Micronews

January 2006 - n° 43

The Yole Développement magazine for Semiconductors, MEMS, Nanotechnology, Life Science Instrumentation and Optics

EDITORIAL

# Behind the facts

Since 2002, Micronews has been providing you what, at Yole, we consider to be the most worthwhile news of the month in nano and microtechnologies. We do our best to present the information in a clear way and sincerely hope it can help you having the right decision for your business. However, we have realized that facts and figures can often drive to misleading if they are not replaced into an overall vision.

Therefore, we are today proud to announce that we have launched a new bulletin only dedicated to MEMS: MEMSentry. This will not be a second Micronews but will be a perfect complementary tool as it will analyze the latest news, describe what has happened and why and will give in-depth analysis of a MEMS application and a MEMS company per issue. Micronews will deliver to you the facts and MEMsentry will give you the keys for understanding where the MEMS business is going.

Each year, Yole is doing more than 1500 interviews in the MEMS field. We have also been involved in all the last M&A in the MEMS field in the last 2 years. This gives us a sharp vision on the MEMS business to provide to you our best analysis of the MEMS industry.

We wish you a happy new year and are pleased to continue accompanying you on your MEMS projects.

Dr Eric Mounier
Editor-in-chief

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## Micronews' Gold Partners

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MEMS Colibrys, ELKAY International, EV Group, HL Planartechnik, Hymite, IMT, ISSYS, Jazz Semiconductor, Measurement Specialties, Meggitt Plc., MEMS Technology Bhd, MEMSCAP, Nexus, Sense Holding, Sensorex, Suss MicroTec, Tessera Technologies, VTI Technologies, WiSPry

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IC MANUFACTURING ASM International, CEA Leti, Essensium, Melexis, Oxford Instruments, Quantiscript, SCHOTT Lithotec, SIA, SIlterra, Soitec, STMicroelectronics, Suss MicroTec, TMEC, Veeco, VLSI Research

## Editorial Staff


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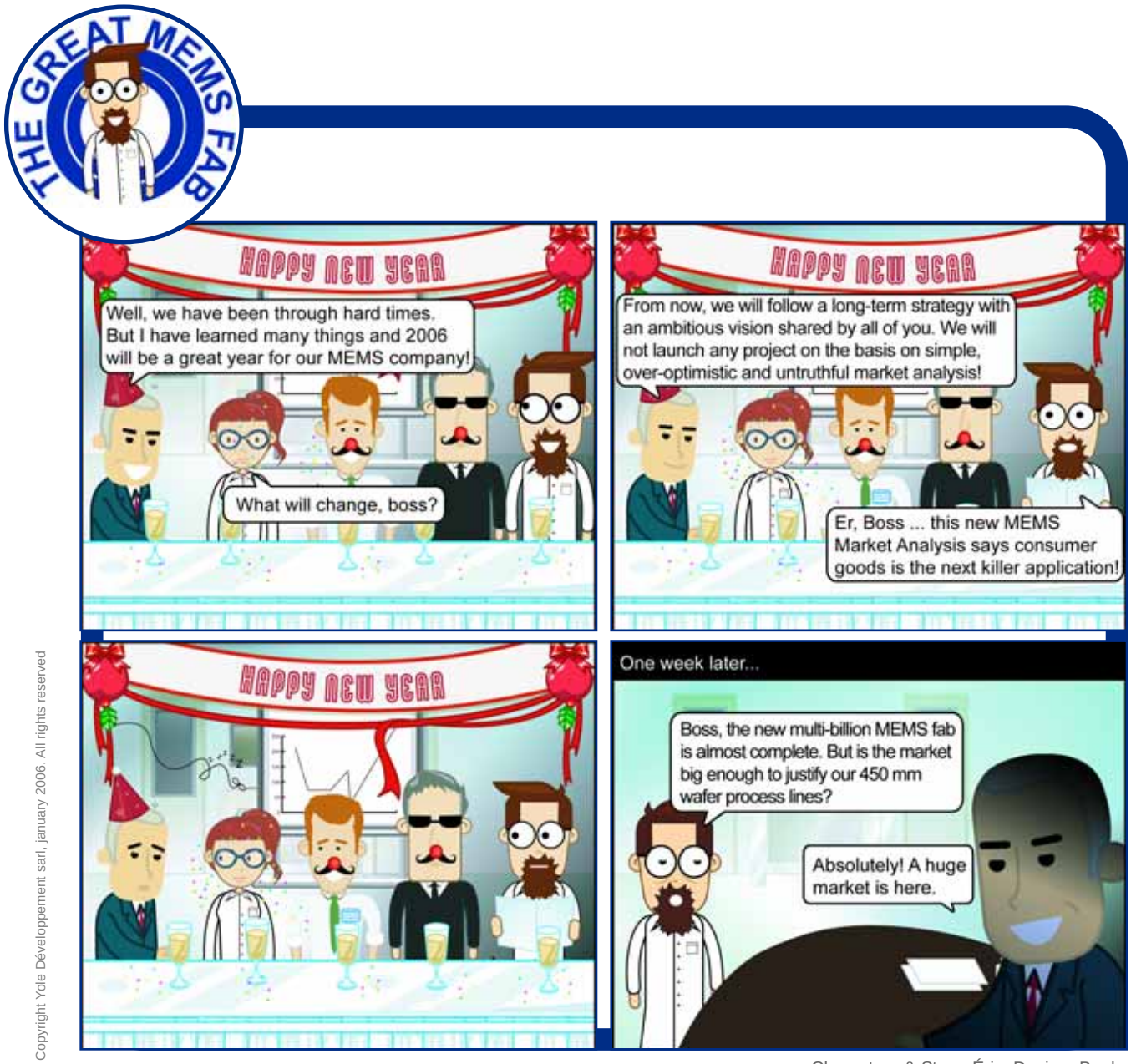
# Yole Index (current stock price)

