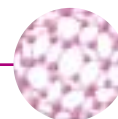
very slow and could only be used to perform a single operation. To re-use the devices the researchers had to place the molecules back into their original position using one of the scanning tunnelling microscopes. To be useful, molecular cascade computers would need an automatic mechanism that would reset some of the molecules and leave the others intact to act as data registers.

HP Labs announced breakthroughs in Molecular Electronics

Researchers at Hewlett-Packard's HP Labs have made a working, 64-bit memory device that uses as few as a thousand molecules to store each bit of information, and they have come up with a process for mass-producing the molecular memory chip.

The researchers' prototype holds 10 times the data of a comparably-sized segment of a silicon memory chip. Ultimately, the molecular technology could pack 100 billion bits into a square centimeter of chip space, which is about 1,000 times what today's chips hold. The molecular memory device consists of two sets of eight parallel wires arranged perpendicularly, one set on top of the other, to form 64 junctions. Each wire is 40 nanometers in diameter. Between the sets of wires is a layer of material only one molecule thick. The molecules act as minuscule electronic switches. Sending a pulse of electricity from one wire to another through the layer of molecules changes the molecules resistance to the flow of electricity. These higher and lower resistance states can represent the ones and zeros of digital information. The memory is nonvolatile, meaning it retains data even when the power has been turned off. High-density memories are likely to be among the first commercialized products to result from nanotechnology research.

<http://www.hpl.hp.com/>



US\$9M funding for Nanomix

Nanomix has closed a \$9m Series B financing round led by Apax Partners and Sevin Rosen Funds. The company has integrated nanotube electronics on a four-inch silicon wafer and performed lab-scale prototyping of a high-density hydrogen storage system. The company plans to produce chemical sensors aimed at industrial gas leak detection, medical monitoring and industrial process control. The leak detection sensors are expected to reach the market in H2 2003. Nanomix is also developing high-density hydrogen storage alternatives for the emerging fuel cell industry.

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

Cetek and Motorola involved in nano-tube-based displays

US ceramics specialist Cetek Technologies has secured a license with Motorola, US

to produce and use carbon nanotube triode technology, which has applications in flat-panel displays. According to Cetek, the combination of Motorola and Cetek's proprietary technologies has produced a high-quality, inexpensive flat-panel display. Motorola's carbon nanotube triodes apparently perform best on Cetek's specially developed ceramic substrate. The displays will have a viewing quality as good as that of conventional cathode-ray tube displays and better than that of active matrix liquid crystal displays (AMLCDs). The company also claims that the displays will consume one-tenth of the power of AMLCD panels and cost a third as much to manufacture.

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

Carbon nanotube composites from Applied Nanotech

Applied Nanotech Inc., US, a subsidiary of SI Diamond has announced the creation of carbon-nanotube composites for electron field emission applications. Applied Nanotech

Inc. is a nanotechnology research and development organization dedicated to generating innovative products and applications using carbon nanotubes, metalized nanoparticles, silicon nanocrystals, and nanowires. Applied Nanotech claimed that it was able to lower the voltage needed for optimal electron emission by combining the carbon nanotube composites with other conductive and non-conductive nanoparticles. Typically, a carbon nanotube needs to be in an electric field of at least 2.5 to 4.5 V/ μm for field emission to take place. Applied Nanotech claims that its composites, on the other hand, have a threshold voltage of between 1.5 and 3 V/ μm under the same conditions. The company claims that this decrease in threshold voltage and the fact that the mixture contains fewer carbon nanotubes, may reduce material cost, enable the use of non-purified carbon nanotubes, allow the use of lower-cost electronic drivers and might not require processes that align the carbon nanotubes perpendicularly to the substrate.

<http://www.sidiiamond.com/ami/>

Quantum dots in volume from Nanoco

UK start-up Nanoco claims to be the first business worldwide to produce and ship quantum dots in multi-gram quantities (preferably sulfides, selenides, gold or silver).

