Micronews

March 2004 - n° 23

The Yole Developpement magazine for Semiconductors, MEMS, Nanotechnology, Bio & Microfluidic Chips and Optics

EDITORIAL

Understanding innovative markets

The sales estimations of innovative technologies or products (quantitative marketing surveys) seem to be quite often in stark contrast with reality when put into historical perspective.

The over-estimations (more than under-estimations) incite companies to invest too much in R&D or production capacity compared to the actual potential of the market. Faced with these facts, marketers have to use or develop innovative methodologies to improve the reliability of market estimations for future technological innovations. I believe the challenge is to tighten the links between qualitative approaches to understand the market (known as marketing surveys) and quantitative surveys to evaluate the market (known as market surveys). It must be unterstood that understanding the market is a pre-requisite to evaluating it.

The article which we have included in this micronews edition “Assessing market potential of new MEMS: what matters is market understanding” was presented at COMS 2002 in Ypsilanti. Professeur Paul Millier from Lyon Graduate School of Business (EM Lyon) and myself co-wrote it. This article is tackling the methodology aspects of marketing surveys versus market surveys. The recent events in the MEMS business should remind us of the importance of this approach.

Starting from now we will regularly present methodological articles in the micronews editions. We hope it will contribute to narrow the gap between technically oriented and market oriented decision making.

Pascal Boulon
Deputy Manager

Contents

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Micronews

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The nanotechnology column is done in collaboration with the IoN. If you have some news that may be relevant to these columns, please contact Ottilia Saxl at the Institute, o.saxl@nano.org.uk

List of companies cited in "Micronews"

MEMS Adixen, Anka, Bookham, Colibrys, Delfmems, EV Group, FLX Micro, FZK, Hymite, IMM, MC2 Technologies, Microfabrica, Nanofocus, PHS MEMS, SAES Getters, Suss MicroTec, XNRI NANO Sumitomo Corporation, Carbon Nanotechnologies Inc, Eikos, Magma, Infineon, Capsulution NanoScience AG, Molecular Imprints, Biotrove, MIT, konarka OPTICS Finisar, Honeywell, Xanoptix, Picolight, Gemfire, Avanex, IPAG, Optospeed, Alcatel, Draka, Sumitomo, CDT, JDSUniphase, Bookham, ANDevices, Dell'Oro Group, APA, Nortel, Sharp, Picogiga, Intel SEMICONDUCTORS AMD, ASM International, ASML, CEA, Dai Nippon Printing, Dalsa Semiconductor, Elmos, ESEC, Fairchild Semiconductor, IMEC, Infineon, Intel, Media-Lario, Micronic Laser Systems, NuTool, Picogiga, Siltronic, Soitec, Sony, Suss MicroTec, Toshiba, Wolfson BIO Aclara, Affymetrix, Allegro Technologies, BioMicrosystems (BioMicro), Ciphergen Biosystems, Ciphergen Diagnostics, Combimatrix, Integrated Sensing Systems Inc (ISSYS), Micronit Microfluidics, NASA, OAI, PamGene, Pfizer, Questra Intelligent Device Management (IDM), Scandinavian Micro Biodevices (SMB), TGen, Verimetra, Zyomyx

January's Worldwide Equipment B: B Ratio at 1.19

January's Worldwide Semiconductor Equipment Book- to- Bill ratio hit 1.19 according to VLSI Research Inc. Worldwide Bookings amounted to $3491M, while Billings were at $2933M. January proved to be surprisingly strong for equipment sales despite typically being a seasonally weak month. Bookings and billings were 46% and 32% above their January 2003 levels, respectively. Of the Billings, $1626M were for Wafer Processing equipment, $711M for Test and Related Equipment, $214M for Assembly, and $382M for Service and Spares.

http://www.vlsiresearch.com

Million USD	Billings (3-month avg.)	Bookings (3-month avg.)	Book-to-Bill
January 2003 (prelim.)	2933.2	3491.4	1.19
February 2004 (Forecast)	2856.7	3350.3	1.17

Billion USD	Billings (3-month avg.)	Bookings (3-month avg.)	Book-to-Bill
December 2003 (prelim.)	13.29	17.08	1.29

Source: VLSI Research, February 2004

Semiconductor Sales up 27.4% Year-Over-Year

According to the Semiconductor Industry Association (SIA), worldwide sales of semiconductors rose 26.6 percent year-over-year to $15.5 billion in January 2004 from the $12.28 billion recorded in January 2003, while sales also recorded a typical month-over-month decrease in January 2004 of 3.0 percent from December 2003. "For more than a decade now, with the exception of the boom year 2000, sales have been slightly lower in January than December because of the seasonality of the semiconductor industry," stated SIA President George Scalise. "We continue to expect sales for all of 2004 to meet the current forecast of 19.4% with broad-based strength in all major end-markets, especially computation, communications, global consumer and automotive".

http://www.sia-online.org

January 2004 ($ Billions)

Month-to-Month Sales			
Market	Last Month	Current Month	% Change
Americas	3.03	2.94	-3.2%
Europe	3.11	2.95	-4.9%
Japan	3.72	3.60	-3.2%
Asia Pacific	6.18	6.07	-1.8%
TOTAL	16.03	15.55	-3.0%
Year-to-Year Sales			
Market	Last Year	Current Month	% Change
Americas	2.56	2.94	14.8%
Europe	2.47	2.95	19.5%
Japan	2.73	3.60	32.0%
Asia Pacific	4.53	6.07	34.0%
TOTAL	12.28	15.55	26.6%

Source: SIA, march 2004-03-03

Dell'Oro Group forecast points to optical transport market recovery

According to Dell'Oro Group's recently published five-year forecast report of the optical transport equipment market, a stable market environment is forecast for optical equipment in 2004 (0-1% year/year growth), with a return to sales growth anticipated in 2005. Sales of optical transport equipment should net $7.3 billion by 2008.

http://www.delloro.com

About Yole

Yole Développement is a market research and strategy consulting company, specialised in :

- -MEMS
- -Compound semiconductors
- -Equipment and materials for the production of semiconductor devices
- -Instrumentation for biology markets
- -Nanotechnologies

Yole Développement offers different kind of services :

- -Custom market research analysis
- -Technology analysis
- -Business development services
- -Specific reports

Created in 1998, Yole Développement is the world leader in the analysis of the Micro and Nano technologies markets. With more than 15 consultants, Yole Développement is working worldwide with the key industrial companies, R&D institutes and investors in order to help them to understand the markets and technology trends. Yole Développement is taking into account the complete value chain in its analysis, including materials and capital equipment business, device manufacturers and system manufacturers, users of the devices.

New Projects

New workshop on regional economical developments

Battelle and Yole Développement will organise in Paris on Wednesday, 28 April 2004 the first-of-a kind program called: TECHNOLOGY AS ENGINE OF ECONOMIC DEVELOPMENT: The U.S. and European Experience. For further information on participation contact David Jourdan at Yole Développement: Telephone (33) 472 83 01 90 or e-mail jourdan@yole.fr

Battelle
The Business of Innovation

New Reports

The following reports are available at Yole Développement :

World MEMS fab : report analysing the MEMS applications/markets and describing all MEMS manufacturers worldwide

Report name : WMF
Publication date : April 2003
Number of pages : 80 pages plus a CD ROM including 366 of company profiles
Price : 4.500 Euro/5.600 US$

SiC World Markets. From materials to devices : report analysis the SiC markets for the materials, production equipment and devices (paper report, Excel file for market evaluation and 80 profiles, 4.500 Euros)

Report name : SiC
Publication date : September 2004
Number of pages : 133 (PowerPoint presentation) plus 160 pages of company profiles (80 profiles) plus a complete Excel file presenting SiC markets, from materials to equipment and devices
Price : 4.500 Euro/5.600 US$

World Inertial Sensor Markets : report analysing the MEMS inertial sensor markets and applications, manufacturing organisations and products on the market (paper report and 20 profiles, 2.900 Euros)

Report name : WISM
Publication date : January 2004
Number of pages : 80 (PowerPoint presentation) plus 45 pages of company profiles.
Price : 2.900 Euro/3.800 US$

New multi-customer action.

We are launching new multi-customer action on the following subjects :

- -GaN markets : from materials to devices
- -Polymer MEMS
- -Micro fuel cells
- -World MEMS equipment and materials markets

CONTACT

To have more information on Yole Développement activities:
J.C. ELOY Tel : +33 472 83 01 82 Email : eloy@yole.fr

Assessing market potential of new MEMS: what matters is market understanding.

YOLE Développement's activity is based not only on the technical and economic knowledge of the microtechnology world but also on sound methodologies when assessing marketing analyses. That is why we have decided to include articles in future Micronews that will reveal certain key aspects of the methodologies we are implementing every day here at YOLE.