| | Symbol | | Total number of shares(M) | Price 01-01-05 | Price 28-12-05 | Variation year to date | High/Low (52-wk range) | Market cap(M) 28-12-05 |
|---|---|---|---|---|---|---|---|---|
| Material | | | | | | | | |
| Okmetic (SF) | OKM1.F | Eur | 16,9 | 2,42 | 1,79 | -26,0% | 1,65/2,05 | 30,2 |
| Soitec (F) | SOIT | Eur | 56,2 | 5,13 | 14,43 | 181,3% | 5,06/15,89 | 810,7 |
| Equipment | | | | | | | | |
| Süss Microtec (D) | SMH | Eur | 15,2 | 5,61 | 4,74 | -15,5% | 3,54/6,55 | 71,8 |
| STS (UK) | SRTS.L | GBP | 31,4 | 0,14 | 0,19 | 35,7% | 0,09/0,29 | 6,0 |
| Ultratech (USA) | UTEK | $ | 23,7 | 18,85 | 16,35 | -13,3% | 13,21/22,93 | 387,3 |
| Components | | | | | | | | |
| Memscap (F) | MEMS | Eur | 108,0 | 0,29 | 0,28 | -3,4% | 0,23/0,36 | 51,0 |
| Affymetrix (USA) | AFFX | $ | 60,3 | 36,55 | 47,02 | 28,6% | 34,45/59,73 | 2834,7 |
| Cepheid (USA) | CPHD | $ | 41,7 | 9,94 | 9,18 | -7,6% | 5,83/11,45 | 382,5 |
| Caliper (USA) | CALP | $ | 28,6 | 7,53 | 6,00 | -20,3% | 5,40/8,13 | 171,7 |
| Elmos (D) | ELG | Eur | 19,3 | 11,80 | 8,93 | -24,3% | 8,68/15,56 | 172,3 |
| Dalsa (CA) | DSA | $ | 16,4 | 20,98 | 12,79 | -39,0% | 11,50/21,10 | 210,1 |
| Motorola (USA) | MOT | $ | 2342,1 | 17,20 | 22,90 | 33,1% | 14,48/24,99 | 53633,7 |
| Analog Devices (USA) | ADI | $ | 373,8 | 36,23 | 36,51 | 0,8% | 31,71/41,40 | 13646,6 |
| STM (F) | STM | Eur | 901,0 | 19,32 | 18,15 | -6,1% | 13,96/19,15 | 16353,9 |
| Melexis (B) | MELE | Eur | 45,6 | 9,01 | 10,90 | 21,0% | 8,96/11,39 | 497,0 |




Characters & Story: Éric, Design: Bupla

# MEMS markets for mobile applications

We review the new business opportunities for MEMS in next-generation mobile phones. As mobile phones integrate more and more attractive features for 3G services (high-speed internet, GPS, entertainment, multi-player gaming, news, email, video, photos …), there are needs for more MEMS in mobile phones.