Nanoco spun out of the University of Manchester in December 2001. It also has an office in northern California. The company has patented a single source precursor manufacturing process for quantum dots. It claims the method does not involve the toxic, inflammable and unstable materials that limit the scale of the current standard 'double source' process, and makes it easier to change the size of the particles' cores and shells and to alter the capping agent. As a result, Nanoco says it can easily configure its NanoDots to meet custom specifications.

<http://www.nanoco.biz/>

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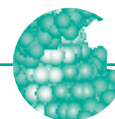
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- 450 profiles (European Fabs, including Israeli and Eastern Europe activities)



Direct inquiries to : Emmanuel Domanski – TEL (33) 472 83 41 27 – domanski@yole.fr





Gyros finalizes distribution agreements for Europe

Gyros signed contracts with the distributors B & L Systems in BeNeLux and Bucher Biotec in Switzerland to market and sell products based on the company's proprietary technology platform.

Gyrolab MALDI has had great success on the biotechnology market and this allows the company to extend its activities into other European regions that are well involved in pharmaceutical and biotech developments.

<http://www.gyros.com>

Collaboration between Nanogen and Bionomics

Bionomics Ltd, based in Australia, is a genomics-based biotech company. The deal, which includes a licensing agreement, is to develop a next generation diagnostic product for epilepsy. Bionomics will develop the test using its own epilepsy gene discoveries and Nanogene's NanoChip@ Molecular Biology Workstation.

Nanogen will provide Bionomics with research support and funding, including development and commercialization milestone payments and royalties.

Nanogen has also settled litigation with Combimatrix: Combimatrix has agreed to pay Nanogen cash totaling \$1 million and to issue Nanogen with 4 million shares of

Combimatrix' stock, or 17.6% of Combimatrix' outstanding shares.

<http://www.nanogen.com> - <http://www.bionomics.com>

Scienion and Metabion design DNA microarrays of highest quality

Two German companies join their know-how to develop DNA micro arrays: Scienion with its experience in design, production, quality control and data analysis of biochips, and Metabion with its experience in synthesizing high-quality long mer oligonucleotides. The first result of this partnership is a custom-specific, ready-to-spot oligo set for the production of biochips.

<http://www.scienion.de> - <http://www.metabion.com>

Strengthened partnership between PamGene and Olympus

The Dutch company, PamGene International B.V. has signed a five years agreement with Olympus Optical Co. Ltd.

This collaboration is a supply agreement arranging product specifications, transfer prices and product delivery. PamGene's strategy is moving from research organization to a product organization. With an growth from 20 to 45 employees in the last 18 months, PamGene is seeking € 15-20 million in a series B funding round.

In addition, PamGene grants also Olympus Optical a license to market and sell PamGene's 4 array platform technology to corporate R&D departments and corporate laboratories in Japan and in Asia.

<http://www.pamgene.com> - <http://www.olympus.co.jp/>

Business News

Orchid Biosciences updates its strategy

The US company will phase out the SNP genotyping instruments and related consumables proposed by its Orchid Life Sciences strategic business unit. It plans to continue providing advanced SNP genotyping services to the pharmaceutical industry.

Dr George Poste explained that the competition and the short product life cycles make the market for research tools and reagents less attractive.

<http://www.orchid.com>

Back to profitability for Virtek

Virtek Vision International Inc. expects to obtain approximately \$23.8 million from continuing operations in fiscal year 2002,

ending January 31, 2003: +5% compared to the same period last year.

Virtek's strategy is based on a strong cash position, balance sheet, market position and customer base. Bob Sandness, President and CEO of Virtek, announced that the company will reserve its cash for future business expansion and that it will focus its effort on sales in order to reach the goal of \$100 million in revenue.

For this, Virtek reorganized its sales taskforce: Virtek appointed a new director of North American sales, Mr Goodnow.

Kevin Quinlan, formerly vice president of business development, is now in charge of sales and the support team. His objectives are to identify and remove impediments to sales, and to determine how to increase revenues. He is also in charge of strengthening relationships with existing and new key distributors.