One of the key elements needed to perform accurate studies is to first focus on "understanding" the market versus "quantifying" it. The importance of this was underlined last year by Jerry Sanders, co-founder of Advanced Micro Devices (AMD): "But it's all about innovation, and I think that increasingly, low cost manufacturing and process technology will be less a differentiator, and things will be more dependent on creative design and market understanding " (International Herald Tribune, March 16-17, 2002).
As a matter of fact, sales estimations of innovative technologies or products (quantitative marketing surveys) seem to be quite often in stark contrast with reality when put into historical perspective.
Faced with this fact, YOLE's marketers have to develop innovative methodologies to improve the reliability of market estimations for future technological innovations. We believe the challenge is to tighten the links between qualitative approaches, which are implemented to understand the market (known as marketing surveys), and quantitative surveys, which are implemented to evaluate the market (known as market surveys). It must be clear that understanding the market is a pre-requisite to evaluating it.
Our experience based on several hundred studies in all industrial fields and not only in micro- and nanotechnologies, enables us to state two essential points.

A qualitative analysis must precede a quantitative analysis.

Evaluating the potential of technological innovation does not usually leave enough room for qualitative data that have an impact on market quantification. It is impossible to quantify what has not yet been legibly described. It is necessary to define what is called the "market": what are its borders? What is the structure of the market (player types and their roles)?
A common misleading quantification practice is to sum up the sales estimations of competing suppliers while forgetting to pay attention to the characteristics of potential customers, that is to say to the understanding of their technical needs and behavior which determine their future buying potential. It is also difficult to distinguish the redundant data on the market, since several suppliers share the same potential customers in total confidentiality. Moreover the new developments can lead to user "unfriendly" products, which, although they encounter a certain success, have an intrinsically limited potential.

Quantifying the market can not be carried out without taking into consideration the possible means for accessing the market.

When drilling for oil, for instance, some oil reserves can only be reached if the oil company has the means to drill in a harsher environment than usual.
This second point naturally leads to a reflection on the sales price in relation to the market volume. If we take the preceding example of drilling for oil, the means implemented to attain the oil reserves depends on the production costs. Drilling stops when production costs are too high for the market. We must remember that these production costs evolve along with the technological advances available.
Moreover, innovation – and more generally the global offer of a company – has an intrinsic potential (level of attractiveness relative to market expectations) which enables it to drill into the market to a greater or lesser extent.
To perform a qualitative analysis, it is necessary to carry out some research to create an image of the market in the shape of a puzzle. In order to do this, criteria must be identified that will explain industrial choices. From there, the contour of the puzzle can be defined as well as all its pieces. These make up the market segments.
There are two types of criteria to be identified :
- The technical criteria which answers the "what", that is to say the specs expected by potential clients.
- The behavioral criteria which answers the "why", that is to say the reasons that lead industry to choose a technical solution guided by its practices, its culture, etc. at a local or worldwide level.
Each market segment has its own technical and behavioral characteristics which make it unique. It is then possible to quantify the market by market segment.

For more information, contact Pascal Boulon, Deputy manager
boulon@yole.fr
References
MILLIER Paul - L'étude des marchés qui n'existent pas encore ,Editions d'Organisation, Paris, 2002

Micromachined gyros: market and players

The gyros market is forecast to be one of the largest growing MEMS market in the years to come. Yole estimates a yearly growth rate above 27 % over the 2002 – 2005 time period. This is due to the maturity of the technology and the large volume applications targeted (automotive). This report reviews the gyros market, the main players and manufacturing technologies.

A market of $649 millions in 2005 !

The following table (Figure 1) shows the gyros market forecast for the 2002 – 2005 time period. The market has been estimated to be $314 million in 2002 and $649 million in 2005. This is a 27% CAGR. Today, the automotive application is 90% of the overall market for:

- Rollover detection
- Navigation (GPS)
- Antiskid systems

The main characteristics of the automotive field is that it requires low cost chips. The gyros' ASP is in the range $15 to $30, which is still considered as an high price for automotive components, thus restricting the use of gyros to high-end cars.

We estimate that 48 million of gyros will be necessary in 2005. In 2007, Analog Devices forecasts a demand for MEMS gyros of 57 millions units.

	2002			2005	
	Units	ASP ($)	Market	Units	ASP ($)	Market
Rollover	2	18	36	5	15	75
Navigation	12	13	156	36	10	360
ABS/antiskid	2	50	100	5	30	150
Image stabilizers	0.5	30	15	2	20	40
Defense	0.005	1300	6.5	0.03	800	24

Figure 1: Gyros market forecasts in million units and $ million market (Yole source)

Main manufacturers are BAE SSS, Bosch, Delphi-Delco, BEI Systron Donner, Murata, Matsushita, X Fab and Samsung.

In 2002, the total volume market was 16 millions of chips for a $292 million market.

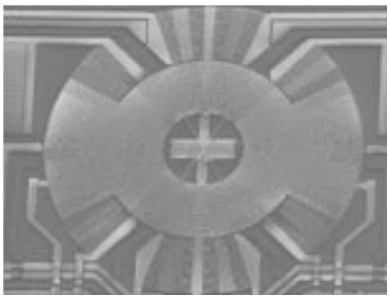


Figure 2: Bosch gyroscope

A large part of the production is using DRIE

Production yield for gyros is in the range of 50% today. We estimate that half of gyros are silicon or quartz surface micromachined. The others are bulk micromachined (for example, SSS is using Deep RIE equipments) but some other players are using Deep RIE equipments in surface micromachining process in order to take benefit from the high etching rate. We then estimate that 70% of the gyros for automotive market are manufactured using Deep RIE equipments.

	BAE SSS	Bosch	Delphi-Delco	BEI Systron	Murata	Samsung
Principle	Annular ring	Si comb drive cells and ring	Annular ring	Double quartz tuning fork	Comb drive cells	Comb drive cells
Performance Technology	0.3 to1°/s Si bulk (with DRIE)	0.3 to1°/s Si surface (with DRIE)	0.1 to1°/s Si bulk (with DRIE)	0.1°/s Quartz micromachi-ning	1°/s SOI comb drive	1°/s Si micromachi-ning

Figure 3: Gyros companies performances and technologies (automotive field)

Figure 3 shows the process characteristics for the main manufacturers of gyros (for the dense application, the performance – bias stability - is generally in the range 0.001°/s to 0.01°/s).
In conclusion, gyros will be a very fast growing market for MEMS in the next years. Like accelerometers, it is also the MEMS devices which is mainly made by DRIE equipment.
In the Special Reports to come in further issue of Micronews, one will especially dedicated to DRIE.

Example of technology dissemination for gyros: From automotive to defense applications

BAE SYSTEMS' SiVSG® vibrating-structure MEMS gyroscope measures inertial force using a vibrating Si ring. Originally developed for automotive use, the gyro has been implemented in Segway™ Human Transporter, a two wheels vehicle stabilized and balanced by this sensor.

The silicon gyro is combined with other precision sensors and electronics to create the SiIMU®, which measures less than 200 cm^3, weighs less than 250 g. As a miniature inertial measurement unit, SiIMU® is used in missiles, guided rockets, gun-launched guided projectiles, and unmanned aerial vehicles.

Up to now, BAE has produced about 6 millions gyros

Yole Développement has just released the World MEMS inertial Sensors Market study. If you are interested, please contact Jean-Christophe Eloy at eloy@yole.fr.

New offer from Yole Développement:

THE WORLD MEMS INERTIAL SENSOR MARKETS REPORT

The MEMS gyroscopes markets will exceed the MEMS acceleration sensors markets in 2005.

The inertial sensor applications are the most buoyant of the MEMS markets. Yole Développement evaluated that, between 2002 and 2005, the compound annual growth rate (CAGR) of gyroscopes will exceed 25%, growing from 314 M$ in 2002 to 649 M$ in 2005. As a comparison, the CAGR of acceleration sensors will be 15%, growing from 420 M$ to 550 M$ over 2002-2005. **For the first time, the markets for micromachined gyroscope will exceed acceleration sensor markets in 2005.** Both markets are dominated by automotive applications

This new report provides a complete in-depth analysis of the micromachined acceleration sensors and gyroscopes applications and markets. Yole Développement also describes for the first time **the market shares in the automotive fields of the different manufacturers** , a comparison of the different devices available on the market, complete profiles of all the worldwide manufacturers (including manufacturing facilities) and a clear analysis of the technology trends.

Report name	WISM
Publication date	January 2004
Number of pages	80
Price	2.900 Euro/3.800 US$

CONTENT OF THE REPORT:

- Executive summary
- Methodology
- Overview of MEMS markets and importance of the inertial sensor business
- Presentation of the manufacturing technologies for gyroscopes and acceleration sensors (flowcharts)
- Presentation of the different sensing principle for gyroscopes and acceleration sensors
- Analysis of the applications and linked markets in the automotive, consumer, medical and defence business
- Comparison of the products on the markets for gyroscopes and acceleration sensors (specifications and prices)
- Forecasts of the applications and markets
- Focus on the automotive market: market shares of the devices manufacturers in the automotive fields, both for gyroscopes and acceleration sensors
- Analysis of the strategies of the major players
- Presentation and analysis of the manufacturing facilities of the major 20 major inertial sensor manufacturers and complete profiles
- Synthesis and conclusion

Company profiles included in the report : Analog Devices, Applied MEMS, BAE/SSS, BEI Systron Donner, Bosch, Colibrys, Conti-Temic, Dalsa Semiconductor, Delphi, Denso, Honeywell, IMT, Murata, Matsushita, Samsung, Sensonor/Infineon, STMicroelectronics, Tronic's Microsystems, VTI Technologies, X-Fab.