## Overview of the mobile phone industry

The shift from 2G to 3G will be a major growth driver for handset makers and chip manufacturers in 2006. It has already started in Japan and is coming to North America and Europe. With 3G, new services will be available while keeping an average price of $50 to $60 for the semiconductor content of a mobile phone:
- Access to mobile video services
- GPS positioning
- Online games
- Enhanced image and video capture …

These new functions will bring new issues to deal with: power consumption, flexibility, new features and cost. The CAGR for 3G handsets is estimated to be 69% for the 2005-2007 time periods while the CAGR for 3G ICs is estimated to be 38.5%. 3G will really be a disruptive technology for operators as new services will be required, new EVDO and WCDMA platforms, new chips needed and new software. It is a key driver for the semiconductor industry as it is estimated that the semiconductor content in value in mobile phone will be worth about US$ 32 Billion in 2007 (these figures includes baseband, RF, power amplifiers, power management, image sensors and memories). In 2005, about 50% of mobile phones had a camera and 83% had color screen. New features will bring new business opportunities for IC and MEMS manufacturers

For mobile phones, the replacement market is now the largest part of the worldwide business for handsets and differentiation of products is more and more difficult due to the availability of all new features to all the manufacturers. Moreover, product lifetime is shortening, in the range of 12 to 18 months and going down to 8 to 12 months. The handset roadmap is almost nonexistent, being changed and adapted every quarter.

## New challenges for MEMS in the mobile phone industry

As mobiles are becoming more and more multifunction, there are five major reasons to integrate MEMS:
- A need to sense what is happening in the external world : e.g. the use of accelerometers, gyroscopes (to add new sensing capacities to mobile phones) and auto focus for image capture
- A need to extend lifetime of the mobile phone : micro fuel cell to replace batteries
- A need for more integration : RF module with MEMS devices
- A need for enhanced function : new screen able to display video
- A need to add new functions : GPS, biometry …

So in the near future, mobile phones will have to integrate additional functions as shown in figure 1.

| Additional functions in mobile phones |
|---|
| Motion capture (accelerometers and gyros) |
| Replacement of ECM microphone |
| RF devices and RF module |
| Image capture |
| Increased battery life time and capacity |
| Identification |
| Enhanced flat panel displays |
| Other innovative functions |

Figure 1: New functions in mobile phones

However, one must consider that the mobile phone business in ruled by 3 laws:
- Rule 1: new functions are most welcome if they can decrease the price of a function or create/increase revenue stream to operators. Image sensor is the perfect example of new service.
- Rule 2: if a new function can be done with software instead of hardware, software will always win. It is a mater of cost, volume and weight: example of stabilization module
- Rule 3: low cost and lower cost year after year is the key points. The price decrease per year is in the range of 20%.

## Key MEMS devices for mobiles

Motion capture is a key application for accelerometers and gyroscopes. These are, for example, acceleration sensors for human machine interface (silent mode activation, game controller, human/machine interface and image presentation, animation of acti-

ve logo). 3D acceleration sensors are already in production at Freescale, STM, Kionix and more than 15 companies in Japan (MEW, DNP …) ! The other inertial MEMS devices which could be used in cell phones are gyroscopes. They can be used for image stabilization with the image sensor (especially for functions with the new > 3 MPixels sensors). Combined accelerometers and gyroscopes market value could worth $64 millions in 2008. This market value is rather conservative: if one of the applications of acceleration sensor will really be useful, then the market will be booming. Just an example: a very strong growth application in Korea for acceleration sensor is the ability to download logos that could be activated by the movement of the mobile phone. The service providers are of course selling such downloads and it is a very important market in Korea. Such business is enabled by accelerometer and the service providers are willing to pay such new function in the mobile phone because they can get more business (we are directly in the Rule 1 of the Mobile phone business).

The second application of MEMS in mobile phones is the replacement of electret condenser microphone (ECM) by Si microphones. This market could start with high-end products only and the growth rate is more than 80%for the next 3 years (Yole Développement has edited a specific report on this market : “Silicon Microphone Markets SiMM”, now available; a dedicated article is describing this silicon Microphone market in the issue 41 of Micronews, available at our web site www.yole.fr). Knowles Acoustics has sold 20 million units in 2004, more than 80 million units in 2005 and we think the market will reach more than 350 million units (or $157 million) in 2008.


Figure 2: What will be the mobile phones’ next attractive feature?

Two kinds of RF MEMS could be of interest for mobile communications: RF switches, enabling multi-frequency bands and RF passive devices, replacing existing passive devices. FBAR are already in production with players like Agilent and Infineon. MEMS switches could allow cell phones to operate on multiple frequency bands but should have:

- Low insertion loss values (< 1 dB)
- Low cost (< 1$)
- Low power operation

Integration of passive RF MEMS could make possible substantial reductions in the number of circuit elements needed in a system (passive integration, compact antenna module …). But it is very hard to compete against discrete devices in term of cost. A very interesting approach is a SOC or SiP approaches with the possibility to integrate passive devices and have a smaller foot print and the possibility to deliver a complete module, with high added value (and normal price). The RF MEMS market for mobile would be worth $233 million in 2008. The price pressure on such device is really incredible : MEMS is facing very strong competition and, compared to other analysis done on this field, we do not think that RF MEMS will make a big hit on mobile phone market in the next 3 years due to cost and reliability.