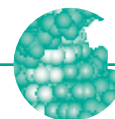
<http://www.virtek.ca>

Key patent for Aspira Biosystems

At the beginning of October, Aspira presented its new US patent 6,458,599 entitled "Compositions and methods for capturing, isolating, detecting, analyzing and quantifying macromolecules". This patent strengthens the position of the company in capture agents for proteins and other macromolecules.

Its innovation consists in solidifying a fluidic material, such as a mixture of polymer precursors which form shaped cavities in the presence of a template molecule that corresponds to a portion of the macromolecule.

<http://www.aspirabio.com>



Progress on strategic objectives and staff reduction for Cepheid

From a research and development company, Cepheid has become a manufacturer and marketer of fully integrated genetic testing systems. The company reached its key strategic objectives for the life sciences, bioterror and genetic assessment markets. The US company has decided to adapt its organization to this strategic realignment by starting with profitability. Cepheid will cut twenty-five full time positions and fourteen contractor positions. The company expects to reduce operating expenses by \$3.5 million per year. These savings will be redeployed to support key programs for its strategic business.

<http://www.cepheid.com>

\$ 3.26 million for Amic

Amic AB, an Uppsala-based microsystems developer, announced that it has raised \$3.26 million in an initial funding round. Investor Growth Capital, a wholly-owned subsidiary of Investor AB, and Innovationskapital participated. Amic was founded in 1998 and has 28 employees. The company will use the new funding to expand its market and production capacity. The biggest customer of Amic is Gyros AB, located in

the same scientific office park in Uppsala.

Bjorn Berg, CEO of Amic, explained that the company grew on revenue generated from customization and production projects and posted revenue of \$2.17 million last year.

<http://www.amic.se>

Six month results for OGS

Revenue decreased from € 13,640 thousand to € 9,049 thousand for the same period. The loss, which reached € 30,560 thousand, reflects the expansion of OGS' drug discovery programs with NeoGenesis and BioInvent. It also reflects the manufacturing costs associated with the launch of Zavesca.

In thousands € **Half year ending June 30**

	2002	2001
Turnover	9,049	13,640
Net operating cost	(45,040)	(35,821)
Operating loss	(35,990)	(22,181)
Loss for the period	(30,560)	(11,323)

Dr David Ebsworth, CEO of OGS, explained that the company has become a R&D-based pharmaceutical company with a focus on products for oncology and inherited storage disorders, supported by world class proteomics.

<http://www.ogs.com>

New Products

Sophion Bioscience will launch its patch clamp system before the end of 2002

Its chip-based patch clamp system is the medium throughput 16-channel QPatch 16.

QPatch 16 has an anticipated screening capability of 250 to 1,200 compounds per work day. This patch clamp system was developed to upgrade the paths to QPatch 96, a 96-channel system to screen 1,500 to 7,000 compounds per work day, scheduled for commercial launch by late 2003.

Sophion Bioscience expects this development to revolutionize ion-channel-based drug discovery.

<http://www.sophion.dk>

A 4D array system from MetriGenix

At the beginning of October 2002, the US company announced the launch of its 4D array system, which is an integrated biomolecular analysis solution for gene expression analysis. This system consists of MetriGenix's patented Flow-thru Chip™ technology. It includes a unique 4D biochip and its associated instrumentation (hybridization and detection stations). MetriGenix's 4D array system can be used for different gene expression analyses and should be used in the future in proteomics research.