Contact for more information or for purchasing the report :
JC ELOY Tel : +33 472 83 01 82 Email : eloy@yole.fr

Life & Death

PHS MEMS announced crash landing

On February 20, 2004, the Commercial Court of Grenoble, declared the Grenoble based PHS MEMS company to be in liquidation after six years of activity. It has been closing its operations and has proceed with the dismissal of all of its 95 employees. PHS MEMS, located in Grenoble, France, has been developing and manufacturing RF MEMS for the wireless market based on proprietary technology such as metal, polymer and magnetic materials processing. Throughout 2003, the new technology push for industrial MEMS solutions for the RF front-end resulted in a growing market pull as key applications were accepted by major OEM's. The solutions offered by PHS MEMS for integration within RF modules were the best in its class and its technology roadmaps successfully fit customer expectations. The company has been a leader in target market segments and was earmarked for significant expansion. However, the cash situation of the company could not continue to support the delivery and acceptance deadlines inherent in the MEMS production supply chain. PHS MEMS' assets, including its extensive intellectual property assets, will be sold with the primary aim of consolidating technology packages related with specific applications to allow for continued market solutions and customer satisfaction.

http://www.phsmems.com

FLX Micro Launches New Web Site

FLX Micro unveils its new website at the end of January 2004. FLX Micro develops advanced MEMS sensors based on its proprietary technology platform in silicon carbide (SiC) microfabrication, which includes patent pending processes for the deposition and etching of poly-SiC films, as well as methods to monolithically integrate poly-SiC microdevices with electronic circuitry. This unique combination of capabilities results in a true breakthrough in MEMS sensors made from advanced materials, allowing FLX Micro to fabricate poly-SiC microsystems cost-effectively for high-volume production. Moreover, our innovative approach is designed to be easily portable into a silicon-based semiconductor manufacturing environment, enabling the integration of SiC as a cost-effective alternative to silicon and other materials.

http://www.flxmicro.com

Nanoimprint technology from DNRI to AIST

Based on its business judgement in terms of using parent company's (Mitsui's) expertise, DNRI, part of XNRI group and specialized in the R&D of nano- and micro-devices, primarily MEMS and MOEMS, decided to stop developping Nanoimprint System. The company will transfer its technology to National Institute of Advanced Industrial Science and Techonology (AIST) and also transfer its marketing function to Hakuto Co.,Ltd. Hakuto, one of the biggest specialized trading company in semiconductor field with good knowledge and experience in nanoimprint technology.

http://www.xnri.com

Adixen, the new brand name for Alcatel Vacuum Technology

Alcatel has concentrated all its strength in vacuum solutions and Micro Machining Technology into a new brand name: Adixen. The company organization and shareholders will remain unchanged. The micro Machining Systems Product Group of Alcatel Vacuum Technology has enjoyed a very strong growth of more than 40% over the year 2003.

http://www.alcatelvacuum.com

Business News

Microfabrica secures $15 million funding in Series B

Microfabrica, Inc. has closed $15 million in Series B financing, led by international venture capital firm WK Technology Fund. All of Microfabrica's existing investors also participated in this round, including DynaFund Ventures, Draper Fisher Jurvetson, Partech International, ChevronTexaco Venture Equities, Zone Ventures and Atherton Venture Partners.The funds will be used primarily to expand Microfabrica's global presence, move into a production mode and expand the capabilities of the company's unique EFAB® manufacturing process to cover additional markets. The EFAB process enables complex microdevices and microsystems previously impossible or impractical to manufacture using other approaches.Microfabrica previously raised $11 million in 2001 and $5.7 million in 2002.

http://www.microfabrica.com

Alliance & Mergers

Strategic alliance for LIGA method

In a strategic alliance, the ANKA Angströmquelle Karlsruhe GmbH, the Institut für Mikrostrukturtechnik of the Forschungszentrum Karlsruhe (IMT) and the Institut für Mikrotechnik Mainz GmbH (IMM) offer services for the fabrication of microproducts using the LIGA method. ANKA is going to take orders as a one-stop shop, separate production steps and delegate them to the ideal partner. The cooperation's aim is an unprecedented time-saving and cost-efficient production, said the institutes. The partners are committed to fulfill all relevant quality standards for industry and realize large volumes with the LIGA process. Together with BESSY GmbH (Berlin), ANKA, IMT and IMM participated in the MODULIGA project of the Federal Ministry of Education and Research (BMBF) in order to adjust the entire LIGA process chain to industrial needs.

http://www.anka-online.de

http://www.fzk.de

http://www.imm.mainz.de

Delfmems and MC2 are linked to propose expertise for RF MEMS reliability

Delfmems and MC2 (Microwave Characterization Center) link their know-hows to expertise the reliability of your RF MEMS in a same place : IEMN Lab. The combination of MC2 and Delfmems reliability test benches allows an expertise of RF MEMS : the evolution of the sij parameters and the mechanical properties can be determined at the same time. Development of test bench (under ultra high frequency probes) permits to stress active, passive and MEMS devices in large signal (500 MHz to 26 GHz) and DC conditions. Today, six devices can be simultaneously tested and in the future, the number will be extended to twelve. The reliability test can be carried out at different humidity rates but only in the temperature range 300 to 450 Kelvin.

http://www.delfmems.com

http://www.mc2-technologies.com

Bookham Technology and Colibrys use new MEMS concepts

MEMS designs and fabrication processes have been jointly established in a complementary relationship between Bookham Technology plc and Colibrys SA to create and implement variable optical attenuator modules. Bookham Technology has designed and patented three-dimensional MEMS structures with micro-shutters to produce optical attenuation with analog control. To commercialize these component parts, Bookham has designed them as generic building blocks that are readily integrated into modules such as dynamic transmitters and receivers. Colibrys has established innovative approaches to the fabrication of a MEMS die that embodies the Bookham designs. In this collaboration, a dedicated snap-apart method is deployed for MEMS-wafer dicing as a necessary replacement for standard semiconductor dicing strategies that prove to be unsuitable for these categories of MEMS devices. This approach delivers high-yield separation (singulation) of MEMS chips in a manner compatible with standard pick-and-place semiconductor equipment and ensures maximum reliability by avoiding particulate generation.

http://www.bookham.com

http://www.colibrys.com

Techno News

SUSS MicroTec delivered first semiautomatic pressure chamber prober to DELTA

SUSS MicroTec AG recently delivered the world's first semiautomatic pressure chamber prober to their MEMUNITY partner DELTA (Danish Electronics Light and Acoustics). According to SUSS MicroTec, The PAP200 is the only prober available capable of testing in a controlled environment from vacuum up to 50 bar. The system, which was developed in collaboration with DELTA, will be used for testing devices such as pressure sensors for plane and truck tires as well as sensors which react to changes in hydraulic systems. These sensors need to detect small changes in pressure and must be able to withstand up to 30 bar without failing. The PAP200 is available at DELTA for tests effective immediately.

http://www.suss.com

SAES Getters extends the lifetime of wafer-level MEMS devices

SAES Getters Group announced that the recently launched PaGeWafer 1, the patterned getter film wafer for wafer-level packaged MEMS technology, has been officially presented to the North American industry and academic community at Photonics West 2004. Leveraging on the Group's 60-year expertise and worldwide market leadership in the getter technology for ultra high vacuum applications, PaGeWafer consists of a wafer with a patterned getter film, a few microns thick, that is placed onto specific cavities of any shape and depth. By providing a maximized sorption of all active gases, like H2O, O2, CO, CO2, N2 and H2, SAES Getters' PaGeWafer guarantees vacuum long term stability in wafer-to-wafer hermetically bonded MEMS devices, such as gyroscopes, accelerometers, IR sensors, pressure sensors, RF devices, resonators, displays, biomedical and optical devices.

http://www.saesgetters.com

EVG to unveil its next generation spray coater at SEMICON China

EV Group, a global supplier of wafer bonding and lithography equipment, will present the newest generation of its EVG®150 Automated Spray Coating system at SEMICON China March 17-19. The improved coater offers enhanced coating performance, even when challenging surface topographies exist, and enables new applications in MEMS, advanced packaging, compound semiconductors and thin-film markets. The new EVG®150 with OmniSpray® Coating technology represents the third generation of refinements since 1998. Designed for conformal coating of substrates with challenging surface topographies such as cavities, the coater is also excellent for small and irregular substrates. Applications of the refined coater process include the full bandwidth of MEMS applications, e.g. used for acceleration, pressure-sensors, wave-guides and substrates with topographic structures in general; advanced packaging such as BCB spray-coated wafer bumps for under filling and air bridges; compound semiconductors; new thin-film applications for organic materials, such as OLEDs and displays; read-and-write heads; and inkjet printer heads

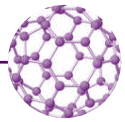
http://www.evgroup.com

Hymite and Nanofocus announced breakthrough in wafer-scale hemerticity testing

Hymite A/S and NanoFocus AG announced that they have achieved a major breakthrough in wafer-level hermeticity testing of packaged optoelectronic components and MEMS devices that use Hymite's proprietary HyShell™ and HyCap® chip scale packaging technology. Many types of electronic and photonic components and MEMS devices require the protection of a hermetic package for reliability reasons. Verifying that a packaged component is hermetic is currently done by testing each individual packaged component separately. This is an expensive process and testing multiple packages at the same time is a significant contribution to lowering the cost of packaging. Hymite and NanoFocus have jointly developed an optical leak detector for Hymite's proprietary HyShell™ and HyCap® products. The leak detector is based on NanoFocus' µScan® profilometer and enables low-cost wafer-level hermeticity testing against Telcordia specifications covering the full range from gross leak to very fine leak testing.

