

Micronews

March 2006 - n° 45

The Yole Développement magazine



Micronews is now available in Japanese!

Since January 2006, we are proud to announce that each issue of Micronews is now available both in English and in Japanese language. Even if English is now a standard language in the micro and nanotechnologies world, we think that it is important to adapt ourselves to the culture of our readers for better mutual connections. Micronews is now well appreciated in the micro and nano community but we really want to keep it evolving. We consider that a Japanese version is a first step for us to be in closer contact with our Japanese readers. Also, for those of you who would like to have your company known in Japan, we now offer opportunities for advertising in this new version. If you would like to publish an ad in the Micronews Japanese version, please contact us.

Dr. Éric Mounier
Editor-in-chief

2006年1月号より Micronews は日本語、英語の両言語にてご愛読いただける運びとなりました。マイクロテクノロジー、ナノテクノロジーの世界では英語が「標準語」として位置づけられておりますが、弊社ではお客様の利便性と同時に、相互理解を深めるべく多言語化への取り組みは重要であると認識致します。Micronews は市場に於ける認知が徐々にされつつありますが、日本のお客様に、より密接な媒体としてご利用頂く為には、やはり日本語化は必然的に重要と弊社では考えております。弊社ではお客様の日本国内での更なる Micronews の有効活用を目指し、広告媒体としてのご利用の機会を承っております。ご関心、ご希望に関するお問合せ等に付きまして、是非お気軽に頂戴したく存じます。

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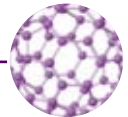
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Laser system shrinks projector to matchbox size

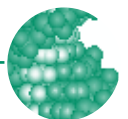
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List of companies cited in "Micronews"

MEMS BFi Optilas , Colybris, Endevco, Entrepix, Freescale, Innovative Micro Technology, Integral Vision, MicroChemical Systems, Perpetuum, Semefab, SiTime , STMicroelectronics, Surface Technology Systems, Suss MicroTec, Temicon **NANO** Arkema, California NanoSystems Institute, Chalmers University of Technology, Degussa, Luna Innovations, Nanomarket, Nanoplex Technologies, Oxonica, Semes, UCLA, University of Bologna **OPTICS & COMPOUND SEMICONDUCTORS** BeamExpress, Coherent , Group4 Labs, Iolon, JDSU, Light Blue Optics, Lighting for Tomorrow, Lumileds, Modulight, NASA, NEC, Nichia, Ovum – RHK, Politecnico di Bari, Qwest, UDC, University of Southampton, University of Surrey **MICROTECHNOLOGIES FOR LIFE-SCIENCES & CHEMISTRY** Agilent Technologies Inc., Applied Biosystems/MDS Sciex, Arrayjet, C2V, CardioMEMS Inc., CombiMatrix, Eksigent Technologies, Illumina Inc., Labcyte Inc., Nanogen, Q Chip, Spectral Diagnostics **IC MANUFACTURING** ADE, Applied Materials, Engineering Research Center for Semiconductor Integrated Technology, Essensium, FEI Company, Fraunhofer, IAF, IBM Research, Image Technology, IMEC, Intelligent Micro Patterning, Kla Tencor, Leica Microsystems, SIA Online, Veeco.

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Leica Microsystems to change its name to Visitec Semiconductor Systems
IBM unveils a way to extend current chip manufacturing techniques

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Yole Index (current stock price)

	Symbol		Total number of shares(M)	Price 01-01-06	Price 01-03-06	Variation year to date	High/Low (52-wk range)	Market cap(M) 01-03-06
Material								
Okmetic Oyj (SF)	OKC.F	Eur	16,9	1,95	2,11	8,2%	2,38 - 2,65	35,6
Soitec (F)	SOI.PA	Eur	56,2	14,46	23,00	59,1%	7,24 - 23,30	1292,1
Cree (US)	CREE	\$	76,3	25,58	30,38	18,8%	20,68 - 30,99	2318,3
Plan Optik (D)	P40	Eur	0,7	27,50	33,60	22,2%	22,00 - 39,48	23,5
Equipment								
Süss Microtec (D)	SMH.DE	Eur	15,2	4,78	8,65	81,0%	3,54 - 9,05	131,1
STS (UK)	SRTS.L	GBP	31,4	0,17	0,39	129,4%	0,09 - 0,29	12,2
Ultratech (USA)	UTEK	\$	23,7	16,50	20,59	24,8%	13,21 - 22,93	487,8
Obducat (SE)	OBDUB	SEK	289,5	1,26	1,90	50,8%	0,95 - 2,50	550,1
Lam Research (US)	LRCX	\$	139,9	36,70	44,67	21,7%	24,24 - 48,57	6248,0
Bio related components								
Affymetrix (US)	AFFX	\$	60,3	47,48	34,72	-26,9%	33,82 - 59,73	2093,2
Cepheid (US)	CPHD	\$	41,7	8,86	9,59	8,2%	5,83 - 11,21	399,6
Caliper LS (US)	CALP	\$	28,6	5,97	6,57	10,1%	5,07 - 7,49	188,0
Psivida (UAU)	PSDV	AUD	387,0	0,71	0,67	-5,6%	0,50 - 1,05	259,3
Nanogen (US)	NGEN	\$	54,2	2,61	2,54	-2,7%	2,50 - 4,77	137,6
Acacia Research-CombiMatrix(US)	CBMX	\$	32,6	1,42	1,77	24,6%	1,29 - 3,10	57,7
Illumina (US)	ILMN	\$	41,2	14,78	26,00	75,9%	6,72 - 25,78	1069,9
Components								
Memscap (F)	MEN.PA	Eur	182,1	0,31	0,43	38,7%	0,22 - 0,44	78,3
Elmos (D)	ELG.DE	Eur	19,3	9,08	10,29	13,3%	8,68 - 15,56	198,6
Dalsa Semiconductor (CA)	DSA.TO	\$	16,4	12,79	12,60	-1,5%	11,50 - 21,10	207,0
Analog Devices (USA)	ADI	\$	373,8	36,13	39,20	8,5%	31,71 - 41,40	14652,0
STM (F)	STM	Eur	901,0	18,30	17,60	-3,8%	13,96 - 19,90	15858,3
Melexis (B)	MELE	Eur	45,6	10,99	12,81	16,6%	9,15 - 13,00	584,1
Cypress SC (US)	CY	\$	135,5	14,60	18,35	25,7%	11,05 - 18,50	2487,0
Freescale SC (US)	FSL	\$	140,8	25,10	27,83	10,9%	15,87 - 28,49	3919,1
Infineon (D)	IFX	Eur	747,6	9,73	8,05	-17,3%	8,30 - 10,53	6017,9
Austria Microsystems (Au)	AMS	Eur	11,0	65,91	79,50	20,6%	38,50 - 79,80	874,5
Tessera Technologies Inc (US)	TSRA	\$	44,9	26,60	32,23	21,2%	24,70 - 46,28	1447,1



Thick-SOI: a \$75M material market for MEMS and Power Devices

Recently adopted in a large scale production by both the MEMS and Power Devices manufacturers, thick-Silicon-On-Insulator is now accounting for more than 20% of the total SOI production, led by thin-SOI material used in the mainstream semiconductor industry. Thick-SOI is chosen in the MEMS industry to provide precise etch-stop solution and to obtain a drastic control of the structures thickness. In the power devices field, thick SOI allows the insulation of different devices cells for in-line IGBT modules and more generally for integrated IPM (Intelligent Power Module).

A few words on the technologies ...

The Thick-SOI material is defined as a 1µm-or-more single-crystal silicon layer capping a buried oxide (BOX) on top of a silicon substrate. It can be obtained in 2 different ways:

- Thick epitaxy on top of a thin-SOI wafer in order to get 1 to 2µm Si layer thickness: Epi-SOI
- Bonding of 2 Si wafers with a intermediate buried oxide layer followed by a thinning of the top substrate using grinding and polishing steps: Bonded-SOI or B-SOI.

Japan is leading the material market but home-made SOI remains present

The Japanese SEH (Shin Etsu Handotai) is representing 1/3 of the total worldwide thick-SOI production (Fig. 1). SUMCO (Sumitomo), TOCERA (Toshiba Ceramic) and Okmetic are challenging it. Half a dozen of smaller players are targeting the SOI market including Virginia SC, Wafer World, Isonics, or Umicore in the US. In Europe Tracit, Technologies has been spun-off French CEA-LETI

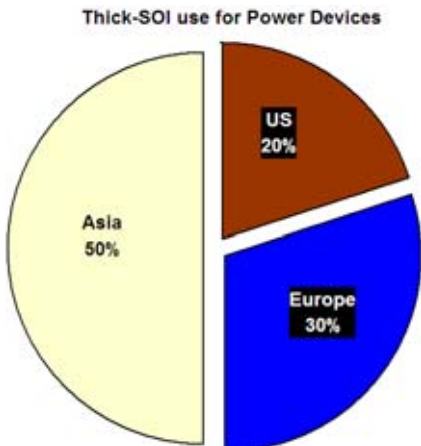


Fig.1: Market forecast for thick-SOI substrates

in 2003 and proposes engineering SOI substrates. The former Irish B C O Technologies has been turned into IceMos and has restarted the activity. Outside of these commercial offers,

home-made SOI is still representing a non-negligible part of the production with a 10% market share, essentially in the Power Devices fabs.