<http://www.metrigenix.com>

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Bookham Technology buys Nortel's optical TX/RX and optical amplifier businesses

Bookham Technology announced an agreement to acquire the two following businesses from Nortel Networks for an amount of EUR 114M: Optical Transmitter and Receiver business and Pump Laser and Optical Amplifier business. The first business includes lasers, receivers, transponder modules for metro, long haul and ultra long haul markets. It employs approximately 940 people - around 310 in Ottawa and the rest in Paignton, Devon, UK. The second business designs and builds Raman and EDFA pumps for metro and long haul. It employs approximately 390 in Zurich, Switzerland and Paignton, UK, with operations in Harlow, UK and Poughkeepsie as well. As part of the agreement, Nortel has also agreed to enter into a EUR 120 million supply agreement with Bookham. The agreement is subject to approval by Bookham's shareholders at an Extraordinary General Meeting to be held on November 5, 2002. The announcement stated that Bookham would acquire the assets of the businesses excluding cash balances and accounts receivable, but including inventory valued at EUR 303.6 million on a gross basis and EUR 57.1 million on a net basis.

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

Teem Photonics announced the acquisition of technology

Teem Photonics acquired the technology of former competitor Northstar Photonics in an undisclosed deal. According to Antoine Kévorikian, Teem Photonics CEO, the acquisition will accelerate Teem's EDWA development program and significantly reduce time-to-market. Minneapolis-based Northstar is specialized in developing and producing POWRETM lasers and amplifiers. As a result of this strategic initiative, Teem will receive a series of patents and applications, including their derivatives, as well as trademarks and technological know-how in the transfer. Both management teams believe the convergence of their respective technologies will allow for devices that neither company alone could have produced.

Teem's engineers have just completed a two-month stint at Northstar's facility in Maple Grove, Minneapolis, learning about the company's manufacturing processes and patents, so they could be transferred to Teem's site in Grenoble, France. Teem is not planning to transfer any of Northstar's employees.

<http://www.northstarphotonics.com/> - <http://www.teem-photonics.com/>

Cube Optics raises EUR 10M

The global private equity firm, The Carlyle Group, together with the international venture capital firm, Target Partners, led a second round of financing for Cube Optics AG. Cube Optics has developed a next generation assembly and manufacturing platform which allows bulk-manufacturing of low cost and miniaturized components for data and telecommunications networks. Funded by STAR Ventures and Sevin Rosen Funds, Cube Optics raised this new EUR10 million financing round to extend its product range and gain further market traction. The investment is being made through Carlyle's EUR 650 million European venture capital fund, Carlyle Europe Venture Partners, and Target Partner's EUR112 million early stage fund based in Munich, Germany. It includes follow-on investments from existing investors Sevin Rosen Funds, STAR Ventures and several private investors. Established in August 2000, Cube Optics AG offers fiber optic components like wavelength division multiplexers, splitters and switches for use in various data communication and telecommunication applications. The company claims that its components will be 100 times smaller than those currently on the market.

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

Micro Managed Photon received a capital injection of EUR 1.2M

Micro Managed Photons A/S (MMP) from Lyngby (Denmark) has received a capital injection of DKK 9M from investors LD Pension and Wise Venture, completing MMPs financing for the year 2003. This adds LD Pension to the group of investors behind MMP, which previously consisted of venture capital firms Wise Venture and CAT Seed. LD will be represented in MMPs board of directors. LDs expertise and strong financial backing will be an important asset for MMP in the future. Preparation for securing the next capital injection, which will take place in the middle of year 2003, will start within the next few months.

Furthermore, MMP has left the COM center at DTU to move to new offices on campus, with improved facilities and possibilities for future expansion.

<http://www.mmpbotons.dk>

Transmode Systems AB secures EUR 8.2 million in third round funding

Transmode Systems AB, a pioneer of CWDM technology and a major supplier of CWDM systems, has secured its third round of funding led by the existing investors Amadeus Capital Partners and European Equity Partners (EEP).

Transmode Systems has developed a world-leading Coarse Wavelength Division Multiplexing (CWDM) system and is now experiencing strong growth in sales.

This follow-on round provides an injection of EUR 8.2 million, which will be used to develop new features on the existing product, as well as expand the global sales organization and allow Transmode to continue to take market shares from its competitors.

In spite of, and to some extent because of, the depressed state of the telecoms equipment market, CWDM is gradually gaining acceptance as an efficient, low-cost alternative to DWDM in cities and towns.