http://www.hymite.com

http://www.nanofocus.de



Business News

New European project on emerging nanopatterning methods

The European Commission (EC) NaPa project on emerging nanopatterning methods aims at integrating top down miniaturisation and bottom-up self-assembly fabrication approaches. NaPa aims to build upon know-how acquired in different countries and in several projects funded within the EC Framework 5 (FP5) research structure. The tools to be developed within NaPa will be less capital-intensive and the processes are envisioned to be environmentally friendly. The key outcome from NaPa will be standardisation of processes for nano-patterning, forming the basis of a library. Such a library would resemble those already available for complementary metal oxide semiconductor (CMOS) technology. The project also aims to ensure that the resulting nano-patterning standard addresses future demands for integrated circuits, pharmaceuticals, biotechnology and medicine.

http://europa.eu.int/comm/research/fp6/p3/firstcallresult_en.html

Capsulution NanoScience AG Triples Turnover during the second half of 2003

Berlin-based Capsulution's success is based on the continued development of its nanoproducts and the acquisition of several major partners and clients. Another substantial increase in turnover is expected for the current year. Capsulution develops innovative nano- and micron-sized capsules which can be given biochemical, electrical, optical and magnetic properties as required, and can be used in many applications including drug delivery, cosmetics and diagnostics. Capsulution's clients and partners include Bayer AG, Gelita, SCA Hygiene Products, Cognis and OctoPlus.

http:// www.capsulution.com

Molecular Imprints sells Nanolithography tools to Korea

Molecular Imprints, Inc., manufacturers of step and flash imprint lithography equipment, announced the sale of its Imprio 100 tool to South Korea's new National Nanofab Center at the Korea Institute of Science and Technology. The Imprio 100 system represents the next generation in nano-lithography, and delivers high resolution, sub-micron alignment, and 3-dimensional replication allowing cost-effective, sub-100nm lithography. The Imprio 100 can handle up to 200mm wafers, with fine alignment to 250nm, 3 sigma.

http://www.molecularimprints.com

Biotrove, Inc. raises $10.9 million for novel nano-scale drug discovery solutions

Investors in the development of Biotrove's 'Living Chip™' and 'Momentum™ Assay Development and Screening' technique include Catalyst Health and Technology Partners, CB Health Ventures, Zero Stage Capital and BioFrontier Partners. Living Chip is a nano-liter fluidics platform for massively parallel and low-volume analysis of genetic, genomic, proteomic, biochemical and cellular samples. Momentum Assay Development and Screening is an ultra high-throughput mass spectrometry technique that enables screening of targets with promising biology that are generally not pursued.

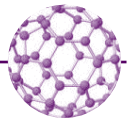
http://www.biotrove.com

Techno News

Paint deals with noxious gases

A paint that absorbs some of the most noxious gases from vehicle exhausts will goes on sale in Europe in March. Called Ecopaint, it is designed to reduce levels of the nitrogen oxides, (NOx gases) which cause respiratory problems and trigger smog production. The paint base is polysiloxane, a silicon-based polymer. Embedded in it are spherical nanoparticles of titanium dioxide and 30nm calcium carbonate particles. Because the particles are so small, the paint is clear, but pigment can be added. The first paint to go on sale will be white. The polysiloxane base is porous enough to allow NOx to diffuse though it and adhere to the titanium dioxide particles. The particles absorb ultraviolet radiation in sunlight and use this energy to convert NOx to nitric acid. The acid is then either washed away in rain, or neutralised by the alkaline calcium carbonate particles, producing harmless quantities of carbon dioxide, water and calcium nitrate, which will also wash away.

THE INSTITUTE OF NANOTECHNOLOGY



Techno News

New Levels of Efficiency in Flexible Photovoltaic

Konarka Technologies, Inc. is focused on the development and commercialization of “third generation” photovoltaic cells that are light-weight, flexible and versatile. They are coatable, plastic, and can be used in many applications where traditional photovoltaic can’t compete. Konarka have now built functioning, full-size production cells that have achieved close to eight percent efficiency and expect to exceed 10 percent in the coming months. Pilot-scale production will begin later this year; scaling-up production capacity in 2005.

http://www.konarka.com

MIT's Nanoruler Could Impact Space Physics

An MIT device that makes the world's most precise rulers could impact on fields from computer chips to space physics. The Nanoruler is 10 to 1,000 times faster and more precise than other methods and can pattern gratings with lines and spaces separated by only a few hundred nanometers across a surface 300 millimeters in diameter, with a precision of less than one nanometer. These surfaces are key to a number of applications such as wafers for the production of computer chips and higher-resolution space telescopes.

http://snl.mit.edu

Alliances & Mergers

Sumitomo Corporation seals agreement with Carbon Nanotechnologies Inc.

Sumitomo and Carbon Nanotechnologies Inc. (CNI) have finalized an exclusive distribution and marketing agreement for CNI's single wall carbon nanotubes in Japan and South Korea. Sumitomo is also investing in CNI; which was founded in early 2002, under the direction of Dr. Richard Smalley, the Nobel Prize Laureate for Chemistry. CNI is the first company in the world to commercially mass-produce single wall carbon nanotube.

http://www.sumitomocorp.co.jp

Eikos Receives $1 Million Investment from Itochu International Inc.

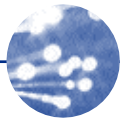
The $1M funding will be used to further develop high transparency carbon nanotube inks for conductive films for markets including flat panel displays, solar energy and OLED lighting. Eikos’ transparent conductors enable high volume, low cost production of a thinner, more flexible and more durable conductive coating technology that will displace Indium Tin Oxide (ITO) as the industry standard. Itochu’s mission is to provide infrastructure and support to help innovative, entrepreneurial companies commercialize their technologies. Itochu International Inc. is a subsidiary of Itochu Corp, one of Japan's leading companies. Its revenues place it among the world's largest corporations.

http://www.itochu.com/
http://www.eikos.com/

Magma and the Chinese Academy of Sciences to Establish the Nanotechnology Design Lab

Magma(R) Design Automation Inc. (Nasdaq:LAVA), a provider of chip design solutions, and the EDA center of the Chinese Academy of Sciences (CAS) today announced the signing of a joint agreement to establish the Nanotechnology Integrated Circuit Design Lab. Under this agreement the lab will develop and provide advanced integrated circuit (IC) design solutions for nanometer technologies based on Magma's integrated RTL-to-GDSII flow. These solutions will be used in CAS' education programs, research projects and commercial applications, which aim to increase the availability of advanced IC design capabilities in China.

http://www.cas.ac.cn
http://www.magma-da.com



Alliances & Mergers

Gemfire to acquire planar lightwave circuit business unit from Avanex

Avanex Corporation and Gemfire Corporation announced the signing of a definitive agreement by which Gemfire will acquire Avanex's silica planar lightwave circuit (PLC) unit in Livingston, Scotland. The passive PLC products from Avanex's U.K. operations will complement the polymer PLC dynamic waveguide products of Gemfire, the first company to qualify polymer optical components to stringent Telcordia standards. The companies said the transaction is expected to close this quarter and is subject to customary closing conditions. As part of the agreement, Gemfire will acquire all outstanding capital stock of the U.K. subsidiary of Avanex, and Avanex will acquire a minority equity interest in GC Holdings, parent company of Gemfire Corporation. After completion of the acquisition, Gemfire will specialize in providing integrated planar WDM solutions to the optical networking systems market. The Livingston facility includes one of the most advanced production lines in the world for WDM planar devices, and operations will be transferred without disruption.

http://www.avanex.com/
http://www.gemfire.com/

Hybrid optoelectronic IC makers consolidate

Xanoptix, a manufacturer of high-density parallel optics and 2D VCSEL-based transceivers, has completed the acquisition of AraLight, which makes high-density optoelectronic components. Xanoptix, based in Merrimack, New Hampshire, says that the acquisition strengthens its multichip hybridization and parallel optics intellectual property portfolio and consolidates its leadership in high-channel density 850 nm parallel optics transceivers. Xanoptix has developed a chip-level hybrid IC technology to combine silicon ICs and compound semiconductor devices. The company offers cost-effective die integration services to component and system owners, and also designs and manufactures its own optical connection products for next generation data links and optical communication applications.

http:// www.xanoptix.com/

Alcatel and Draka to form jointly owned optical fiber and cable company

Alcatel and Draka (Amsterdam) today announced their intention to combine their global optical fiber and communication cable businesses into a jointly owned company. It is agreed that Draka would own 50.1% of the new company and Alcatel 49.9%. In optical fiber and fiber cables, the combination would be the undisputed number one in China, through the combination of Alcatel's assets with Draka's interest in YOFC, the leading Chinese optical fiber and fiber cable manufacturer. The new company would also be a leader in Europe and a major player in North America.