MEMS is taking market share over Power Devices in thick-SOI use

With a current average selling price of about \$250 for a 6" SOI wafer, the market has reached \$75M in 2005 with 27% of the revenues made in the MEMS field. We forecast this ratio to grow up to 1/3 by 2009. MEMS world is widely focused on B-SOI compared to Power Devices players who are equally using both Epi and Bonded SOI. In terms of geographical breakdown, more than 50% of thick-SOI consumption for Power Devices is made in Asia (Fig. 2), where the plasma display drivers market is grabbing a large part of the production. SOI-based

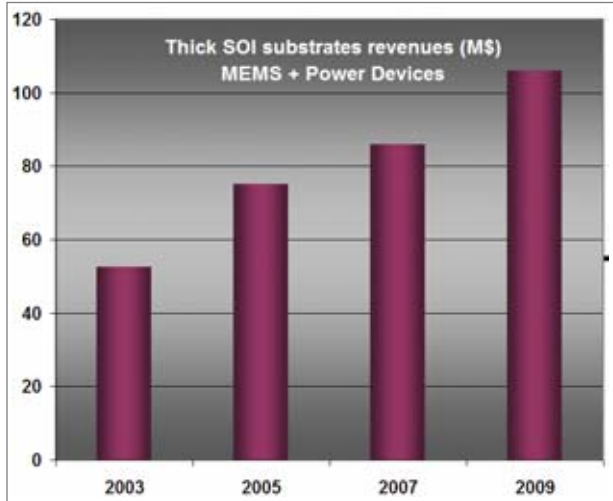


Fig.2: Thick SOI use for Power Devices

MEMS manufacturers are much more spread with 30% for US and EU and about 40% for Asia.

Special Report

New initiatives in the MEMS fields will pull the market up

Accelerometers, gyroscopes, RF and optical MEMS are the leading applications using thick-SOI substrates. Recently, new announcements have been made by companies willing to enter this business or expand their current capacity. Freescale has started in 2005 the SOI-based accelerometers production in Tohoku (J) fab and plans to launch the gyro, based on the same technology, by 2007. VTI has just released the extension of its fab to enter in the battle. Analog Devices is still very active in the thick-SOI MEMS field, even if they have sold its Irish subsidiary BCO, bought for \$150M in June 2000. SMI, Bosch, Mitsubishi, Honeywell, Colibrys are examples of some well-known MEMS players having strong R&D in thick-SOI.

Plasma panels market remains the engine of the Power Devices SOI market

Deep trench isolation is a technology that fits perfectly with the use of thick-SOI. It allows insulating

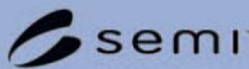
different heterogeneous kind of power devices on the same chip, in a single process. Those devices, so-called IPM for Intelligent Power Module, are targeting mid-power applications (100-600 volts) and handle about 10 volts per each μm of active silicon layer (on top of the oxide). Plasma Display Panel (PDP) scan drivers are benefiting from this technology to address every light dots of a plasma TV screen. NEC and Fuji Electric are leading this market. Others applications of IPM are home appliances and motor control, targeted by Denso, STM, Toshiba, Philips, Hitachi or Analog Devices.

Market analysis related to thick-SOI can be found in 2 of our reports:

- Thick-SOI'06 market report, released in April
- PowerD'06 market report including a thick-SOI chapter. This report is available.

If you are interested to know more about these report, please contact David Jourdan at jourdan@yole.fr

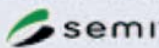
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 - MEMS companies are identified through out the exhibition
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4-6 April 2006
Munich Trade Fair Center
Munich, Germany





Business News

SUSS MicroTec adds wafer bonding system at IMT

SUSS MicroTec, a leading supplier of precision manufacturing equipment for the semiconductor and emerging markets, announced the installation of an additional wafer bonding system at Innovative Micro Technology in Santa Barbara, CA. Innovative Micro Technology (IMT) required additional wafer bonding capacity as part of its ramp up to volume production on several new MEMS products. These include novel patented IR emitters as well as MEMS switch

products, both of which are now in production at IMT's wafer fab, now in 24x7 operation.

<http://www.itmems.com>
<http://www.suss.de>

Integral Vision announces new orders for MEMS displays

Integral Vision, Inc. announced that it has received two additional orders for MEMS display inspection systems. One of the orders is from a repeat customer and the other order is from a new customer. Integral Vision's products provide for detection of display defects to

assure quality in the manufacturing process.

<http://www.iv-usa.com>

Silicon Clocks fundings

Silicon Clocks has raised \$11 million in funding. Silicon Clocks Inc. plans to aggressively penetrate the market for crystals and timing devices providing a completely integrated solution for frequency generation in wireless CDMA systems. Silicon Clocks provides a true single chip solution by integrating micro- and nano-mechanical resonators directly above the controlled electronics.

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

Perpetuum received funds from IP2IPO

IP2IPO Group plc, the intellectual property company that commercialises university technology, is pleased to announce that Perpetuum Limited, a spin-out company from the University of Southampton in which IP2IPO holds an equity stake, has succeeded in raising £2.2m in second round finance. The round includes £1,425,000 from Quester, which led the financing, £650,000 from Top Technology Ventures and £125,000 from SULIS. The financing round capitalises the company at £5.2 million. Post the completion of the financing, IP2IPO holds a 14.6% interest in Perpetuum.

<http://www.perpetuum.co.uk>

"MEMSFoundries": Analysis of the market and business trends of MEMS foundries and contract manufacturers

▶ Market is expected to be multiplied by 3 in 6 years, representing more than 5% of total MEMS markets

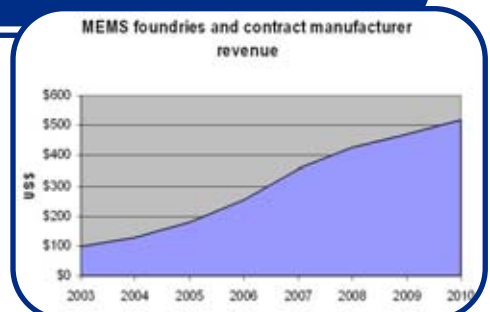
Yole Développement has edited a brand new analysis of the markets, strategies and evolution of the MEMS contract manufacturers and MEMS foundries. For the first time, you can have access to unique features:

- Detailed analysis of MEMS foundries and contract manufacturers revenues evolution 2003-2010 (see figure 1)
- Detailed analysis of the 20 most important MEMS foundries worldwide
- Analysis per company of the possible exit strategies
- Identification and analysis of emerging applications, including consumer, mobile phones, energy...
- Analysis of today relationship between MEMS foundries and contract manufacturers and design houses/fabless companies
- Scenario analysis of the evolution of the foundries and contract manufacturers business

Today, most of the contract manufacturers are full of work, both for development projects and production: we expect that the MEMS foundry and contract manufacturer markets will reach total revenue of more than 500 M\$ in 2010 (a market multiplied by 3 in a 6 years period).

Price: EURO 3,900 / US\$ 4,700 for 150+ slides PowerPoint report

Contact: David Jourdan, Tel: +33 472 83 01 90, Email: jourdan@yole.fr, website: www.yole.fr





Akustica announced its MEMS-based microphone. According to Yole Développement, the Si microphones market will worth 400M\$ in 2010

Akustica announced at the Globalpress Electronics Summit (Monterey, CA) the availability of its Microphone Chips, the first single-chip microphones on the market. The Akustica Microphone Chips are small, thin, light devices designed to replace the Electret Condenser Microphone (ECM), a fifty-year old technology that has been used in billions of portable electronic devices—while remaining fundamentally unchanged.

Yole Développement forecasts a significant growth of the silicon microphone market from 65M\$ in 2005 to nearly 400M\$ in 2010. The market adoption from mobile phone suppliers has been very swift from 2004 up to 2005. The overall market is mainly driven by this application today and accounts for a large share of the 44% CAGR. The first uses of Si microphone within VoIP applications can not be better highlighted than with the first Akustica product released this week. Moreover, the forecasted launch of Windows Vista this year will also support microphone array applications.

With the production started at Akustica (the third player entering this market), the MEMS microphone industry continues its technological evolution. It evolves from a two-chip solution in a metal package to a stacked Si chip product, to a monolithic configuration recently released. The winning companies are delivering devices featuring small size, easier integration and embedded functionality. Digital output is set as a standard since it has been announced by the three current players. These companies have similar business models. They leverage the benefits of the fables model in terms of manufacturing and cost structure. These major trends are confirmed by the latest identified players which are using Analog Devices fab for its developments based on SOI substrates

<http://www.akustica.com>

A N N O U N C E M E N T

AMAA 2006

ADVANCED MICROSYSTEMS
FOR AUTOMOTIVE APPLICATIONS

HOTEL STEIGENBERGER BERLIN APRIL 25-27, 2006, BERLIN, GERMANY
LOS-ANGELES-PLATZ 1

An international platform about the role of microsystems technologies in automobiles. The event is organised by:

The Innovation Relay Centre Northern Germany is represented by:

Demo Day, April 27, 2006

This year AMAA will celebrate its 10th anniversary. On the 27th of April we therefore offer you the special opportunity to participate in our demonstration day at the ADAC training centre near Berlin.

You can see and test yourself cars equipped with advanced driver assistance systems under exceptional circumstances. Don't miss to experience the effects of microsystems in cars. The Demo Day will last from 9 am to 5 pm. The participation for conference members is free of charge. Transport to the training centre and back to Berlin is provided. Details will be available soon on the AMAA web page.