Intense Photonics gains additional investment

Intense Photonics (High Blantyre, U.K), which uses a proprietary development and manufacturing technique known as Quantum Well Intermixing (QWI), has received an additional £750,000 (EUR 1.18m) investment from Italian-based Alice Ventures to close its series B funding round. The additional funding increases the round led by Cazenove Private Equity previously announced on August 22, 2002 to £11.25m (EUR 17.6m). Alice Ventures joins the syndicate consisting of Cazenove Private Equity, FNI Venture Capital, TTP Ventures together with first round investors 3i and ACT Venture Capital. Intense Photonics will use the

funds to further accelerate the development of its product range and strengthen its marketing effort. To date, Intense Photonics has successfully secured funding that totals £21.25m (EUR 33.6m).

<http://www.intensephotonics.com>

Highwave sold its thin film coating activities

Highwave Optical Technologies announced the sale of its thin film coating activities in Marseilles. Highwave Optical Technologies and CILAS signed a draft agreement to transfer 100% of Highwave Optical Technologies' Marseilles shares to CILAS. According to Highwave President, Eric DELEVAQUE, this step allows them to refocus their efforts on their core business,

i.e. fibers, Bragg networks and optical amplifiers. What's more, this transaction ensures continuity for Marseilles' technological expertise, while enabling Highwave to forge strong links with CILAS. CILAS (Compagnie Industrielle des lasers) develops, produces and markets laser and laser-based systems for the Ministry of Defense, the Atomic Energy Commission and other well known scientific and industry-related programs.

<http://www.cilas.com/> - <http://www.highwave-tech.com/>



Cube Optics housing

Alliances & Mergers

New companies joined the DWDM pluggable TxRx MSA

Agilent Technologies, Nortel Networks and Agere Systems which, in June 2002 announced the DWDM MSA, announced that six additional companies had joined the MSA and would supply devices having the specification defined: Alcatel Optronics, JDS Uniphase, Mitsubishi Electric, NEC Corporation, Oki Electric and Sumitomo/Excelight. The standard of DWDM MAS is specified by the three companies as having 2.5Gbit/s DWDM pluggable transceiver package outlines, pin function definitions, software interface and electrical characteristics that define transceivers.

<http://www.bofplugdwdm.org/>

Schott ups percentage of ULM Photonics

The German industrial conglomerate, the Schott Group is increasing its stake in the German VCSEL manufacturer ULM Photonics. Schott will take a 52% majority ownership in the spin-off of the University of Ulm.

The announcement said ULM's VCSELs would continue to replace traditional lasers in applications such as medical devices, printing, sensors, and data communications, and quoted Dr. Karl Peter Merz, Member of the Corporate Management Committee of Schott Glas and Chairman of the Board of Directors of Schott Optovance, as saying Schott was pursuing "attractive opportunities to apply ULM's leading VCSEL technology in applications inside, as well as outside, the telecom and datacom markets".

<http://www.ulm-photonics.de/>

Opto Speed signed a distribution agreement for South Korea

Opto Speed of Zurich, Switzerland, a developer and manufacturer of InP based opto-electronic components, founded in 1995, announced an agreement with 19 year old 3C TAE YANG of Seoul, giving Opto Speed a channel for sales and professional after-sales service for the South Korean Market.

<http://www.optospeed.com>

**For €1,800,
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ever made!**

This market study, coordinated by the Institut für Mikrotechnik Mainz GmbH and Yole Développement, and partially funded by the European Commission under the GROWTH program, analyses the technological offer and the industrial demand for Microreaction. 90 interviews from potential end-users and manufacturers / developers of micro-reaction units have been performed.