The new high end mobile phone have a key problem: the life time of the battery is very weak. So developments of micro-fuel cells are currently running. The objective for a micro-fuel cell for a mobile phone is to have duration of the cartridge of at least 1 week in full operation. The fuel cell will be integrated directly in the mobile phone, with its accumulator and it will integrate MEMS technologies. The prize target for the micro fuel cell module in the mobile phone is between $3 and $8. Toshiba, NEC and Fujitsui have samples available both for the cartridge and for the micro fuel cell, and the production has been announced for Q1 2007, which is a very aggressive schedule.

Although the technologies are closer to the microelectronics than to the microtechnologies, new image sensors will also more and more integrate auto focus devices, bringing high added value optical functions to mobile phones. New image sensors with resolution higher than 1.3 MPixels will need autofocus module. Some companies are now proposing auto focus lenses (liquid lens technology fromVarioptic) and new comers are investigating MEMS technology for that (Siimpel).

Other innovative functions are foreseen for the mobile phone markets. One is identification functionality. Alps Electronic has developed miniature and thin sensor based on pressure sensitive sensors. This sensor is more oriented toward PDA but mobile phones could be a market of interest. The second one is enhanced flat panel display as the multimedia mobile phone will need very advanced flat panel displays and MEMS may be interesting on the long run. These 2 applications may happen after 2008, depending on product availability. The key challenge for MEMS for mobile phones will be the cost. Looking at today's semiconductor cost in a 2G mobile phone, it is less than $20. The pricing for MEMS device must be commensurately low.

## Conclusions

Figure 3 shows the total market forecast for MEMS for mobile phones.
We estimate the 2008 MEMS market for mobiles to be 600 MUSD with an average of $6 MEMS device cost per mobile phone. The major part of the market is for inertial MEMS, silicon microphone and FBAR. Of course, the price pressure in the mobile phone business is really a constraint and MEMS have to be accepted as new, key function enablers. This analysis could be impacted by positive changes. First, if new features provided by MEMS devices are accepted by the user, there will be a strong possible impact. The second strong impact is the ability for MEMS devices to bring extended technical capabilities (such as extended life time of the battery).

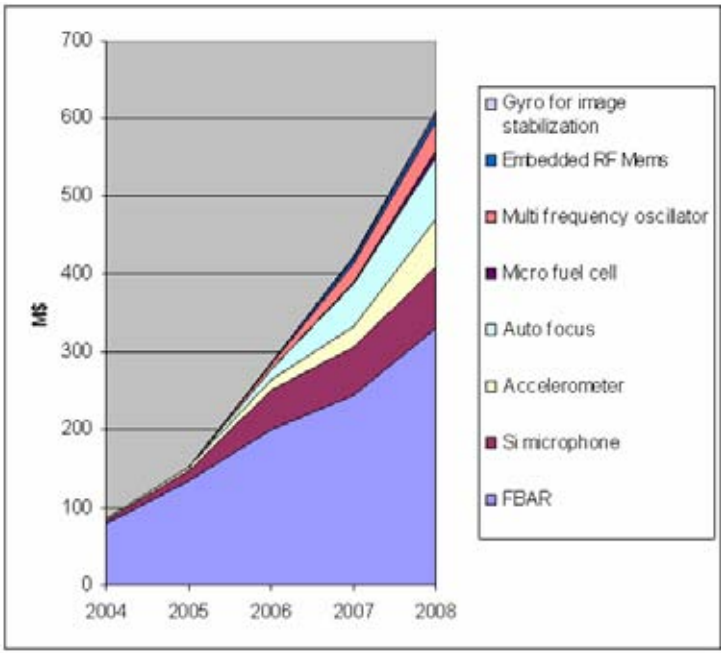



Figure 3: 2004-2008 MEMS market for mobile phones

Yole will release the MEMS4Mobile 06 report in February 2006. This is a full update of the 2005 version. This report describes the differents applications, their markets, main players, expected products launch, complete and in-depth technology analysis...
If you are interested to know more about this report, please contact David Jourdan at jourdan@yole.fr

# Company Report

## Plan Optik – Going Public

2005 was a successful and eventful year for Plan Optik – the technology leader and one of the biggest producers of wafers from glass, quartz and glass-Si-compounds has doubled its capacity because of a dramatically increasing demand for these products.