Supported by:

AMAA Conference Chair: Dr. Jürgen Valldorf, Phone: +49 30 310078-183, valldorf@amaa.de

W W W . A M A A . D E



Techno News

ST announces the thinnest digital output sensor, expanding its 3-axis accelerometer portfolio

STMicroelectronics claimed that it has expanded its portfolio of three-axis accelerometers with the thinnest digital-output sensor on the market. Embedding high performance and smart functionality in a 1-mm-high package, ST's LIS3LV02DL opens new possibilities for advanced motion-based applications in ever-more popular, thin-profiled clamshell mobile phones. ST's new ultra-slim 3D sensor with digital output extends these advanced capabilities to the clamshell form factor, which is expected to account for 41% of the estimated 750 million handsets sold worldwide in 2006, and which will represent the majority of mobile phone sales by 2008. The LIS3LV02DL is sampling now, with volume production starting in March 2006.

<http://www.st.com>

Freescale introduces 3 MEMS-based accelerometers mainly dedicated to the consumer market

Freescale Semiconductor has introduced three highly sensitive sensors to address the rapid shift in the micro-electromechanical-systems (MEMS) industry toward greater adoption within the consumer market. The introduction of the MMA6270Q (XY-axis), MMA6280Q (XZ-axis) and MMA7261Q (XYZ-axis) MEMS-based sensors — also known as accelerometers — extends Freescale's current offering from 1.5g to 10g. The three low-gravity (low-g) sensors aimed at the low-cost consumer electronics market are ideal for electronic systems that require the detection of small changes in force resulting from fall, tilt, motion, positioning, shock or vibration. The sensor devices provide two and three axes of sensitivity based on the application needs.

<http://www.freescale.com>

Alliances & Mergers

COLIBRYS appoints BFi OPTiLAS as distributor

COLIBRYS, Switzerland, supplier of Micro Electro-Mechanical (MEMS) and Micro Optical Electro-Mechanical (MOEMS) components and subsystems announced the appointment of BFi OPTiLAS as Pan-European distributor for their complete range of MEMS (product range). Europe is well recognized as a key strategic market for MEMS thanks to the wide variety of high technology applications and R&D investments. BFi OPTiLAS' distribution core competence and strong presence across Europe will provide to COLIBRYS an excellent opportunity to approach new applications in emerging markets and a greater level of support for existing customers.

<http://www.bfiptilas.com>

<http://www.colibrys.com>

SiTime selects Entrepix for CMP process outsourcing

SiTime, a fabless integrated circuit company that provides MEMS timing device alternatives to traditional quartz crystals for the consumer, automotive, and industrial markets, has selected Entrepix Inc., for CMP process outsourcing. Entrepix Inc. is a semiconductor foundry dedicated exclusively to CMP outsourcing services, from initial process characterization and integration, through high-volume production for emerging companies, materials developers and top-tier integrated device manufacturers (IDMs).

<http://www.entrepix.com>

<http://www.sitime.com>

Life & Death

temicon GmbH established at the end of 2005 as spin-off of Technotrans

On 1st October 2005 the Micro Technology Company temicon GmbH was established in Dortmund. temicon GmbH came from the business area of Micro Technologies at technotrans AG, a leading manufacturer of electroforming and wet process equipment for micro technologies. Beside the equipment business technotrans produced micro and nano structured products on cus-

tomers request and in small quantities. This technically and commercially highly attractive business activity has been transferred and extended to a separate strategic entity — temicon GmbH. temicon is producing micro and nano structured products based on the technology chain "lithography and electroforming" in the excellently equipped laboratory and clean-room facilities of the MST.factory in Dortmund. The product portfolio comprises micro and nanostructured mold inserts, metal foils and metal microparts.

<http://www.temicon.de>



Life & Death

STS opens new regional office in Taiwan and appoints new Company Secretary

Surface Technology Systems plc (STS), a specialist in plasma process technologies required in the manufacturing and packaging of MEMS and advanced electronic devices, announced that it has reinforced its Asian presence with the opening of a new sales and support office in Hsinchu, Taiwan. Along with STS' Singapore office, which opened in May 2005, the new Taiwanese office provides support for all Asian customers and STS agents. Mr. Henry Chu has been appointed General Manager of STS' Taiwan office, bringing valuable continuity and many years of experience as he moves from his position as Sales Manager for STS products within Challentech International, the agent previously used by STS in the region. STS also announced the appointment of Richard Rees as Company Secretary. Rees, who took up his new position on 17th January 2006, joined the Company in 2004 as Group Financial Controller, and had previously worked for KPMG for seven years, gaining his ACA in 2000.

<http://www.stsystems.com>

Endevco expands its MEMS production facility in response to growth in MEMS technology

Sensor manufacturer, Endevco, announces the expansion of its northern California MEMS production facility to increase clean room and testing capabilities in response to growth in MEMS technology. The goal of the one-year, \$5 million effort is to improve the facility's infrastructure for DI H₂O, HVAC, exhaust, and electrical capacity, while providing space for new equipment and expansion over time.

The qualification of facilities, processes and equipment will be implemented to monitor standards for purity, capacity and reliability. New equipment to be installed will add process capability, with qualification for new designs and an extensive product and process release procedure. Additionally, the company has recruited and trained several process engineers, including one of the few silicon carbide (SiC) etch engineers with real-world production experience.

<http://www.endevco.com>

Robotics and Networking Visionaries to Kick off 20th Anniversary Sensors Expo & Conference

sensors expo & conference

2006 Sensors Expo & Conference

Donald E. Stephens Convention Center in Rosemont, IL, June 5 to 7

Stanley the Robot, brimming with advanced sensor technology and artificial intelligence, was first to cross the finish line in the Mojave Desert at the DARPA Grand Challenge.

Stanley illustrates the leading edge of sensor development, and will be the subject of a presentation to be made at the 20th anniversary Sensors Expo & Conference by Sebastian Thrun, Director of the Stanford Artificial Intelligence Laboratory, who led the mobile ground robot racing team.

Thrun will describe the technology that allowed Stanley to make sense out of the massive amounts of sensor data acquired by the robot as it traversed 132 miles of punishing desert terrain in less than ten hours.

Sensors are also in big demand, of course, in less hostile environments and less high-tech applications. In fact, they are often an integral part of the ubiquitous micro-controller, embedded increasin-

gly in both specialty and consumer products. Analysts estimate that some 7.5 billion micro-controllers shipped worldwide last year, expected to surpass 10 billion by 2007.

In another keynote presentation, Internet inventor Bob Metcalfe will describe the need for networking these devices in a structure he calls "CSI" (Control, Sensor, and Identity). He will describe today's CSI space -- including the characteristics and capabilities of those three technology types -- and the likely direction of control networking protocols.

The 2006 SENSORS EXPO & CONFERENCE will be held at the Donald E. Stephens Convention Center in Rosemont, IL, June 5 to 7 <http://www.sensorsexpo.com>. It is the largest showcase of sensing technologies and systems in North America, attracting corporate executives, product design engineers, system design engineers, consultants, and system integrators.



Life & Death

Semefab will offer first MEMS open access facility in UK

Fife-based semiconductor technology company Semefab is set to become the UK's primary centre for the design and development of micro machines and nano-systems, helping to drive major advances in medicine, drug discovery, communications and manufacturing. Scottish Enterprise and the Department of Trade and Industry (DTI) are supporting the company in a £15 million project that will enable them to offer companies open access to a fully integrated MNT

capability, from product design and prototyping to product development, testing and qualification. The company will specialise in the design and production of Micro Electro Mechanical Machines (MEMS) – tiny sensors, switches and processors at the heart of microchip technology that are only a quarter of the diameter of a human hair. Semefab will work with the Institute of System Level Integration (ISLI), in partnership with the University of Strathclyde and Heriot Watt University, to enhance its design capabilities while the purchasing of new MEMS processing equipment will enable the company to offer a comprehensive prototyping service over the next 5 years.

<http://www.semefab.co.uk>

MiCS moves up the value chain

MiCS (MicroChemical Systems SA) was founded in 1998 with the buyout of Motorola's gas sensor business. Since 2001, the Swiss based company has established its reputation in the automotive market as a provider of semiconductor gas sensors, working with partners such as Saia-Burgess or Siemens VDO. Building upon its strong knowledge of the AQS (Air

Quality Sensor) function, MiCS now offers complete AQS solutions to both HVAC manufacturers and OEMs. Since introducing its integrated modules in 2005, the company has already won several significant contracts, proving that this strategic transition was well received by both European and Asian automotive customers. There is a clear and fast trend in this market towards replacement of modules with ceramics gas sensors by MEMS based solutions. Some

OEMs actually request MEMS in their specifications, thus eliminating solutions based on traditional ceramics sensors. MiCS began developing its integrated products in 2004 and is now seeing the benefits. It is the only company in the world that masters the entire AQS value chain, from MEMS sensor design and manufacturing to the integration of proprietary electronics and software into an automotive-type compact plastic housing.

<http://www.microchemical.com>

You can send us press releases to mouly@yole.fr

MEMS4Display: Market analysis of MEMS based microdisplays

▶ Projection and RPTV applications are driving the microdisplays market but a severe competition is emerging

The new report MEMS4Display is presenting market forecasts (volumes and prices), players involved in MEMS-based microdisplays, analysis of the competition, the different MOEMS applications with a specific analysis on the MEMS-based microdisplays:

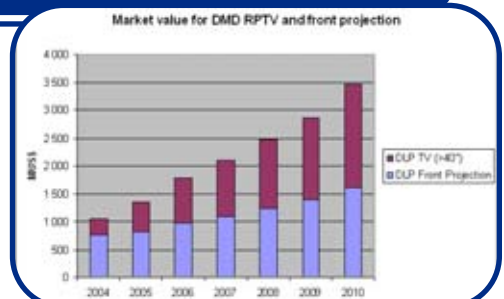
- Projection and RPTV market forecasts
- Other DMD applications
- MEMS-based microdisplay competition
- The future of RPTV: LEDs and lasers
- Analysis and short description of the different players
- Analysis per micro-mirrors application : portable applications, future applications

MEMS4Display is featuring a unique analysis of the MEMS/MOEMS food chain, the trends and business models in the MEMS/MOEMS fields,

The reports also present longer term applications also include HUDs, HMDs, AFS...