http://www.alcatel.com
http://www.draka.com

Finisar to acquire Honeywell's VCSEL Optical Products business

Finisar Corporation and Honeywell International Inc. announced today that they have entered into a definitive agreement in which Finisar has agreed to acquire Honeywell's VCSEL Optical Products business, based in Richardson, Texas, for approximately $75 million in cash. The transaction is subject to applicable regulatory approvals and other customary closing conditions and is expected to close in the first calendar quarter of 2004. Following the completion of the acquisition, Finisar expects to continue to operate the business at the Richardson, Texas facility.

http://www.finisar.com/home/
http://www.honeywell.com/

IPAG buys Opto Speed's assets in Germany

Innovative Processing AG (IPAG), a manufacturer of InP-based optoelectronic devices based in Duisburg, Germany, has acquired the assets of Opto Speed Deutschland GmbH (OSD). The deal provides IPAG with a product portfolio containing Fabry-Perot (FP) and distributed feedback (DFB) lasers operating at 1310 and 1550 nm, as well as superluminescent diodes (SLEDs).

http://www.ipag35.de/

Alliances & Mergers

Honeywell? Finisar? Picolight doesn't care

Back in November 2003 Picolight Inc., a supplier of VCSEL-based transceivers and VCSEL subassemblies, signed a cross-licensing agreement with Honeywell VCSEL Optical Products for laser-related intellectual property. Despite the fact that Finisar just purchased the Honeywell business line, Picolight won't lose sleep over the fact that a direct competitor now has a license for its technology. According to Warner Andrews, vice president of marketing at Picolight, the agreement was designed to reassure customers that they could rely on an uninterrupted supply of products based on "oxide-confined" VCSELs from the company, despite the fact that Picolight and Honeywell had potentially competing patents on aspects of the technology. The licensing agreement -- which applies to four Picolight patents and one Honeywell patent for oxide-confined technology -- achieves that end despite Finisar's purchase of the Honeywell assets, Andrews says. Andrews also indicates that he was not particularly concerned about the fact that a competitor in the transceiver field would have access to the Picolight patents. Picolight could still create significant differentiation of its products from any Finisar might develop using the patents, he asserts.

http://www.picolight.com

Joint development by Sumitomo and CDT

Sumitomo Chemical and Cambridge Display Technology (CDT) agreed joint development of high efficiency polymer organic light-emitting diode (OLED/PLED) display materials. The agreement is for co-operation in the development and scale-up of a range of solution processable, PLED materials, designed for use primarily in the manufacture of flat panel displays. Under the agreement, the companies will focus on the development of new solution processable, phosphorescent materials, such as dendrimers, which exhibit very high efficiencies and good stability.

http://www.sumitomo-chem.co.jp/english/
http://www.cdtltd.co.uk/

Business News

Financial results: JDS Uniphase

Fiber-optic component manufacturer JDS Uniphase reported revenue of $153 million for the final quarter of 2003, a rise of around 4% from the previous quarter. In the year-ago period the company's revenue was $157 million. The Communications Products Group represented $78 million in net revenue, or 51% of net revenue, with the Thin Film Products Group accounting for the remainder. However, JDSU's net loss increased sequentially from $28 million (2 cents per share) in the third quarter of 2003 to $59 million (4 cents per share) in the final quarter. The net loss was $215 million (15 cents per share) in the last quarter of 2002. CEO Kevin Kennedy told analysts that the company believes its markets are stabilizing, and that certain areas are showing signs of growth. The company anticipates a 1-6% sequential increase in net revenue for the first quarter of 2004, with a loss of 1 cent per share. JDSU hopes to reach a break-even revenue level of $170 million by the second quarter of this year.

http:// www.jdsu.com/

Japanese firms to set standards for LED lighting

Nichia, Toyoda and Matsushita are working on LED lighting standards with Japan's Ministry of Economy, Trade and Industry. Japan-based LED manufacturers Nichia, Toyoda Gosei and Matushita Electric Works are working with the Japanese Ministry of Economy, Trade and Industry to draw up a common set of standards for LED-based lighting equipment. According to Japan's Nihon Keizai Shimbun newspaper, the consortium will finalize the standards within the next year. The Japanese companies are hoping to take the initiative in setting global standards, it reports. The report says that the LED manufacturers are planning to establish a standardization organization this spring. Once this group is set up, it will invite Toshiba, Matsushita and other LED manufacturers to join the standardization process. It is thought that as many as 100 companies globally will become involved in drawing up the standard.

Business News

ANDevices secures funding

ANDevices, an optics company focusing on communications and bio-photonics applications, has closed its first round of financing. Led by AsiaTech Management and supported by several Silicon Valley angel investors, the new funding will be used to develop communications components used in fiber-to- the-home (FTTH) and fiber-to-the-premises (FTTP) applications, as well as bio-photonic applications such as a spectrometers on a chip and other bio-sensing devices. The amount of the funding was not disclosed.

http://www.andevices.com/

Acquisitions drive growth spurt at Avanex

Avanex has seen as big jump in revenue, thanks to contributions from its acquisitions from Alcatel, Corning and Vitesse. Fiber-optic component and sub-system manufacturer Avanex has reported revenue of $27.0 million for the final quarter of 2003, the first full quarter in which the operating results include the businesses acquired from Alcatel, Corning and Vitesse. The company's revenue increased by $8.9 million, or 49%, compared with $18.1 million in the third quarter of 2003. Results for the previous quarter represented only two months of the Alcatel and Corning acquisitions, and one month of the acquisition from Vitesse.

http://www.avanex.com

Bookham cuts cash burn as weak dollar bites

The UK-based fiber-optic and RF components manufacturer racked up a $125 million loss in a year of consolidation. Bookham Technology, UK, has reported revenue of £24 million ($40.5 million) for its fourth quarter, ended December 31 2003, and full-year revenue of $145.2 million for 2003. The fourth-quarter revenue was up 9% on the previous quarter in terms of US Dollars, but the weakened currency cut into much of the increase, which was only 3.9% in Pounds Sterling. Net loss in the quarter was $9.3 million under US GAAP rules. The full-year revenue was up 157% on the 2002 figure, reflecting the large reliance on sales to Nortel Networks, which represented 59% of sales in 2003. However, Bookham's net loss also increased in 2003, to almost $125 million. These figures included charges of $24.6 million as a result of its extensive restructuring last year. Bookham reduced its cash burn to $15 million in the most recent quarter, down from $36.9 million previously. The company now holds $63.6 million in cash, a figure that should increase by $105 million when the proposed acquisition of New Focus is approved. The Securities and Exchange Commission (SEC) is currently investigating the deal, which includes space and military RF component and module maker JCA Technology. In its outlook for the next quarter, Bookham said that it expected revenue to drop to between £20.5 and £22 million, partly as a result of the weak US Dollar.

http://www.bookham.com

Life & Death

APA ceases optics manufacturing

APA Optics has discontinued its optics manufacturing activities, eliminating 5 positions at its facility in Blaine, Minnesota, citing continued low demand for DWDM multiplexers and downward price pressures. The company's Blaine operations will now focus mainly on gallium nitride technology and products, utilizing GaN manufacturing facilities in Aberdeen, South Dakota. In addition to fiber-optic products, APA manufactures GaN-based ultraviolet detectors, instruments and consumer products.

http:// www.apaoptics.com

Nortel unveils interoperability testing lab

Canadian optical equipment vendor Nortel Networks has set up a new lab to accommodate increased interoperability testing with key third-party vendors. Located in Research Triangle Park, North Carolina, US, the interoperability lab is expected to be fully up and running by 1 April this year. According to Nortel, the lab will serve as a global hub for interoperability advances with its wireline partners and customers, as well as increase the flexibility of circuit-to-packet migration and speed deployment of multimedia services. This carrier-focused test lab will be connected to other carrier- and enterprise-based interoperability labs in Asia, Canada and the US.

http://www.nortelnetworks.com/index.html

Silica nanowires offer low-loss connection

Super smooth silica nanowire could be the way to wire optical circuits of the future. Low-loss silica nanowires that can guide light around tight corners have been fabricated by a team from the US, China and Japan. The researchers from Harvard University, Zhejiang University and Tohoku University say that their wires are promising for building future microphotonic devices. (Nature 426, 816).

http://www.harvard.edu/
http://www.zju.edu.cn/english/
http://web.bureau.tohoku.ac.jp

Linked lasers fashion an all-optical memory

Scientists at the COBRA Research Institute in the Netherlands have developed an all-optical memory with three memory states. Designed for all-optical packet switches, the subsystem is constructed from three coupled ring lasers, with the memory state determined by the device's output wavelength. The ring lasers use semiconductor optical amplifiers (SOAs) as their gain medium, and lase when the SOA's gain is higher than the threshold of the laser. However, injecting high-intensity external light into the SOA saturates the amplifier, reducing its gain and halting the lasing process. By coupling the output of each ring laser with the other two, the COBRA team created a system whereby each laser can suppress lasing in the others, and only one device emits light at any given time. The initial memory state is set by activating one laser; then applying external light to one of three input ports will flip it to a different state. The researchers tested the memory by injecting a sequence of 1551 nm light pulses into the input ports. The pulses lasted 2.5 ms and were injected every 12.7 ms. In response, the device changed memory state every 12.7 ms, with a 40 dB contrast ratio between each state.