In late December, Plan Optik was going public and the success has continued: the result of the great run on Plan Optik shares was a 24 times oversubscription on the approximately 23% of shares being sold before the first trading day on December, 29. The shares are traded at Frankfurt (Open Market, Entry Standard), Munich and Berlin-Bremen stock exchange.

This success is driven by the development of own manufacturing methods e.g. for the polishing of glass wafers. So called MDF (micro damaging free) polished wafers show an impressive surface quality (no sub surface damaging) and are suitable for safety relevant devices such as tyre pressure sensors. No sub-surface-damaging means a dramatically increased yield during etching processes. Additionally the surface roughness is much below 5 Angstrom (0.5 nm) – this makes them suitable for direct bonding.

Plan Optik, a high tech glass processor, existing since 1972 and based in Germany, has focused more and more on MEMS related products from glass or similar materials (mainly borosilicate glass wafers used for wafer level packaging of MEMS). Within the last years, the wafers of Plan Optik set the standard for glass wafers for this still young market

In the near future the technologies developed and used by Plan Optik will set new standards in consumer electronics - especially for mobile phones and DVD pickup heads of the newest generation.

More information: www.planoptik.com

## Business News

# MEMSCAP will supply pressure sensors to Liebherr Aerospace. MEMSCAP also announces new ticker symbol

MEMSCAP, provider of innovative solutions based on MEMS technology, announced that it won a contract to provide its pressure sensors for the aeronautics systems of Liebherr Aerospace Toulouse, a provider of Air Conditioning Systems for civil and military aviation. According to this agreement, MEMSCAP will provide Liebherr Aerospace Toulouse with its SP82 pressure sensors, which will be fully integrated into the pressure management and control systems of the plane for which this program is conceived. Liebherr will use MEMSCAP pressure sensors for all the ACS (Air conditioning system), systems dedicated to measuring the pressure inside the plane : cockpit, cabins, and other pressurised zones. MEMSCAP high-end SP82 pressure sensor is fit for aircraft systems around the world, ranging from engine control, to cabin pressure, through air data computer systems and altimeters, said the company and fulfils the most stringent requirements in terms of stability, extreme precision and performance, while enabling the execution of the widest range of measures, from the highest to the lowest. At the end of December 2005, MEMSCAP also announced the change of its ticket symbol and become “MEM”

http://www.memscap.com

# MEMS market to double over the next 5 years according to a market report by Nexus

EnablingMNT researchers predict the MEMS market to grow from $12 billion in 2004 to $25 billion in 2009, a CAGR of 16%. The “NEXUS Market Analysis for MEMS and Microsystems III, 2005-2009” report sees MST/MEMS sensors and actuators consolidate their position in established IT peripheral markets for read/write heads and inkjet heads, in addition to creating new opportunities in areas such as microphones, memories, micro energy sources and chip coolers. enablingMNT market researchers expect the automotive sector to remain a major application field with several high-volume safety products including air bags and tire pressure monitoring systems.. The major boost to the growing market will be the consumer electronics segment, which is forecast to almost quadruple its share from 6% of the MST/MEMS market in 2004 to 22% in 2009 (a CAGR of 50%).

http://www.nexus-mems.com

## Business News

### ISSYS received phase 1 grant for development of wafer-scale hermetic packaging of MEMS-based systems

Integrated Sensing Systems (ISSYS) announced that it has won a Small Business Innovation Research contract from the National Science Foundation (NSF). The six-month project, entitled "Wafer-Scale, Hermetic, Packaging of MEMS-Based Systems" is aimed towards development of a novel packaging method which will greatly simplify the packaging of MEMS and their associated electronics. This simplification allows the commercialization of a variety of MEMS-based products that are currently not possible due to high cost of manufacturing or packaging problems. ISSYS' method can be used for a wide variety of MEMS based devices, in particular, for applications where the MEMS device needs to be in direct contact with the media and the electronics need to be isolated from the environment.

http://www.mems-issys.com

### Tessera completes acquisition of certain Shellcase assets

Tessera Technologies, a provider of miniaturization technologies for the electronics industry, announced it has completed its purchase of certain assets of Shellcase, including all of Shellcase's technology. Shellcase is the world's leading provider of commercially available wafer level image sensor packaging technology. This transaction solidifies Tessera's commitment to the wafer-level packaging market for image sensors and MEMS. Tessera announced the Shellcase transaction on November 1, 2005. Under the terms of the agreement, Tessera paid approximately $33 million in cash for certain assets of Shellcase and hired a majority of Shellcase's employees. With these newly acquired assets, Tessera has created a Wafer-Level Packaging Center of Excellence which is focused on developing next-generation wafer-level packaging technologies for new and fast-growing markets.