Price: EURO 3,300 / US\$ 3,950 for 90 slides PowerPoint report

Contact: David Jourdan, Tel: +33 472 83 01 90, Email: jourdan@yole.fr, website: www.yole.fr





Announcement



Yole Développement is now editing an exclusive bulletin analyzing
what has happened & what will happen
 in the MEMS fields

Benefits for MEMSentry readers:

- Analysis of the last events, news and strategic movements in the MEMS field
- Detailed analysis of a company: facts and figures, but also key trends, technologies and strategies
- Analysis of the latest financial news
- Key access to MEMS Yole Développement expertise with a Q&A session

Typical content of MEMSentry:

- The Analysis of the last news: Highlight the key aspects of the latest news, with a particular focus on industrial strategies, new applications, industry changes...
- What has happened and why? presentation of the evolution of the different industrial companies, last changes and Yole analysis on the impact on the industry
- Last financial and investment rounds: presentation of the last investments in MEMS companies, M&A, exits, new venture rounds...
- Analysis of one application: in each issue, we will analyze a specific application in order to provide market data and present the strategy of the main players involved on this market
- Analysis of one company: in each issue, we will analyze a specific company in term of technologies, products, future developments, but also finance

Coming issues:

MEMSentry	Issue #4	Issue #5	Issue #6	Issue #7
Company Analysis	MEMSCAP	Matsushita Electric Works	ImvenSense	Bosch
Application Analysis	MEMS based oscillator	Frequency bulk acoustic resonator	Optical Scanner	Tyre pressure monitoring systems

- **Starting date of the publication:** December 2005
- **Content:** Approximately 10 pages, depending on the news
- **Price:** Euro 450 / \$ 540 for an annual subscription (single user license)
- **Contact:** David Jourdan, Tel: +33 (0)472 83 01 90, jourdan@yole.fr, www.yole.fr



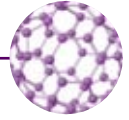
The Materials Market Research File

Decision Support for Buyers of Market Research

A single, continuously updated online resource for larger enterprises and organisations engaged in diverse materials markets

The Materials Market Research File (MMRF) is a comprehensive database allowing professionals to find and compare market research in various areas of the engineering and base materials world. The MMRF is updated continuously and provides information on market intelligence such as industry reports, conference proceedings, directories, newsletters etc., plus access to the Editorial Calendar and Current Issue of the leading English language Trade Magazines. The file is highly up-to-date, covering a period of 12 months only backdating from the current month.

www.materialmarkets.com



Alliances & Mergers

Oxonica acquires Nanoplex Technologies Inc

UK nanomaterials business Oxonica has completed its acquisition of Nanoplex Technologies, US. Nanoplex, which has 17 staff, specializes in encoded nanoparticle-based detection systems for the healthcare and security markets. "With Nanoplex fully on board, we are now ready to start com-

mercializing a series of biomarker detectors for the life sciences and clinical diagnostics markets," said Kevin Matthews, Oxonica chief executive officer. "We expect to begin showcasing prototype products for specific market sectors in the next few months." Oxonica spun out of Oxford University in 1999 and now has more than 37 employees.

www.oxonica.com

Printed electronics: Degussa reinforces its position

Germany-based Degussa announced the company is taking a holding in Printed Systems (Chemnitz, Germany), a company specialized in the use of mass printing processes for manufacturing electronic products. This venture capital participation gives Degussa access to applications and products for new material systems which it develops in its "Science to Business Center

Nanotronics" in Marl. With this move, Degussa aims at increasing its involvement in the market for printed electronics, thus strengthening its position in system-integrated nanomaterials for electronic application. Degussa founded the "Science to Business Center Nanotronics" in April 2005 in order to develop nanomaterials-based system solutions for electronic applications. The company is investing around EUR 50 million in the activities of this center over the next four years.

www.degussa.com

www.creavis.com

Events

Next BIO-NANO-ROBO seminar series

The next BIO-NANO-ROBO seminar will be held the 27th of March 2006 (11:00 – 12:30) at LIMMS-CNRS-IIS, University of Tokyo, Komaba 4-6-1, Meguro-ku, Tokyo 153-8505, Japan, seminar room: "Dai Kaigishitsu", Building An, 3rd floor. Prof. Nobutaka HIROKAWA, from the Department of Cell Biology, Graduate School of Medicine, University of Tokyo, will present "Molecular Motors and Intracellular Transport; Structure, Dynamics and Functions"

Contact for free registration:

frose@iis.u-tokyo.ac.jp

Business News

Nanofab Lab open to European researchers, free of charge

The Nanofabrication Laboratory, at the Department of Microtechnology and Nanoscience (MC2) at Chalmers University of Technology (Göteborg, Sweden) has secured a contract with the European Commission to open up the clean-room laboratory free of charge for European users. The laboratory provides means of fabricating structures and devices for microwave electro-

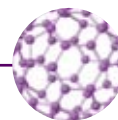
ronics, photonics, micro/nanosystems and nanotechnology. The project named MC2ACCESS started 1st of January 2006, and will run for 48 months. The access is available for universities and other organizations that freely disseminate their results. The sole exception to this rule is that the contract may cover the first access of small or medium sized companies. The user groups accessing the infrastructure must be based in any of the EU-member states (except Sweden) or in any of the associate and candidate countries.

www.mc2.chalmers.se

Nanotechnology-enabled memory market to surpass \$7 Billion in 2010

According to US-based consultancy NanoMarkets, the market for nano-enabled memory will grow to \$7 bn in 2010, up from \$1.4 bn in 2008. In its "Nano-enabled Memory and Storage, 2006 and Beyond" report, the company also predicts that four key segments will have emerged in the market by 2010 - MRAM, with around \$1.5 bn in revenues, ovonic with revenues of roughly \$877 m, and holographic and nanocrystalline, each with revenues of \$980 m.

www.nanomarkets.net



Business News

Arkema opens a carbon nanotube plant in France

On Monday January 30, Arkema inaugurated a carbon nanotube pilot plant at its Lacq Research Center (Pyrénées Atlantique, France) capable of producing some 10 tonnes per year of carbon nanotubes. With this pilot plant operating a patented catalysis process, Arkema is looking to the commercial development of carbon nanotubes to fulfill the expectations of converters in the ther-

moplastics, epoxy, elastomer and coating sectors. Progress is also expected in the field of energy in which the use of carbon nanotubes will play a role in the manufacture of energy-efficient batteries and fuel cells, said the company. Arkema is currently developing a range of pre-composites based on carbon nanotubes. This new range will be launched officially at the JEC Composites tradeshow in late March.

www.arkemagroup.com

Semes unveils CNT mass synthetic system

Semes Co. announced the development (for the first time in Korea) of a carbon nanotube (CNT) mass synthetic system. The system has a CNT mass production capability of less than 10nm diameter (premium quality), 100nm (normal quality), and maximum production of 10 Kg. Hyperion, Ulvac Co and NEC currently produce CNT synthetic systems. The world market volume for CNTs is expected to reach US\$6billion by 2010 and Semes aims to secure US\$20 million in annual sales volume.

www.kdhs.co.kr

Life & Death

Functionalized clothes: ProeTEX project started

The European Project ProeTEX (Protection e-Textiles: MicroNanoStructured fibre systems for Emergency-Disaster Wear) has officially started its activities. This four year, EUR12 million project involves 23 European partners. The goal of ProeTEX is to develop functionalized clothes, capable of monitoring physiological and environmental parameters in order to improve the safety of emergency disaster personnel. ProeTEX is lead by the Italian National Research Center S3 devoted to "Nanostructures and bioSystems on Surfaces".

www.infm.it

www.venetonanotech.it

Luna Innovations Inc. files for initial public offering

Luna Innovations has filed for an initial public offering (IPO). The company's Luna nanoWorks division has expertise in trimetaspheres - fullerene molecules that enclose three metal atoms and a nitrogen atom - as well as functionalized single-walled carbon nanotubes and fullerenes. Luna Innovations also has expertise in sensing systems. The company has yet to decide the number of shares that it will offer and the price range for the offering.

www.lunainnovations.com

Techno News

Chemists create nano motor powered by solar energy

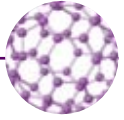
Chemists at Italy's University of Bologna's Photochemistry and Supramolecular Chemistry Group, UCLA (USA) and the California NanoSystems Institute (CNSI, USA) have designed and constructed a molecular motor of nanometer size powered only by sunlight. The nano motor can work continuously without any external interference, and operates without consuming or generating chemical fuels or waste, said the

researchers. Designed, assembled and run by the research groups at UCLA and the University of Bologna working closely together, the nano motor is a multi-component molecular-scale system called a rotaxane. Precisely how light-powered nano motors will be used in the future is not yet clear, the scientists admitted. Nevertheless they listed a number of possible areas for applications: nanoelectronics, molecular computers and nano valves that perhaps could be used for the delivery of anti-cancer drugs and other medications.

www.cnsi.ucla.edu

www.unibo.it

You can send us press releases to pieters@yole.fr



Techno News

Nanoscale engineering to power a greener future

Researchers at the University of St Andrews (UK) have found a new electrode material which could lead to more powerful fuel cells than currently available. The new materials were developed through a directed programme of study to control and manipulate their structure on the nanoscale. This approach involved the introduction of nanometer thick layers through control of composition and then directing the composition to the point where these layers became disrupted, but retained their activity. According to the scientists, the materials allow a more efficient direct utilisation of natural gas or biogas (as produced from waste) in fuel cells and could help achieve voltages up to 40% higher than currently achieved. As well as enhanced voltage, these new electrodes provide highly competitive performance with conventional state of the art electrodes, they said. The University of St Andrews worked in collaboration with the University of La Laguna in the Canary Islands.