http://www.cobra.tue.nl/

Smallest CCD camera from Sharp Microelectronics

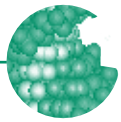
Sharp Microelectronics claims to have developed the industry's smallest (2.63cc), 2Mpixel charge-coupled device (CCD) camera module with auto-focus for high-end mobile telephones with cameras. The new camera module operates at light levels down to 2lux. Sample shipments of the camera module will start in April 2004 with quantity production starting in December 2004 for the North American market.

http://www.sharpsma.com/sma/main/index.html

Intel uses Si to modulate light

Intel scientists report on use of metal-oxide-semiconductor (MOS) capacitors on silicon to modulate light at a bandwidth exceeding 1GHz (Nature, February 12, 2004). Previous attempts to modulate light with silicon have had modulation frequencies of the order 20MHz. To obtain higher frequencies III-V or electro-optic materials such as lithium niobate are used. The scientists maintain that the new Intel silicon waveguide structure is compatible with complementary MOS (CMOS) processing. Indeed, their devices were produced on a CMOS line at Intel. The device uses the "free carrier plasma dispersion effect". The MOS capacitor modulates the charge density in silicon that in turn modifies the material's refractive index. This introduces a phase shift in the light. These phase shifters are used in Mach-Zehnder interferometers (MZIs) to achieve the modulation. In the MZIs, the light beam is split, put through the phase shifters and finally recombined to interfere.

http://www.intel.com



New Products

Microfluidics and microsurfaces solutions from SMB

Scandinavian Micro Biodevices introduced two new concepts: µ-Fluidics is the process of developing costumer specific lab-on-a-chip solutions. µ-Surfaces is a unique plasma technology developed and patented by SMB. Associated to microfluidic technology, micro-surfaces offer a wide range of functional surfaces. Proposed substrates are glass, ceramics, teflon and silicon rubber. SMB's offer includes all steps from a design framework using simulation to a prototype lab-on-a-chip design phase.

http://www.smb.dk

Micronit Microfluidics offers new products and new capabilities

New products are: a pressure chipholder for low dead volume microfluidic interconnections, updated micro reactor chips, microtiterplates suitable for confocal microscopy. Operating range reaches 0-80 bars. The Dead volume for each connection is less than 100 nanoliters. The component can be used with 10 fluidic connections max. New capabilities are for example: metal windowing, decreased tolerances on powder-blasting and etching.

http://www.micronit.com

BioMicro launches a dual chamber mixer for microarray hydridization

The component, named Maui® has been designed to allow two independant arrays to be processed simultaneously on a single 1'' x 3''glass slide. Maui is the latest addition to a line of disposable, mixing micro-chamber products used with the compay's proprietary MAUI hybrization system.

http://www.biomicro.com

ProteinChip technology to discover panels of novel serum biomarkers

The research team of Ciphergen Diagnostics, division of Ciphergen Biosystems, used the company's ProteinChip technology, named SELDI, to discover panels of novel serum biomarkers. These biomarkers are able to differentiate patients with pancreatic cancer from patients with other pancreatic diseases and from healthy individuals. This technology is enabling Ciphergen's researchers to rapidly advance the prospect of highly sensitive, specific and non-invasive tests for numerous cancers and others diseases

http://www.ciphergen.com

Alliance & Mergers

TGen and Affymetrix partner to use GeneChip DNA analysis products

Affymetrix and the Translational Genomics Research Institute (Tgen) announced, they have entered into a non-exclusive agreement under which the institute will offer genotyping services to their collaborators and NIH funded core facility programs using Affymetrix Genechip brand DNA analysis technology. Tgen currently runs gene expression core facility programs on the Affymetrix platform for the National Institutes of Mental Health and the National institutes of Neurological Disease and Stroke. This collaboration also concerns DNA analysis technologies developed by Affymetrix. The two partners also agreed to organize future collaborations.

http://www.affymetrix.com

Aclara and Pfizer signed a co-development agreement

The two companies have entered into an eTag TM Access Agreement for two years. Pfizer will have access to Aclara's technology for use in their pharmaceutical discovery research. Aclara's eTag assay System TM is being commercialized for use both in drug disvcovery research and to support preclinical and clinical development of specific targeted therapies.

http://www.aclara.com

Alliance & Mergers

Collaboration between PamGene and Questra Intelligent Device Management (IDM)

PamGene is integrating IDM's software into an advanced microarray testing platform. The 96-array platform for high-throughput applications in drug development will be equipped with Questra IDM software that monitors the device's operations and performance. Remote monitoring and management delivers the high uptime and fast service response that is a strong competitive advantage for complex devices located in pharmaceutical research facilities.

http://www.pamgene.com
http://www.questra.com

Business News

$10 million for Zyomyx

Zyomyx announced at the beginning of February, that it has raised $10 million in a private round of venture financing. The round was led by CSFB Private Equity. Existing investors took also part in this financing round: Alloy Ventures, Lilly BioVentures, Hambrecht & Quist Capital Management, Medihase Venture Partners and Bio One Capital Pte Ltd … Zyomyx develops biochips for phamaceutical, biotech and academic institutions. The US company expects to launch its new Murine Cytokine Biochip in April 2004.

http://www.zyomyx.com

NASA grants ISSYS some MEMS money

Integrated Sensing Systems Inc., ISSYS, received a Small Business Innovation Research (SBIR) contract from NASA to continue its work on MEMS sensors for medical and space applications. NASA announced $600,000 grant to help ISSYS in the development of implantable pressure and flow sensors. These sensors will be dedicated to tailored treatment of chronic diseases such as congestive heart failure and hydrocephalus.

http://www.mems-issys.com

BioTrove has raised $10.9 million

Catalyst Health, Technology Partners, CB Health Ventures, Zero Stage Capital and BioFRONTIER Partners took part in the financing round. Funds will be used to ensure the development and the commercialization of the company's Living Chip TM and Momentum Assay TM .The company develops micro and nanofluidic technologies to improve the efficiency and the productivity of drug discovery.

http://www.biotrove.com

New products and record sales for BioForce

BioForce Nanosciences announced that two new products will be launched in 2004. At the same time, the company reported record sales of its current nanoscale products for January. BioForce is working on the update of its system, the NanoArrayer, a nano-surface patterning instrument and its identification / detection product, ViriChip. Record sales of January represent one quarter of their total 2003 sales. BioForce explained that this result is not due to a large marketing effort but rather the evolution of its market's environment: death of competitors for example.

http://www.bioforcenano.com

A new name for Allegro Technologies

The Irish biotech company has announced its new trade name at the beginning of February: Deerac Fluidics TM .This new name represents the strategy of Allegro Technologies to ensure its position on the liquid handling market. Instruments developed and commerciliazed by Deerac allow customers to improve R&D efficiency. Deerac promoted its new liquid handling instrument Equator TM at LabAutomation 2004 in San Jose and launched its new website, www.deerac.com

http://www.deerac.com

Micralyne announced a new commercial contract

The Canadian company secured at the beginning of February, an important supply agreement to manufacture MEMS sensors dedicated to chemical analysis instrumentation. For $2 million, Micralyne will manufacture MEMS die that will be embedded into analysis devices. Name of the customer has not been disclosed. Micralyne's offer includes lab-on-a-chip devices, sensors…

http://www.micralyne.com

Microfluidics Roadmap for the Life Sciences

In the course of the "FlowMap" project, a consortium of strong European partners comprising IMTEK (D), HSG-IMIT (D), Cranfield Biotechnology Center (UK) and Yole Développement (F) has analyzed existing and future markets, products and technologies for microfluidics in the life sciences.
During this one-year project, more than 150 external experts have been involved in FlowMap by a series of designated workshops, personal interviews and a world-wide questionnaire action. As a result, partners have quantified the economic development and pinpointed important market drivers. Furthermore, the paramount technology drivers which will determine the present and expected capabilities have been identified. This way, the roadmap provides a solid basis for decision makers planning investments in the life science arena.
The most frequently technological advantages mentioned are
- Reduced amounts of reagents,
- Small size and weight of devices
- Short time-to-results as well as enhanced system integration and automation.

The most cited demands on microfluidic technologies comprise
- Amenability to
    - Point-of-care
    - Point-of-use
    - Portable applications
- Novel technologies for centralized laboratories.

The main market drivers have been identified as
- Cost reduction,
- Reduced analysis time
- And increased throughput.

Being asked for major hurdles presently impeding the commercial proliferation of microfluidic technologies, the experts involved in the FlowMap project mentioned
- Cost of associated equipment,
- Cost of microfluidic components,
- Strength of competing / substitutive technologies,
- Lack of
    - Commercial suppliers,
    - Infrastructure
    - And industrial standards.

To tackle these serious techno-economical obstacles, we encourage agreeing on a small number of broadly accepted microfluidic platforms for a given group of applications, each equipped with a full-fledged set of components, instead of developing individual component technologies.
The majority of participants expect an overall annual growth rate for microfluidic technologies in the life sciences of more than 30% per annum with drug discovery, medical diagnostics and therapeutic devices representing the most promising fields. In a systematic market analysis based on the data acquired during the FlowMap project, our partner Yole Développement has estimated the global market of microfluidics in the life sciences to approximately 500 M , increasing with an assumed annual growth rate of 19% to 1.4 billion in 2008. The FlowMap report presents a detailed breakdown of this turnover in each microfluidics segment identified in Life Sciences.