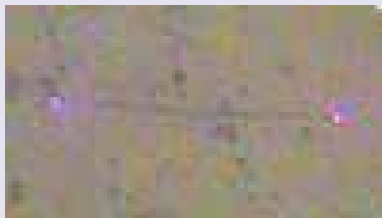
Direct inquiries to : **Emmanuel Domanski**
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GaN nanowire laser emits first light

A team from the University of California (Berkeley) and Lawrence Berkeley National Laboratory have observed lasing in gallium nitride (GaN) nanowires for the first time. The researchers said that its tiny UV-emitting lasers may find uses in lab-on-a-chip systems and in high-density data storage. GaN is a wide-bandgap semiconductor that forms the basis of all UV-emitting LEDs and laser diodes. Emission from nanowire structures has remained elusive but now, thanks to advances in microfabrication techniques, the team has seen emission in both GaN nanowires and films. To stimulate lasing, the GaN nanowires are optically pumped by the fourth harmonic of a pulsed optical parametric amplifier (290 to 400 nm). The next step in the research is to make an electron-injected version of the laser.

<http://www.berkeley.edu/> - <http://www.lbl.gov/>



GaN nanolaser

Furthermore, Nanosys Incorporated, Palo Alto, CA (a newly formed company focused on the development of nanotechnology-enabled systems) announced that it had signed an agreement with the University of California for the exclusive license of semiconductor nanowire-based nanolasers.

Among some potential applications of this technology are high density information storage, high definition displays, photonics, opto-communications and chemical analysis on microchips. This technology could even enable the development of extreme-resolution nano-lithography for next-generation microprocessor fabrication.

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

Blaze Photonics announced PCF with low losses

Scientists from Blaze Photonics, the UK spin-off of the University of Bath, claim to have made a solid-core photonic crystal fiber (PCF) with a loss of just 0.58 dB/km at a wavelength of 1.55 μm . As well as being the lowest attenuation reported to date, the development suggests that PCF is fast approaching the transmission loss of standard single-mode optical fibers (0.2 dB/km). Practical applications for PCF, silica fiber riddled with holes which has unusual optical properties such as enhanced non-linearity and dispersion, have in the past been hindered by the fiber's large optical attenuation of several dB/km. The loss of Blaze's PCF is almost half the dB/km value of the previous best PCF which was made by scientists in Japan and exhibited a loss of 1 dB/km. Blaze's PCF design consists of a solid core made of pure undoped silica embedded in a cladding filled with holes. The air-holes have a diameter of 1.85 μm

and are spaced by 4.2 μm .

<http://www.blazephotonics.com>



Example of Blaze's PCF

Life & Death

Two new optical telecom companies

Despite the massive layoffs in the telecom sectors, and the bad results of the large companies, two new start-ups have recently been created in the optical component sector, more precisely in the source field (VCSELs and coatings for laser diodes).

A new Scottish spin-off company

A new Scottish multi-million pound photonics company is geared up for the future of telecommunications after securing a seven figure private investment deal. The investment has allowed Helia Photonics Ltd, a Heriot-Watt University spin-off, to purchase the coatings division of Terahertz Photonics in a technology transfer deal. They are already in discussion with a European partner over a major contract. Helia will offer high volume coating and characterization finishing services for laser diode producers. Helia has top quality technical expertise, largely developed at Heriot-Watt University during the 1990's. Helia Photonics Ltd will be based at the Kirkton Campus in Livingston.

Another VCSEL start-up

Alight Technologies A/S (Lyngby, Denmark) is yet another spin-off of the COM Research Center, Denmark Technical University, and appears to be aimed at offering the 1310nm VCSEL makers a better way of channeling the light in their devices so that their VCSELs can move into the higher-power laser market. A team of six scientists claims to have hit on a way of turning Vertical Cavity Surface Emitting Lasers (VCSELs), which are traditionally low-power devices best suited to datacom, into high-power lasers suitable for long-distance telecommunications. And they have started up a company to commercialize their work. Alight has just made an agreement with the Technical University's technology transfer unit, DTU-Innovation, for seed funding of 0.8 million, and is hoping to increase that total to €1 million (US\$0.98 million) with additional funding from the Danish Growth Fund.

<http://www.alight.dk> (under construction)