<http://calvin.st-andrews.ac.uk>

Hybrid electric vehicles: Nanotecture awarded DTI grant

UK-based nanotechnology materials company Nanotecture has been awarded a £374.6K (app. EUR550K) grant by the UK's DTI, to support a two-year research and development project entitled "Next Generation Super-capacitors for Hybrid Vehicle Applications". The project involves a collaboration between Nanotecture, Johnson Matthey and HILTech Developments. It will combine Nanotecture's materials technology with Johnson Matthey's manufacturing skills and HILTech's system engineering design capability. The purpose of the project is to demonstrate the benefits of Nanotecture's proprietary, nanostructured materials in a novel power supply system for hybrid electric vehicles. This system will use super-capacitor technology to improve the overall driving experience of hybrid electric vehicles and increase overall energy efficiency which in turn will have a significant impact on carbon dioxide emissions.

www.nanotecture.co.uk

www.matthey.com

www.hiltechdevelopments.com

Nanozoom – how small can we go?



Micronora, 16th International Microtechnology Trade Fair
26th to 29th of September 2006

Parc des Expositions Micropolis, Besançon, France

Website: www.micronora.com

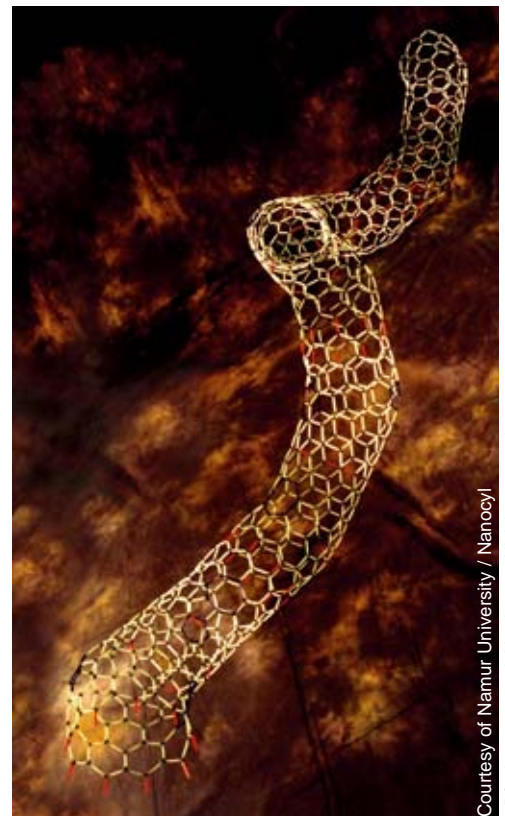
During each exhibition, Micronora organizes a special event called Zoom (conferences and thematic exhibition). This year thematic exhibition and conferences will be dedicated to Nanotechnologies. Nanozoom topics will tackled:

- Nanomaterials and surface treatments
- Related manufacturing equipment
- Microscopy, characterization and instrumentation tools

The objectives of the Nanozoom are:

- To communicate on the first industrial applications of nanomaterials through the exhibition
- To propose scientific conferences from European labs involved in this field (Paul Scherrer Institute and EPFL from Switzerland, IMS from Austria, CEA, LAAS and LPN from France, ...).

The conferences will be held on 2 days (27th and 28th of September 2006).



Courtesy of Namur University / Nanocyl

For Nanozoom registration, don't hesitate to contact Faycal El Khamassi from Yole Développement (before 28th of April): khamassi@yole.fr, + 33 472 83 01 95



Techno News

Laser system shrinks projector to matchbox size

Light Blue Optics, developer of the revolutionary PVPro technology for miniature projectors, has a new demonstrator unit, which is only 62cm³ in volume, and is similar in size and shape to a typical matchbox. Projectors based on PVPro technology can be used to display images from a range of mobile devices, including laptop computers, personal media players such as the video

iPod, digital cameras and even mobile phones. Light Blue Optics has developed unique laser-based projection technology, which uses computational algorithms and novel optical techniques to allow miniature lasers to display video images in real time using the diffractive nature of laser light. This overcomes the size limitation of conventional projection techniques, allowing projectors to be smaller than ever before.

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

Nanophotonics: a novel dual-grating assisted directional coupler

With the ever-decreasing size of communications devices optical technologies are currently at nanometer scale. The control and manipulation of light at this wavelength involves polarisation, loss and coupling issues. One of the key issues to be solved in nanophotonics is the coupling of light between an optical fibre and a semiconductor waveguide. A collaborative research project between Innos, the UK R&D development company, the universities of Surrey, Southampton and the Politecnico di Bari in Italy has addressed this challenge. According to Innos, the project has demonstrated the highest recorded coupling efficiency of 55%. The result was a novel method for coupling light from an optical fibre to 200nm thick silicon wave-

guides for optical communications. The project also has developed the Dual-Grating Assisted Directional Coupler with support from Innos who fabricated the device.

<http://www.innos.co.uk/>

<http://portal.surrey.ac.uk/>

<http://www.poliba.it/>

UDC unveils novel full-color AMOLED prototype on flexible metal foil

Universal Display Corporation (UDC) has unveiled a full-color, active-matrix OLED (AMOLED) display prototype on flexible metal foil at the United States Display Consortium (USDC)'s 5th Annual Flexible Displays & Microelectronics Conference in Phoenix, Arizona. In the paper titled "Full Color 100 dpi AMOLED Displays on Flexible Stainless Steel Substrates," Anna Chwang highlighted the performance characteristics of a prototype based on the company's proprietary phospho-

rescent OLED (PHOLED), top-emitting OLED (TOLED) and flexible OLED (FOLED) technologies. The full-color AMOLED prototype also uses polysilicon thin film transistor (TFT) backplanes designed and fabricated by PARC, a subsidiary of Xerox Corporation, and was encapsulated by Vitex Systems.

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

Lumileds unveils 140 lumen Luxeon K2 LEDs

Lumileds Lighting has launched its Luxeon K2 LEDs. The company claims these devices will set industry benchmarks in a variety of areas including light output, temperature tolerance and drive current. Luxeon K2 Emitters enable the development of solid-state lighting applications with more useable light, reduced thermal management engineering, lower cost, and simpler manufacturing, says the company.

www.lumileds.com

World first: GaN-on-diamond

Group4 Labs LLC, of Menlo Park, USA, has developed what they claim to be the world's first gallium nitride (GaN)-on-diamond semiconductor wafer. The Xero Wafer, which has been under development for three years, sits less than 0.5 nanometres away from a synthetic diamond substrate. It offers high temperature resilience for high-power, high-frequency electronic, solid-state

white lighting, photonics and military applications. Military applications include: microwave and millimetre wave circuits for radar, and communications satellites. It is ideal for use in the conventional epitaxial growth of GaN and its aluminium and indium-based alloys, and is initially available in 10mm x 10mm square pieces. Priced at \$450 per unit, the new wafers are available through the company's online store.

www.Group4Labs.com/Products



Alliances & Mergers

NASA, Qwest ink optical networking agreement

Qwest Communications announced that it has signed a new agreement with the National Aeronautics and Space Administration (NASA) to provide a nationwide networking service. Under the agreement, Qwest is to provide both local and nationwide connectivity to six NASA centers as well as to other NASA locations, comprising the entire core of NASA's new network. The provided platform will enable end-to-end wavelength services using the carrier's QWave optical communication services.

<http://www.qwest.com/index.html>
<http://www.nasa.gov/>

Bookham buys Avalon Photonics

Bookham Inc. has agreed to acquire Avalon Photonics. Bookham will give up about 765,000 shares of Bookham common stock valued at approximately \$5.5 million on signing. The company could also end up paying an additional 348,000 share earn-out based upon Avalon achieving certain revenue and production performance criteria over a two-year period, Bookham said. The transaction is expected to close in March.

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

JDSU sells Ottawa optical ops

JDSU today announced that it has entered a definitive agreement to sell its manufacturing operations located in Ottawa, Canada to Fabrinet, its contract manufacturing partner. According to a press release, the transaction is expected to close in the third quarter of FY06. Fabrinet will manage ongoing production and the Asian transfer activities currently performed by the Ottawa site.

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

Coherent to buy Iolon

In California, Coherent Inc. of Santa Clara has agreed to purchase Iolon Inc. of San Jose in a cash transaction valued at approximately \$5 million. Coherent plans to use Iolon's optical component technology, including widely tunable lasers and filters, for products in the instrumentation and display markets. Iolon's physical assets will be transferred to Coherent's Santa Clara facilities.

www.coherent.com

NEC Electronics announces merger

NEC Electronics Corp. has announced that it will merge its wholly-owned subsidiary, NEC Compound Semiconductor Devices, Ltd., back into the parent company, effective April 1, 2006. NEC Compound Semiconductor Devices designs and manufactures RF and wireless semiconductors, components for fiber-optic communications, optocouplers, and solid state relays. According to a press release, in the U.S. and throughout the

western hemisphere, California Eastern Laboratories (CEL) will be NEC's exclusive sales and marketing partner for the products manufactured by NEC Compound Semiconductor Devices. CEL maintains an extensive inventory, provides engineering and applications support, and participates in the design of the NEC Compound Semiconductor Devices' products, specifically targeting domestic markets. CEL has sales offices throughout North America, plus a network of independent representatives and distributors.