Please visit http://www.microfluidics-roadmap.com for further information on the FlowMap project and the final report which is available on CDROM and as a hardcover book (197-pages with about 150 mostly colored illustrations and tables).

The FlowMap consortium is sponsored by the IST program of the European commission, Framework Programme 5, Contract No.IST-2001-37905.

Jens Ducrée - Project coordinator and editor (IMTEK, University of Freiburg)

Intel and the 90-nm manufacturing technology

Intel Corporation is delivering four new processors (formerly codenamed Prescott) that are built on the company's industry-leading, high-volume 90-nanometer (nm) manufacturing technology. These processors are among six new offerings in Intel's line of desktop chips, bringing new features and high performance to a wide range of PC users. Intel® Pentium® 4 processors built on the 90-nm process retain the multitasking capabilities of Hyper-Threading (HT) Technology, and include new features such as enhanced Intel® NetBurst™ microarchitecture, a larger, 1 MB Level 2 (L2) cache and 13 new instructions. Intel's 90 nm (a nanometer is one-billionth of a meter) process technology is the most advanced semiconductor manufacturing process in the industry, built exclusively on 300 mm wafers.
Intel also claimed the world's first NOR flash memory device on 90-nanometer (nm) manufacturing technology. Intel® Wireless Flash Memory is the company's ninth generation of flash memory technology and will retain the high performance features of flash memory needed by wireless handset makers.

http://www.intel.com

Infineon joined the X initiative

The X Initiative announced that leading European chip maker, Infineon Technologies, has joined the semiconductor supply-chain consortium. Infineon has tested its X Architecture manufacturing readiness with the successful fabrication of a 130-nm test chip and plans to further validate production designs using the innovative interconnect architecture in 2004. The X Architecture represents a new way of orienting a chip"s microscopic interconnecting wires using diagonal pathways, as well as the traditional right-angle, or "Manhattan," configuration. Infineon fabricated the X Architecture test chip at its Corbeil-Essonnes facility using its 130-nm production flow and leveraged the technology of other X Initiative members. Cadence Design Systems provided the test structure design, DuPont Photomasks and the Infineon maskhouse produced the X Architecture masks, and Nikon"s equipment was employed for photolithography.

http://www.infineon.com

Unitive selects Suss technology to develop next generation packaging processes

Unitive has selected SUSS lithography equipment and SupraYield™ to develop next-generation packaging processes. The SupraYield installation and process development will take place at Unitive's state-of-the-art facility in Research Triangle Park, North Carolina. Unitive is a technology leader in wafer-level packaging for manufacturers of semiconductors, compound semiconductors and MEMS. Under the terms of the agreement, SUSS will help Unitive upgrade its installed base of SUSS 1X full-field lithography (1XFFL) systems with SupraYield Technology. SUSS will also provide technical support that will enable Unitive to achieve optimal results.

http://www.suss.de

Sony and Toshiba to collaborate on 45-nm process technologies for next generation LSI

Sony and Toshiba announced that they would collaborate in the development of highly advanced 45-nm process and design technologies for next-generation system LSI. Under the terms of an agreement, the two companies will take their successful development of 65nm process technologies to the next level, with positive results expected in 2005. Sony and Toshiba signed the joint development agreement in Tokyo and it calls for completion of the project by late 2005, with the ultimate goal of being first to market with 45nm know-how. The project will have a budget of 20-billion yen, to be shared by both companies, and approximately 150 engineers from the two companies are expected to work on the project at Toshiba's Advanced Microelectronics Center in Yokohama, Japan and Oita Operations in Kyushu island of Japan.

http://www.sony.com
http://www.semicon.toshiba.co.jp

Micronic announced that it abandons 1G mask systems

In 2002 Micronic Laser Systems AB shipped a Sigma7100 system to DuPont Photomasks Inc. (DPI). The parties have during an extensive period been engaged in negotiations concerning production performance. The parties have reached an agreement where DPI will return the system. Micronic has decided to discontinue the Sigma7100, which will be replaced by Sigma7300. It is Micronic´s intention to rebuild both systems for future sales. The total cost including rebuilding, write down of accounts receivables and inventory, amounts to SEK107,5 millions and will be accounted for in year 2003.

http://www.micronic.se

Techno News

Picogiga introduces advanced-compound epitaxial layers on silicon substrates

Picogiga International—a division of Soitec, producer of silicon-on-insulator (SOI) wafers and other engineered substrates for use in semiconductor manufacturing—introduced a family of advanced aluminum gallium nitride (AlGaN)/gallium nitride (GaN) epitaxial layers on silicon substrates. Aimed at high-power high-electron-mobility transistors (HEMTs) used in wireless-infrastructure and other high-speed applications, these new structures feature excellent electrical-transport properties. Early customer evaluations confirm that the AlGaN/GaN growth results obtained by Picogiga, using its molecular beam epitaxy (MBE) process, enable the creation of highly competitive device features.Picogiga's new AlGaN/GaN-on-silicon structures are available in 2-, 3- and 4-inch sizes.

http://www.soitec.com

Alliances & Mergers

Siltronic signs licensing agreement for Soitec's smart cut™ technology

Soitec, producer of silicon-on-insulator (SOI) wafers and other engineered substrates, and Siltronic (the silicon wafer division of Wacker Chemie GmbH), suppliers of silicon wafers for the semiconductor industry, announced that Siltronic has signed a license for Soitec's proprietary Smart Cut™ technology. The licensing agreement, which will allow Siltronic to utilize Smart Cut to produce advanced SOI wafers and strained SOI wafers, also includes a joint program to accelerate the development of strained SOI wafers. Siltronic will be able to provide bonded SOI wafers based on the Smart Cut technology to its customers in 2005. According to Auberton-Hervé, this agreement is consistent with Soitec's long-term strategy to bring Smart Cut-based SOI wafers into the mainstream and generate revenues from two sources: direct sales of its own Smart Cut-based products—including SOI UNIBOND™ wafers, where Soitec is the volume leader; and revenues from its IP licensing model, under which the company receives royalties from strategic partners such as Siltronic.

http://www.soitec.com
http://www.siltronic.com

Capricorn Venture Partners to collaborate with IMEC to support spin-off

Capricorn Venture Partners and the Leuven-based research center IMEC will collaborate to support new IMEC spin-off initiatives with start-up and seed capital. As part of the agreement, Capricorn Venture Partners has been mandated to raise the funds required for the ITF seed capital fund.

Capricorn Venture Partners expects to raise 40-60 million euro of committed capital for ITF from local and international investors. The first closing is likely to be called towards the end of Q3 2004 at around 20-25 million euro, allowing ITF to make its first active investments. Under the agreement, IMEC will identify new spin-off initiatives internally and coach these through the pre-seed phase. Once a first version of the business plan for the new spin-off has been completed, the relevant intellectual property defined and valued, and a management team appointed, the spin-off will be presented by IMEC to ITF for investment consideration. External start-up companies that plan to bundle significant IMEC intellectual property with that of a third party will also be eligible for investments by ITF.

http://www.imec.be

Intel and Media-Lario into investments and commercial agreements

Intel Corporation and Media Lario International S.A., a manufacturer of high-accuracy optical components, announced agreements aimed at the development of key optical components for Extreme Ultraviolet (EUV) Lithography. The agreements include an equity investment by Intel Capital and a commercial agreement that is designed to accelerate Media Lario's research and development activity for EUV. Specific terms of the agreements were not disclosed.

EUV Lithography is positioned for commercialization by 2009, but several technical hurdles have to be overcome for the timely delivery of the technology. In particular, some of the most stringent technical requirements need to be addressed through the design and manufacture of very high accuracy reflective optical components, the core capability of Media Lario

http://www.intel.com
http://www.media-lario.com

Alliance & Mergers

ASMI acquires NuTool

ASM International N.V announced that it has entered into a definitive agreement to acquire NuTool., Inc., a privately-held semiconductor equipment company based in Milpitas, California. NuTool is providing through the patented Electrochemical Mechanical Deposition (ECMD(TM)) a unique planar Copper deposition technology to a market that still is early in its development but is expected to grow substantially over the coming years.
ASMI currently owns preferred stock representing approximately 15% of the fully-diluted common stock of NuTool. ASMI will acquire the remaining 85% of NuTool in exchange for shares of ASMI common stock. The number of shares to be issued will be determined based on the market value of ASMI common stock as of the closing date. The transaction is subject to NuTool stockholder approval and is expected to close in May 2004. This press release is not an offer of securities, nor the solicitation of an offer to purchase securities.

http://www.asm.com
http://www.nutool.com

ASML and DNP announced strategic alliance

ASML MaskTools and Dai Nippon Printing (DNP) announced a strategic alliance on CPL™ Technology. A single-mask, single-exposure resolution enhancement technique, CPL Technology is designed to increase the productivity of lithography processes by as much as 40 percent as compared with competing technologies as well as enhancing cost effectiveness and resolution capability. This new agreement extends industry support for CPL Technology and builds additional momentum for its adoption. As part of the agreement, DNP will develop a production worthy mask-making process that ensures delivery of high-quality CPL masks with fast turnaround times to semiconductor manufacturers around the world.

http://www.asml.com
http://www.dnp.co.jp

Life & Death

US federal appeal court denied the latest request from Soitec and the CEA

The US federal appeal court has denied the latest request from Soitec and the French atomic energy authority (CEA) to overturn a jury verdict that invalidated some claims in Soitec's primary Smart-Cut patent (No.5,374,564). The attempt followed an appeal court affirmation (November 26, 2003) of a jury verdict. The most recent petition from Soitec and the CEA was made on the grounds "the enablement issues raised by this appeal are exceptionally important - both to the parties and the practising bar". Soitec and the CEA argued that "the panel should rehear the case and reverse the unsustainable judgement of non-enablement. Alternatively, the case should be reheard en banc to resolve the conflicts and questions left open in this Court's decisions on enablement." The Court of Appeals denied the petition on January 7, 2004. SiGen attorney Bryan Wilson commented: "This will be the end of the case unless Soitec requests review by the United States Supreme Court."