http://www.tessera.com

### Investor Allianz Life Insurance reduces shares in MEMS Technology Bhd

Allianz Life Insurance Malaysia Bhd has ceased to be a substantial shareholder of MEMS Technology Bhd after it disposed of a total of 2.97 million shares between Dec 16 and 21. Filings to the stock exchange on Dec 28 showed that it sold 2.30 million shares in the Mesdaq-listed company on Dec 16, another 88,000 shares on Dec 19 and 10,000 shares the next day. On Dec 21, it sold 570,000 shares. The shares were trading between 34 sen and 35 sen on those days.

http://www.memstech.com

### VTI sensors selected for engine vibration in Jaguar

An accelerometer by VTI Technologies Oy, Finland, has been selected for the new Active Engine Mount system developed by Avon Automotive. Avon's Vibramount™ systems with VTI sensors are delivered to the British sports and luxury car manufacturer Jaguar. According to Jaguar, the Vibramount™ system enables them to eliminate as much as 90% of engine vibration in the diesel models of Jaguar XJ series, launched in 2005. The current system includes two broadband SCA610 series components by VTI that measure engine vibration. Engine vibration measurement is a new, growing market. Large diesel engines, as well as engines where some of the cylinders can be disconnected, are the most important applications for vibration dampening measurement. The proportion of diesel engines in upper middle and luxury class cars is growing rapidly, making efficient vibration dampening increasingly important.

http://www.vti.fi

## Alliances & Mergers

### COLIBRYS selects ELKAY International as Indian distributor

COLIBRYS, Neuchâtel, Switzerland announced appointing ELKAY International Inc. and their marketing arm AARJAY International Pvt Ltd. as Indian distributor for their complete range of MEMS (product range). India is seen as one of the fastest growing markets for MEMS, according to COLIBRYS. ELKAY/AARJAY's strong presence in the Indian Defence and Professional Electronics markets coupled with a high level of local and specialised technical support will provide COLIBRYS an opportunity to service the customer needs of the fast growing Indian market.

http://www.colibrys.com

## Measurement Specialties acquired MEMS sensor company HL Planartechnik

Measurement Specialties, a designer and manufacturer of sensors and sensor-based consumer products, announced it has acquired the capital stock of HL Planartechnik GmbH ("HLP"), a sensor company located in Dortmund, Germany for 6.0 million or $7.1 million ($3.0 million at close and the assumption of $4.1 million in debt and liabilities). The sellers can earn up to an additional $3.5 million if certain performance hurdles are achieved in 2006. HL Planartechnik specializes in thin-film metallization processes, producing sensors in four main categories:

- Infrared thermopiles used in appliance, automobile, medical and other applications for non-contacting temperature measurement
- Magneto-resistive sensors that measure changes in magnetic fields to determine position, angle, rotation, or current
- Mass air flow (MAF) sensors to measure the changes in air flow and other gases for use in automotive, medical and industrial applications
- MEMS-based inclination sensors for the precise measurement of level, angle or tilt in construction equipment, automobile and aerospace applications.

HL Planar has a production and development facility with a Silicon MEMS fab in the heart of Germany's technology corridor.

http://www.hlplanar.com
http://www.msiusa.com

## Meggitt acquire the sensor manufacturer Sensorex

The consulting company Clifford Chance Paris has advised Meggitt PLC for the Sensorex acquisition, at the end of November 2005. Sensorex is manufacturing sensors and electronic equipments for aerospace applications. Sensorex is now part of the Aerospace of Meggitt division.

http://www.meggitt.com
http://www.sensorex.fr

## Alliances & Mergers

# Jazz Semiconductor and WiSpry partner to create RF-MEMS

WiSpry, developer of low-cost, high-performance radio frequency micro-electro-mechanical systems (RF-MEMS) tunable components and modules for the wireless industry, and Jazz Semiconductor, an independent wafer foundry, announced that they have partnered to create innovative RF-MEMS offerings using Jazz's leading-edge RF-CMOS processes. The program has successfully demonstrated the feasibility of commercially manufacturing WiSpry's digitally tunable capacitor devices into Jazz Semiconductor's 200mm wafer fab and provides commercial availability of highly integrated RF-MEMS devices, built upon Jazz's leading-edge processes. The companies plan to integrate RF-MEMS digital capacitors and other functions into active silicon circuitry, enabling a roadmap to higher levels of integration with RF circuitry such as low noise amplifiers (LNAs), power amplifiers (PAs), and transceiver technology. Solving one of the key barriers to leveraging standard low-cost RF packaging techniques, the companies are co-developing techniques for commercial wafer level sealing of RF-MEMS devices. Wafer level sealing is one of the key components necessary to provide low-cost, high volume commercial RF-MEMS products.