<http://www.csd-nec.com/>

Business News

Nichia sales hit by white LED price cuts

Nichia, the world's leading LED manufacturer, is expected to report sales of Yen 195 billion (\$1.645 billion) for the fiscal year ended December 31, 2005, according to an article in the Japanese newspaper Nihon Keizai Shimbun. If correct, the figure will represent a 5.5% decrease over the previous year's sales. Nichia is also expected to report a fall in

pre-tax profit of 17.6% to Yen 78 billion, which would make 2005 the first year that both annual sales and profit have slipped since 1993, the year that the Japanese chip manufacturer launched its industry-changing blue LEDs. While net profit is predicted to remain above Yen 40 billion, it is likely to slip by more than 10% compared with fiscal 2004 when the firm earned Yen 56 billion. Although LED production ramped up strongly in 2006, a 30% annual fall in the price of white LEDs, of which Nichia is the

dominant global producer, is being blamed for the sales decline. Capital spending at the company continues apace, however, with Nichia using Yen 35 billion for its new Naruto plant in Tokushima Prefecture, slated to come online in July, as well as for expanding its headquarters plant. For fiscal 2006, sales are anticipated to climb to the Yen 200 billion mark, while Nichia aims to post sales of Yen 10 billion in fiscal 2008, says the report.

www.nichia.com



Business News

US group launches solid-state lighting competition

Lighting for Tomorrow, a US program that aims to stimulate the market for high-efficiency residential lighting, has launched a new solid-state lighting (SSL) competition. The competition, launched at the US Department of Energy (DOE)'s Solid-State Lighting Workshop in Orlando, Florida, will encourage and recognize innovation, lighting quality and energy efficiency in the use of SSL technology for specific lighting

applications. Responding to rapid development of SSL technology in recent years, Lighting for Tomorrow is soliciting lighting fixture designs that use LEDs as the sole light source for specific applications. A separate 2006 Lighting for Tomorrow competition for compact fluorescent fixtures was announced in January 2006. The registration deadline for the competition is April 1, 2006 and the date by which entrants must submit working prototype or production quality fixtures is September 15, 2006. Lighting for Tomorrow is organized by the American Lighting

Association (ALA), the DOE represented by Pacific Northwest National Laboratory (PNNL) and the Consortium for Energy Efficiency (CEE). About two dozen energy-efficiency organizations nationwide have combined to pledge more than \$150,000 to sponsor the 2006 Lighting for Tomorrow program. This initial Lighting for Tomorrow SSL competition is geared to facilitate learning about effective applications of this new light source in appropriate niche lighting applications.

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

Modulight gets \$1.8m Finnish contract to develop high-power laser diode bars

Laser manufacturer Modulight Inc of Tampere, Finland has received a \$1.8m contract from Technology Development Centre (Tekes), the Finnish Funding Agency for Technology and Innovation, to develop high-power laser diode (HPLD) bars for solid-state pumping, to be delivered by the end of 2006.

<http://www.modulight.com>

BeamExpress closes \$14.2M 3rd funding round

BeamExpress Inc. a producer of innovative optical transceiver/transponders used in the 10Gigabit enterprise applications announced that it closed a \$14.2M funding round led by Oak Investment Partners along with existing investors Index Ventures and European Technology Ventures (ETV).

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

You can send us press releases to mounier@yole.fr

LED2Light: HB-LEDs for General Illumination and Automotive Lighting

In 2007, the number of 2" equivalent GaN based wafers to process could reach 3,3 millions!

Yole Développement has edited a new report describing the market and technology trends for HB LEDs in general illumination and automotive lighting.

In 2007, GaN-based LEDs will reach a higher luminous efficiency than fluorescents. The ramping-up of solid-state lighting business will really start at that time. Companies like Lumileds, Osram, Nichia or Cree are now marketing high brightness white LEDs with more than 40 lumen/watt efficiency) and an ASP less than 5\$/part.

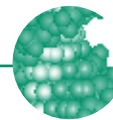
Yole Développement forecasts that the annual demand for LEDs for general illumination should reach about 3.6 billions units in 2010 and between 4 to 7 billions units after 2020. 2007 is the turning point where general illumination business will start. Depending of the lm/lamp and \$/lm couples, illumination market could reach about \$3billion by 2010.

The report contains 130 slides of PowerPoint presentation plus 50 pages of the main manufacturer's profiles.

Price: EURO 3,900 / US\$ 4,700

Contact: David Jourdan, Tel: +33 472 83 01 90, Email: jourdan@yole.fr, website: www.yole.fr





Business News

C2V awarded grant to develop a fast handheld gas chromatograph for threat detection

C2V (Enschede, The Netherlands) announced that it leads a consortium to develop fast handheld chemical threat detectors. Funded by a 2M\$ government grant C2V will work with the world leading research at the Vrije Universiteit in conjunction with Omnilabo International and will develop an ultra fast, handheld threat detector based on gas chro-

matography for security applications. The platform combines micro components with narrow bore capillary GC columns for optimal performance. Functional components such as injectors, detectors, sample definition and diagnostics are integrated leading to higher functional density and smaller, handheld instruments. The flexible system configuration enables tailoring for optimal performance in targeted applications. C2V develops handheld screening and detection instrumentation, based on silicon micromachining technology and its proprietary micro/nano fluidics integration platform.

www.c2v.nl

Illumina reports financial results for fiscal year 2005

For the fiscal year 2005, Illumina, Inc. (San Diego, CA, USA) reported total revenue of \$73.5 million, a 45% increase over the \$50.6 million reported for the prior fiscal year. The Company reported a net loss of \$20.9 million, or \$0.52 per share, compared to a net loss of \$6.2 million, or \$0.17 per share, for the prior year. The Company's net loss for the 2005 fiscal year included a one-time charge of \$0.39 per basic and diluted share related to the write-off of \$15.8 million of acquired in-process R&D in connection with the its acquisition of CyVera

Corporation in April. Excluding this one-time charge, the net loss for the fiscal year was \$5.1 million, or \$0.13 per basic and diluted share. Cash and investments totaled \$50.8 million at year end, an increase of approximately \$0.7 million over the third quarter of 2005. For the fiscal year ended January 1, 2006, gross margins were 67.7%, compared to 72.7% for the comparable period in 2004. For the year, R&D expenses were \$27.7 million compared to \$21.1 million in 2004. Selling, general and administrative expenses were \$28.0 million compared to \$25.1 million in 2004.

www.illumina.com

CombiMatrix awarded \$2.4 million from the US Department of Defense

Acacia Research Corporation announced that the 2006 Defense Appropriations Bill, recently signed by President Bush, includes an allocation of \$2.4 million to fund efforts by CombiMatrix to develop further its microarray technologies for the detection of biological and chemical threat agents. Since March 2004, CombiMatrix has been awarded a \$5.9 million contract and a \$2.1 million contract

that is currently in process. Under previously funded programs with the US government agencies including the Department of Defense, CombiMatrix demonstrated that its microarray could be multiplexed for the simultaneous detection of toxins, viruses, and bacteria using immunoassay and genomic analysis. Unique to this platform is "on chip" electrochemical detection, which eliminates the need for a large, complex and expensive optical system.

www.combimatrix.com

Techno News

Agilent Technologies expands 1200 series HPLC-Chip/MS portfolio

Agilent Technologies Inc. (Palo Alto, CA, USA) expanded its line of high-performance liquid chromatography (HPLC)-chip/mass spectrometry (MS) modules, introducing five new chips for the study of small and

large molecules, all to be used with the 1200 Series HPLC-Chip System. Agilent's breakthrough HPLC-Chip technology combines nanoflow HPLC with an electrospray ionization source in a reusable microfluidic chip about the size of a credit card. Agilent's first two HPLC-Chips, the Protein ID chip and the MS Calibration and Diagnostic chip, were introduced about a year ago. The HPLC-Chip/MS makes the dra-

matic sensitivity increases promised by nanospray LC/MS attainable by more researchers, thanks to elimination of half the fittings and connections of conventional nanoflow LC/MS systems. This reduces the potential for leaks and dead volumes while significantly enhancing chromatographic performance, simplifying workflows and enhancing reliability.

www.agilent.com

You can send us press releases to labat@yole.fr



Techno News

Labcyte issued broad European patent covering acoustic droplet ejection and 25th US patent

Labcyte Inc. (Sunnyvale, CA, USA) announced the issuance of its first European Patent EP 1337325. This broad patent covers many aspects of acoustic droplet ejection (ADE), an extremely precise and accurate technique that moves small volumes of liquid with sound. The patent describes moving the source of the acoustic energy from one well to another and ejecting different fluids at rates greater than one second per fluid. In response to the need for rapid transfer from high-density plates such as those containing 1536 wells, Labcyte has commercialized systems that operate at much higher speeds. The newest Labcyte system, the Echo™ 555 liquid handler, can transfer as many as 640,000 different compounds in a single day. The company also announced issuance of its 25th U.S.

patent, No. 6,991,917. This patent describes spatial control of the acoustic delivery of cells from a carrier fluid. The technique can distribute cell-containing droplets to form an array of living cells for numerous biological applications.

www.labcyte.com

A microfluidic-based microencapsulation process to improve drug bioavailability and kinetics