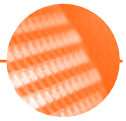
http://www.soitec.com

http://www.cea.fr

Infineon expands its memory development center in Dresden

Infineon Technologies announced it will expand the Memory Development Center at its Dresden reference location with the aim of further strengthening and extending the central role of the site in the development of process technology, particularly for DRAM and flash products. Toward that end, the company will erect a new building on the premises of its Dresden plant, with a development cleanroom at its center. Investments totaling around Euro 120 million will be spent on the project over the next two years. Infineon currently expects to take on about 120 new hires for the Development Center expansion in the current fiscal year. The Memory Development Center's extra capacity will be housed in a new building complex to be erected immediately next to Infineon's existing semiconductor fab by early 2005. Construction is scheduled to start in the middle of this year. When completed, the new complex will provide around 2,300 m^2 of additional cleanroom space. The new adjunct to the Development Center will focus on the development of innovative memory concepts and fabrication processes on 300mm wafers for the manufacture of future memory generations.

http://www.infineon.com



Life & Death

Toshiba announced the completion of its new building for a 300-mm fabrication facility

Toshiba Corporation announced that it had completed construction of the building for a new 300mm-wafer-fabrication facility at Oita Operations in Kyushu, Japan. The new fab is scheduled to start production in autumn this year, and will mass-produce high-performance System-on-Chip (SoC) LSIs with extremely high levels of integration. The new Oita fab is the first of two advanced 300mm-wafer facilities that Toshiba plans to construct. The second, to be built at Yokkaichi Operations in Mie, Japan, will support the company in meeting fast growing demand for NAND flash memory.

http://www.toshiba.co.jp

ASML to implement restructuring in the Netherlands

ASML Holding NV (ASML) announced that it would implement the Netherlands segment of its restructuring plan in March, after reaching agreement with the company's works council. The restructuring was revealed in July 2003 and has already been implemented in Asia and the U.S.

ASML will reduce 305 positions in the Netherlands, consisting of contractors and full time employees. The reduction is approximately 11 percent of the total Dutch work force and approximately 6 percent of the global ASML work force. As of December 31, 2003, ASML employed 5,059 people worldwide, with 2,711 people based in the Netherlands.

http://www.asml.com

MC2 Technologies, a new spin-off from IEMN lab

Microwave Characterization Center is a Spin Off from IEMN lab, and the main location is Villeneuve d'Ascq, France. The activities are services in microwave frequencies for industrial companies or R&D Organizations from semiconductors and MEMS. The provided services are microwave characterization (from DC to 220GHz), modeling, physical analysis, reverse engineering, stress test (RF power, temperature, humidity stress) and trainings. This company disposes of a complete panel of facilities in order to answer to any microwave characterization demand.

www.mc2-technologies.com

Fairchild expands fabrication facility and refines management structure

Fairchild Semiconductor, a global supplier of high performance products that optimize power, announced an expansion of its Mountaintop 8-inch facility, dedicated to manufacturing power components. The expansion includes refurbishing a 15,000 square-foot clean room and installing state-of-the-art tooling and support systems to increase Fairchild's production capacity, particularly for its discrete power line. Upon completion, the plant will be capable of producing 1200 wafers per day, according to the company. Fairchild will invest $143 million in the expansion, creating 320 new jobs over four years. In the same time, Fairchild Semiconductor announced that it is refining management structure to accelerate strategic growth. The company has appointed Dr. Izak Bencuya as chief strategy officer and Thomas Beaver as executive vice president of Worldwide Sales and Marketing.

http://www.fairchildsemi.com

Wolfson reported preliminary results for full year 2003

Wolfson Microelectronics plc, a mixed-signal semiconductor company that produces proprietary high performance integrated circuits, announced its maiden full year results as a listed company for the 12 months ended 31 December 2003. revenues increased by 125% to $75.7m (2002: $33.7m) and profit before tax increased to $12.5m (2002: $3.6m). R&D expenditure increased to $9.4m (2002: $4.9m). "In 2004 we are continuing to see a healthy build-up of our first half order book and are excited by the interest customers are showing in our new products for multimedia mobile phones and digital cameras' said David Milne, Chief Executive Officer of Wolfson Microelectronics.

http://www.wolfsonmicro.com

ASMI reports final Q4 and full year 2003 financial results

ASM International reports final fourth quarter 2003 and full year 2003 operating results. Fourth quarter of 2003 net sales of 163.6 million, up 11.0% from net sales in the third quarter of 2003 and up 19.1 % from net sales in the fourth quarter of 2002. The fourth quarter of 2003 showed the first signs of a recovery in the semiconductor equipment industry, said ASMI. The company saw an increase in order levels and improved sales in the fourth quarter of 2003. Full year 2003 net sales of 581.9 million, up 12.2% compared to 518.8 million in net sales for the full year 2002. Sales from Front-end operations were up 7.3% and sales from Back-end operations were up 17.3%.

http://www.asm.com

ESEC reports its Q4 and 2003 financial year

During its completed 2003 financial year, ESEC witnessed a 27 percent increase in bookings to a total of CHF 200 million (2002: CHF 157 million). Sales rose to CHF 165 million, a 10 percent increase in comparison to the previous year (2002: CHF 150 million). In the fourth quarter of 2003, bookings at ESEC increased versus the previous quarter by 83 percent to CHF 81 million (Q3 2003: CHF 44 million), while sales doubled to a total of CHF 59 million (Q3 2003: CHF 29 million). This remarkable rise in bookings and sales is mainly attributable to improved business activities in the die bonding area. ESEC closed out its 2003 financial year with a backlog of orders totaling CHF 47 million (2003: CHF 17 million).

http://www.esec.com

European Union approved investment aids for AMD fab 36 in Dresden, Germany

Advanced Micro Devices, Inc. received the European Union (EU) Commission's approval of investment aid for its next-generation microprocessor wafer facility, AMD Fab 36, in Dresden, Germany. The Federal Republic of Germany and the Free State of Saxony are providing investment allowances and investment grants of up to approximately 545 million — the highest benefit possible under the grants and subsidy program. AMD broke ground on its 300 mm manufacturing facility on November 20, 2003. The new facility , named AMD Fab 36, is part of AMD Fab 36 LLC & Co. KG and is being built in Dresden, Germany, adjacent to AMD Fab 30. AMD Fab 36 is expected to be in volume production in 2006.

http://www.amd.com
http://www.europa.eu.int

Dalsa reported Q4 financial results for its semiconductor division

DALSA Corporation reported its fourth quarter financial results for the period ended December 31, 2003. Revenue in the Semiconductor Business was $13.6 million, up 36% from the fourth quarter of 2002, but down slightly from the third quarter of 2003 due to changes in product mix relative to the previous quarter. Net income in the Semiconductor Business was $1.5 million, up 419% from the same period last year.

http://www.dalsasemi.com

ELMOS recorded two digit growth of sales in the year 2003

According to preliminary results 2003, ELMOS Semiconductor AG increased net sales to EUR 121.4 million (FY 2002: EUR 109.7 million), with EUR 30.8 million contribution in the fourth quarter (Q4 2002: EUR 28.6 million). Gross profit amounted to EUR 61.4 million (FY 2002: EUR 53.8 million), equivalent to a gross margin of 51% of sales (FY 2002: 49%). The successful acquisition of 31 new design projects in 2003 reflects a future sales contribution of about EUR 227 million over lifetime. Therefore, the research and development costs grew to EUR 20.4 million (FY 2002: EUR 17.5million) or 17% of sales (FY 2002: 16%). For the current year 2004 a growth of 15 to 20% in sales is expected

http://www.elmos.de

Semiconductor equipment market is expected to grow more than 55% in 2004

The semiconductor equipment market will experience extremely robust growth in 2004, says Advanced Forecasting, a semiconductor forecasting house. Currently, the IC cycle is in a boom period, over-capacity has been eliminated, and equipment will undergo a considerable ramp up. In the last several weeks, a number of foundries and IDMs have released their expected capital expenditure budgets for 2004. The majority of these announcements showed more than thirty percent growth over 2003, supporting Advanced Forecasting's position that the industry will add needed capacity quite rapidly. Bookings for semiconductor equipment have already risen steadily since their bottom in 2Q-2003. Cumulative bookings during 2003 amounted to $22.3 billion, an 11 percent growth over 2002. While the IC industry began recovering from the 2001 recession in 2002, equipment revenue remained flat due in large part to over-capacity from the 1999-2000 boom.