http://www.jazzsemi.com
http://www.wispry.com

## Techno News

# Sense Holdings develops an advanced handheld explosive sensor

Sense Holdings, a developer of next-generation biometric and explosive detection security technologies for government and commercial security markets, announced its landmark filing of a new patent related to an advanced handheld explosives detection technology. The new patent relates to advanced explosives sensor technology based on the cutting-edge science of MEMS. These microstructures also serve as a technology base upon which the Company is currently co-developing a handheld, explosives detection device with the Oak Ridge National Laboratory, which is part of the U.S. Department of Energy. Sense also plans to eventually deploy a product line of innovative handheld detectors with varying substance-sensing capabilities to governments, airports, and law enforcement agencies, as well as to private companies, stadiums, coliseums and many other possible targets in the United States and around the world. A first-generation handheld explosives detector is expected to be ready for marketing by mid-2006.

http://www.senseme.com

## Techno News

# Hymite unveils its new Si-based package for MEMS and electronic devices

Hymite, a manufacturer of silicon-based packaging products for MEMS and electronic devices, announced the availability of HyCap® S –QFN/SON, a product that offers a smaller, hermetic MEMS and IC package that is conformant with standard QFN/SON package specifications for high-volume system-in- package (SiP) applications. The silicon encapsulation technology enables manufacturers in such markets as handheld devices to integrate MEMS with electronic components and passives into one compact package, shortening development cycles and cutting fabrication time and cost. Unlike plastic QFN/SON, which is currently the standard for non-hermetic packages, the HyCap® S silicon housing offers hermeticity but also smaller size and controlled internal atmosphere. As a silicon-based technology, HyCap® matches the thermal expansion coefficient of MEMS and CMOS devices. The package enables wafer-scale assembly and testing for high-volume production. High hermeticity and vacuum levels together with electrical connectivity are enabled through the use of patented micro-vias that pass from the inside of the cap to surface mount pads on the outside. Standard wafer-to-wafer sealing techniques keep the technology cost-effective.

http://www.hymite.com

# Texas Instruments sells unit to Bain for $3B

TI says it will sell its sensors and controls business to private-equity firm Bain Capital for $3B in cash as it focuses on chips for mobile phones and other consumer electronics. The Attleboro, Massachusetts-based division produces switches and sensors for vehicle transmissions and thermostats, aircraft circuit breakers, air conditioning products and other items. It reported revenue of > $1B in 2004.

http://www.ti.com/

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





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# Announcement

MEMSentry
The Exclusive Yole Bulletin on MEMS

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 latest 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 latest 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
- Latest 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 #2 | Issue #3 | Issue #4 | Issue #5 |
|---|---|---|---|---|
| Company Analysis | Dalsa Semiconductor | VTI Technologies | TSMC | Matsushita Electric Works |
| Application Analysis | Gyroscopes for ESP | MEMS based oscillator | Silicon Microphone | Frequency bulk acoustic resonator |
| Analysis of the latest news | x | x | x | x |
| What has happened and why | x | x | x | x |
| Latest financial rounds | x | x | x | x |

Starting date of the publication:
December 2005
Content:
Approximately 10 pages, depending on the news
Price:
Euro 450/ $540 for 18 issues per year (single user license)
Contact: David Jourdan,
Tel: +33 (0)472 83 01 90,
jourdan@yole.fr, www.yole.fr

## Life & Death

# EVG celebrates its 25th company anniversary and 15 years as MEMS equipment supplier

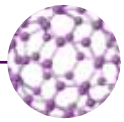
"MEMS technologies driven by automotive, information technology and telecommunication applications have successfully matured from lab to fab" says Mr. Thallner (CEO and founder of EVG), "Since 25 years we have been pioneering the equipment technology and establishing equipment industry standards in MEMS. Today we are enjoying the transition of MEMS processing technology to 300mm mainstream semiconductor. The era of "new-MEMS" has begun". Since 15 years 100's of millions of MEMS devices rely on EVG equipment technology for automotive safety applications protecting us on our way to work or travelling across the country everyday, said the company. According to EV Group, highest reliability and yield requirements have perfected the semiconductor equipment for applications in emerging wafer level packaging (WLP) technologies. "25 years of innovation and development have matured EVG's equipment technology to be the tool of choice for high volume manufacturing customers", celebrates Mr. Thallner.