Q Chip (Cardiff, UK) is a developer and producer of drug delivery systems. Integrating its expertise in microfluidics, polymers and molecular biology, Q Chip developed the proprietary Rational Capsule Design technology. This microfluidic precision microencapsulation technology enables the development of uniform, precisely-loaded microcapsules, using any biocompatible polymer, which can be further functionalised to achieve optimal delivery charac-

teristics tailored for each particular therapeutic application.

www.q-chip.com

Patent granted to Arrayjet for microarray fabrication

Arrayjet (Mayfield, Scotland) announced that a European patent had been granted for 'Fabrication of microarrays by inkjet printheads'. Used inside the company's Aj100 and Aj120 microarrayers this technology enables samples to be picked up from 96 or 384 well plates and then printed in arrays ranging from a few spots in a high density format to slides containing 43,000 elements or more with rows of uniform and consistent spots. With its core technology now officially recognised, Arrayjet is talking to other manufacturers about compatible applications outside of microarray technology, and is also considering new variants of its current instruments.

www.arrayjet.co.uk

Alliance & Mergers

CardioMEMS launches its implantable wireless pressure sensor

CardioMEMS Inc. (Atlanta, USA) has launched its EndoSure™ sensor, which makes testing safer and more convenient for aneurysm patients. Based on

intellectual property from the Georgia Institute of Technology, EndoSure is the first implantable pressure sensor that combines wireless and MEMS technology to receive FDA clearance. Officially known as the EndoSure Wireless AAA Pressure Measurement System, it measures blood pressure in people who have an abdominal aortic aneurysm.

www.cardiomems.com

Nanogen closes acquisition of POC cardiac diagnostic test business from Spectral Diagnostics

Nanogen, Inc. (San Diego, CA, USA) has completed the acquisition of the rapid cardiac immunoassay test business from Spectral Diagnostics, thereby expanding its portfolio of complementary diagnostics to include Spectral's Cardiac STATus and Decision Point product lines, the i-Lynx reader, related intellectual property and manufacturing capabilities. Nanogen now has a fully integrated

point-of-care group with resources and capabilities in research, product development, manufacturing, and sales and marketing with a worldwide distribution network to compete in the \$1.5 billion worldwide point-of-care market. Spectral reported nearly CDN\$7 million in product revenues during 2005 from the Cardiac STATus tests and i-Lynx readers. The Cardiac STATus line includes four FDA-cleared tests that can be used at the point-of-care to determine elevations of cardiac markers, providing an aid to physicians to assess and diagnose acute coronary syndrome (ACS) as indicated by chest pain.

www.nanogen.com



Alliance & Mergers

Eksigent Technologies announces HPLC distribution agreement with ABI/MDS SCIEX

Eksigent Technologies (Dublin, Ireland) has signed a distribution agreement with Applied Biosystems (ABI) under the terms of which ABI will offer a new line of high performance liquid chromatography (HPLC) systems based on Eksigent's proprietary technology, integrated with Applied

Biosystems/MDS SCIEX joint venture's mass spectrometers (MS). The new Tempo(TM) liquid chromatography (LC) systems will be sold and serviced by ABI/MDS SCIEX, and includes platforms for nano LC, high-throughput micro LC and an LC-MALDI deposition system. The Tempo systems are based on Eksigent's Microfluidic Flow Control (MFC) technology, which has been widely adopted in proteomics research for high sensitivity biomarker discovery and in pharmaceutical discovery applications for rapid, high resolution LC-MS.

www.eksigent.com

Event

State of the art in "NanoTechnologies for cell investigation" 14th March 2006, Paris

At a seminar organised by the Observatory for Micro & NanoTechnologies, International experts will present the state of the art in the new field of "micro-nanotechnologies for cell biology".

With the participation of:

- Guenter Fuhr, Fraunhofer-Institut für Biomedizinische Technik (IBMT), Germany
- Prof. Peter Fromherz, Max Planck Institute, Martinsried, Germany
- Tejal Desai, Univ. of California, San Fransisco, USA
- Prof Pier Luigi Luisi, Professor Emeritus ETH-Zürich & Università degli Studi di Roma
- Jon Cooper, Glasgow University, Scotland
- Prof. Kishan Dholakia, St Andrews University, UK
- Benoit Dubertret, ESPCI, Paris, France
- Pascal Silberzan, Institut Curie, Paris, France
- Michel Bornens, Institut Curie, Paris, France
- Alexandra Fuchs, CEA/DSV, Grenoble, France
- Véronique Baticle, CEA-BEM, Grenoble, France

Agenda and on line registration: <http://www.omnt.fr>

"LifescienceIC": Analysis of the applications and added value of semiconductor devices in life sciences

▶ Life Sciences explained to the semiconductor industry

The purpose of this report is to provide a better understanding of Life Sciences to become an innovation player and join Affymetrix as a big player of the field. The report is bringing a lot of value to IC manufacturers, Mems manufacturers, suppliers to IC manufacturers and system manufacturers in order to understand the business potential, the technology status and who is doing what for strategic and marketing decision making. We answer to the question: "how could IC and MEMS companies become a key leader of the Life Sciences field?"

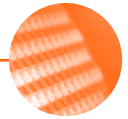
This report presents and describes the biological challenges, ins and out. We highlight the specificities of the different Life Science industries and the business opportunities for semiconductor companies. Best practices to enter the Life Science field are proposed in this report. They are based on analysis of industry key players: Affymetrix, Agilent, microParts, STMicroelectronics (profiles included in the report). We also analyse past experiences from Motorola and Infineon to understand why such companies have stopped their investments in Life Science applications.

A part of this report is also dedicated to the different existing techniques used today in molecular biology. We highlight the gold standard technologies per application field. Such information is required when launching an innovation on the market to get a technological and commercial competitive advantage.

Price: EURO 3,300 / US\$ 3,950 for 170 slides (PowerPoint report)

Contact: David Jourdan, Tel: +33 472 83 01 90, Email: jourdan@yole.fr, website: www.yole.fr





Global chip sales hit record \$227.5 billion in 2005

According to the Semiconductor Industry Association (SIA), worldwide sales of semiconductors set a new record at \$227.5 billion in 2005, an increase of 6.8 percent from the \$213.0 billion reported in 2004. Worldwide semiconductor sales in December amounted to \$19.95 billion, a decline of 2.2 percent from November when sales were \$20.41 billion. Sales in December 2005 were up by 8.6 percent compared to the \$18.37 billion reported in December 2004. Worldwide sales for the fourth quarter were \$59.86 billion, up by 2.0 percent from third-quarter sales of \$58.67 billion, and up by 8.6 percent from sales of \$55.10 billion in the fourth quarter of 2004. "2005 turned out to be a very good year for the semiconductor industry," said SIA President George Scalise. "Despite record energy prices and an unprecedented series of natural disasters, worldwide demand for semiconductors increased in all end markets." Scalise noted that the semiconductor sales data reflect the continuing shift of electronics manufacturing operations to the Asia-Pacific region in general and to China in particular. SIA forecasts that worldwide sales of semiconductors will grow by 7.9 percent in 2006 to \$245 billion.

December 2005 (\$ Billions)

December 2005 (\$ Billions)			
Month-to-Month Sales			
Market	Last Month	Current Month	% Change
Americas	3.73	3.71	-0.5%
Europe	3.53	3.32	-6.1%
Japan	3.77	3.62	-3.9%
Asia Pacific	9.38	9.31	-0.8%
TOTAL	20.41	19.95	-2.2%
Year-to-Year Sales			
Market	Last Year	Current Month	% Change
Americas	3.24	3.71	14.6%
Europe	3.53	3.32	-5.9%
Japan	3.86	3.62	-6.2%
Asia Pacific	7.75	9.31	20.1%
TOTAL	18.37	19.95	8.6%

Source: SIA, February 2006

Intelligent Micro Patterning announces 2005 financial results

Intelligent Micro Patterning, LLC, St. Petersburg, Florida, announced record financial results for the year ending 2005, with over \$1.0 million annual revenue and record profitability. The improved results were driven by the introduction of the SF-100 Auto Stage, an automated version of the proven SF-100 maskless lithography system. The SF-100 is a unique, maskless photolithography system that utilizes patented Smart Filter technology, licensed by Intelligent Micro Patterning, LLC from the University of South Florida. Smart Filter technology incorporates proprietary, cutting-edge, micro-optical techniques to rapidly project master images directly onto diverse

substrate materials, such as quartz, ceramics, metals and plastics, without the use of photomasks. In order to continue its growth in the new year, Intelligent Micro Patterning, has announced an expansion of its global headquarters location in St. Petersburg Florida, to accommodate additional lab space and facilities.

<http://www.intelligentmp.com>

Applied Materials ships 500th 300mm CMP system

Applied Materials, Inc. announced that it has shipped its 500th 300mm CMP (chemical mechanical planarization) system. The semiconductor industry's leading CMP system, the 300mm Applied Reflexion(R) LK CMP, and the revolutionary Applied Reflexion LK Ecmp(TM) (elec-

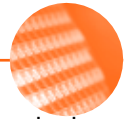
trochemical mechanical planarization) system, are used by memory and logic chipmakers worldwide for advanced production, as well as for next-generation device development.

<http://www.appliedmaterials.com>

Fraunhofer IAF selects Veeco GEN20A MBE system

Veeco Instruments Inc. announced that it has received an order for its automated GEN20™ (model GEN20A) Molecular Beam Epitaxy (MBE) System from Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Institute for Applied Solid State Physics), Freiburg, Germany. The system will be used to grow nitride-based electronic devices.

<http://www.veeco.com>
<http://www.iaf.fraunhofer.de>



Life & Death

Engineering Research Center for Semiconductor Integrated Technology in China

The Engineering Research Center for Semiconductor Integrated Technology is an advanced technology platform, which was established by

Institute of Semiconductors, Chinese Academy of Sciences in 2002, for the strategic development of the institute, Chinese Academy of Sciences and Chinese government. The whole investment is RMB 110 millions for clean rooms (1,700m²), laboratories (1,100 m²), and equipments for key technologies. The center started running in December 2004.

Current research projects include nanoscale quantum devices,

high-speed photonic devices and modules, hybrid integration of micro- and nano-optoelectronic devices, passive and active optoelectronic devices and integration, GaN and SiC based devices, circuits and novel CMOS/SOS integrated circuits, MEMS and NEMS, Integration of Optoelectronic and microelectronic devices, and System on Chip.

<http://159.226.228.70/semi/>

Leica Microsystems to change its name to Vistec Semiconductor Systems

The equipment division of Leica Microsystems will soon change its name to Vistec Semiconductor Systems. The company's product line will reportedly be unchanged. Leica Microsystems was previously part of the Leica Group, best known for manufacturing cameras. The German company

also provides geosystems products. Leica Microsystems was acquired by technology company Danaher in July 2005 for approximately Eur.450m. Danaher then sold the Semiconductor Equipment Division to US investment firm Golden Gate Capital. To distinguish itself from its former parent company, the Semiconductor Equipment Division will change its name to Vistec in the near future.

<http://www.leica-microsystems.com>

Techno News

Image Technology acquires large area mask defect inspection tool

Image Technology, a supplier of 1X full-field photomasks, announced that it has acquired a Lasertec Large Area Mask (LAM) defect inspection tool to enhance their full production line for advanced 9-inch photomasks. The acquisition of this tool positions the company as being the first merchant pho-

tomask making company in the world to offer sub-micron detection on 9-inch photomasks and can also be used to inspect advanced phase shift masks. The tool is also capable of detecting surface contamination as well as inspecting photomasks between 4 to 9-inches in size. Image Technology is a wholly owned subsidiary of SUSS MicroTec and is a supplier of 1X full field photomasks, specializing in Large Area Masks (LAM).

<http://www.suss.de>

<http://www.image-tec.com>

IBM unveils a way to extend current chip manufacturing techniques

IBM researchers announced they have found a way to extend a key chip-manufacturing process to generate smaller chip circuits, potentially postponing the semiconductor industry's high-risk conversion to an

extremely expensive alternative. IBM scientists have created the smallest, high-quality line patterns ever made using deep-ultraviolet (DUV, 193-nanometer) optical lithography – a technology currently used to essentially "print" circuits on chips. The distinct and uniformly spaced ridges are only 29.9 nanometers wide. This is less than one-third the size of the 90-nanometer features now in mass production and below the

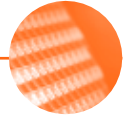
32 nanometers that industry consensus held as the limit for optical lithography techniques. The record-small pattern of well-defined and equally spaced 29.9-nanometer lines and spaces was created on a lithography test apparatus designed and built at IBM Almaden, using new materials developed by its collaborator, JSR Micro (Sunnyvale, California).

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

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You can download an issue at: www.meminfo.jp/yd_micro_news.shtml



Alliances & Mergers

Belgian spin-off Essensium secures Eur. 6 million in Malaysian funding

Essensium NV, a Belgian fabless provider of SoC ASICs (system-on-chip application-specific integrated circuits), announced that it has secured a strategic partnership with Silterra, a semiconductor wafer foundry in Malaysia, through a Eur. 6 million private equity financing from Silterra's parent company Khazanah Nasional. The capital will be injected in the spin-off of IMEC - the Belgian research centre on nanotechnology and nanoelectronics - through Atlantic Quantum, the investment sister company of Silterra.

<http://www.imec.be>

<http://www.essensium.com>

KLA Tencor to acquire ADE Corporation

KLA-Tencor Corporation and ADE Corporation jointly announced that they have signed a definitive agreement for KLA-Tencor to acquire ADE in a stock-for-stock transaction valued at approximately \$488 million based on the closing price of KLA-Tencor on February 22, 2006. Pursuant to the agreement, which has been unanimously approved by the boards of directors of both companies, each share of ADE common stock will be exchanged for 0.64 shares of KLA-Tencor common stock on a fixed basis. The transaction is expected to close by early in the third calendar quarter of 2006.

<http://www.ade.com>

<http://www.kla-tencor.com>

FEI Company terminates discussion with Carl Zeiss SMT

FEI Company announced that it has terminated discussions with Carl Zeiss SMT, a unit of Carl Zeiss AG regarding the potential acquisition of FEI by Carl Zeiss SMT. The discussions were initiated by Carl Zeiss. Commenting on this announcement, Vahe Sarkissian, chairman, president and CEO of FEI stated, "We are renewing our focus on generating improved operating results in 2006, building on our market focus and restructuring activities of 2005. Our potential as a leader in tools for nanotechnology is very large, and we are concentrating on taking advantage of that potential, generating positive shareholder returns in the process."

<http://www.feicompany.com>

You can send us press releases to mouly@yole.fr

Power 06' Advanced Technologies and Markets for Power Devices



In 2007, IPM will account for more than 45% of total Power Devices market

In microelectronics world, the power devices industry is very specific as there are few standards and represents a few % of the mainstream semiconductor business (about 10%). However, this industry is also characterized by a high level of innovation: deep etching, the use of SOI or thin wafers to answer power devices technical challenges. This report gives a complete analysis of the markets and new technical trends for the power devices industry today. It is also presenting the current and the future technical solutions to improve power devices.

The key challenges are:

- Lower R_{dson} – the global switch resistance in the on state - (to have low heating, low losses)
- Lower cell size: shrinking the chip area reduces the chip cost but power dissipation per unit area becomes an issue
- Add protecting features: high operating temperature, latch up free, very high voltage applications, ElectroStatic Discharge (ESD) protection are requested for automotive applications
- Built robust devices

Price: EURO 3,900 / US\$ 4,700 for 120 slides (PowerPoint report) plus 67 profiles (Excel table format)

Contact: David Jourdan, Tel: +33 472 83 01 90, Email: jourdan@yole.fr, website: www.yole.fr





About Yole Développement

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

- MEMS & Nanotechnology
- Compound semiconductors & optics
- IC manufacturing
- Micro and nano technology for Life Sciences and chemistry

Yole Développement offers various kinds of services:

- Custom market research and technology/strategy analysis
- Marketing and communication services through micronews
- Editions of market reports and publications (micronews & MEMSentry)



Jean Christophe Eloy is the founder and Managing Director of Yole Développement.

Founded in 1998, Yole Développement is now the world leader in the analysis of the microtechnologies and compound semiconductors markets. Each day, Yole Développement's team of 18 consultants is in contact with worldwide key industrial companies, R&D institutes and investors in order to help them to understand the markets and technology trends. In its analysis, Yole Développement takes into account the complete value chain including materials and equipment suppliers, device & system manufacturers and devices users.

To meet us at exhibitions

- **Semicon Europa**, Munich, Germany, 4-6 April, please contact Jean-Christophe Eloy at eloy@yole.fr
- **AICHe Spring Meeting**, Orlando, USA, 25-27 April, please contact Jean-Christophe Eloy at eloy@yole.fr
- **CS Mantech**, Vancouver, Canada, 24-27 April, please contact Philippe Roussel at roussel@yole.fr
- **AMAA 2006**, Berlin, Germany, 25-27 April, please contact Mathieu Potin at potin@yole.fr
- **MEPTEC "MEMS Packaging" Symposium**, San Jose, USA, 17-18 May, please contact Jean-Christophe Eloy at eloy@yole.fr

Our reports



PowerD: Advanced technologies for power devices

A complete analysis of the markets and new technical trends & challenges for the power devices industry. The report provides a complete and in-depth analysis of these emerging technologies, forecasting their impacts on the related material and equipment market. Available since February 2006.

Price: Euro 3,900 / US\$ 4,700



MEMSFoundries: Market analysis of MEMS foundries and contract manufacturers

Market is expected to be multiplied by 3 in 6 years, representing more than 5% of total MEMS markets. A complete analysis of the markets, strategies and evolution of the MEMS contract manufacturers and MEMS foundries with analysis of their revenues evolution 2003-2010, of the 20 most important foundries and of the possible exit strategies per company. Available since February 2006.

Price: Euro 3,900 / US\$ 4,700



MEMS4Display: analysis of the MEMS-based microdisplays markets

MEMS4Display is presenting market forecasts (volumes and prices), players involved in MEMS-based microdisplays, analysis of the competition, the different MOEMS applications with a specific analysis on the MEMS-based microdisplays. Available since February 2006.

Price: Euro 3,300 / US\$ 3,950



LifescienceIC: life science explained to semiconductor and MEMS industry leaders

This report presents and describes the biological challenges, ins and out. It highlights the specificities of the different Life Science industries and the business opportunities for semiconductor companies. It answers to the question: "how could IC and MEMS companies become a key leader of the Life Sciences field?". Available in January 2006.

Price: Euro 3,300 / US\$ 3,950



And still: World Inertial Sensor Market, Status of the MEMS industry, SiC 2005...



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Yole Développement の調査報告書に関するお問合せは日本販売代理店株式会社グローバルインフォメーションのサイトを御覧下さい。

www.infoshop-japan.com/publisher/YD.shtml