http://www.evgroup.com

# Suss MicroTec has appointed MEMS industry veteran to its management team

SUSS MicroTec, a supplier of precision manufacturing equipment for the semiconductor and emerging markets, announced the appointment of Dr. Amir R. Mirza as International Product Manager for its Wafer Bonding Division. SUSS wafer bonding systems are designed and manufactured in Waterbury Center, Vermont. Dr. Mirza's extensive MEMS experience includes the development of a wide variety of silicon micromachined products - such as accelerometers, pressure sensors, optical MEMS and microfluidic devices. Dr. Mirza brings years of semiconductor capital equipment experience to the company. He joins SUSS MicroTec from Innovative Micro Technology, Santa Barbara, CA, a leading MEMS design and fabrication foundry, where he held program management responsibilities for new products. Dr. Mirza will relocate to Vermont and report to Michael Kipp, General Manager, Wafer Bonder Division.

http://www.suss.com



## Alliances & Mergers

### Arrowhead assembles a CNT patent portfolio through exclusive licenses with leading universities

Arrowhead Research subsidiary NanoPolaris, US, has exclusively licensed a number of US patents and patent applications in the field of carbon nanotubes. The company says it now controls commercialization of issued patents and patent applications claiming nanotube compositions of matter and general manufacturing techniques such as chemical vapour deposition synthesis, plasma chemical vapour deposition synthesis, purification, solubilization, separation of certain types of tubes, coating, functionalization and manipulation. The patents cover technologies developed at California Institute of Technology, Duke University, Pennsylvania State University, Rensselaer Polytechnic Institute, Tsinghua University at Beijing, China, University at Buffalo, University of California Los Angeles, and the University of Toronto. "We are taking the lead in consolidating the fragmented patent landscape and working with manufacturers to integrate these materials into their end products," said Bruce Stewart, chairman of Arrowhead. NanoPolaris says it will generate revenue by licensing the intellectual property.

www.arrowheadresearch.com

### Oxonica acquiring Nanoplex

UK nanotech company Oxonica signed an agreement to acquire Nanoplex Technologies, the US specialist of nanoparticle based detection systems for the healthcare and security markets. Nanoplex will change its name to Oxonica Inc on completion and will become part of Oxonica's healthcare business. Completion is expected to take place before the end of January 2006. The acquisition is expected to enhance the development of Oxonica's existing biomarker detection and security technology, said the company. Following the 2005 launch of Oxonica's commercial applications (fuel borne catalyst Envirox™ and UV absorber Optisol™), Oxonica aims to commercialise further products based on Nanoplex's technology. The addition of Nanoplex to the Group also provides Oxonica with a presence in the US market.

www.oxonica.fr

## Events

### Next BIO-NANO-ROBO seminar series

The next BIO-NANO-ROBO seminar will be held the 27th of January 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. Masayoshi Asashi will present "MEMS for practical applications" and Prof. Chuchei Oshima will present "Demountable single-atom electron source and their applications to microscopes". Contact for free registration: frose@iis.u-tokyo.ac.jp.

## Techno News

### Nanopillars reverse optical behaviour

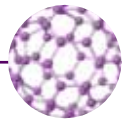
Scientists in the UK and Russia have succeeded in fabricating a material that has a negative permeability at visible wavelengths. The development is important because it could lead to so-called "left-handed" materials which exhibit a negative refractive index and function as a perfect lens, focusing light to a smaller spot than is usually possible.

http://www.aston.ac.uk/
http://www.ipmt-hpm.ac.ru/

### Hitachi Machine produces CNT sheets

Hitachi Zosen Corp. has developed a machine that can manufacture carbon nanotubes (CNT) sheets, and hopes to market the sheets by 2008 to the auto industry for capacitors that can store large amounts of power for hybrid cars. Hitachi is expecting a sales volume of US$400 million in 2010 for the CNT sheets. Compared to CNTs with a flat arrangement, this forest of nanotubes can store more electricity, promising capacitor designs that are lighter and faster charging than ones made from activated carbon or lithium ions. Hitachi Zosen expects this product to replace nickel hydrogen batteries, and to start sales of their capacitors in 2008 at a price of US$2,000 per unit.

www.hitachizosen.co.jp



## Business News

### Nanotech, a big market for European chemical industry

SusChem, the forum jointly initiated by the European Chemical Industry Council (Cefic) and the European Biotechnology Industry Association (EuropaBio) and supported by the European Commission, has published a Strategic Research Agenda (SRA) and three scenarios demonstrating the value of innovations in chemistry. The SRA outlines the central role of chemistry in nanotechnology R&D. The future products of chemistry, including areas such as nanomaterials, biotechnology and environmentally benign processes, will be central to the development of solutions to today's and tomorrow's main societal needs and challenges, explains SusChem. The SRA also recalls that the nanomaterials/nanotechnology sector is an important market for the chemical industry. "Conservative estimates predict an annual growth rate of between 10-15%, with an expected products market volume of 500 billion and components (nanoporous materials, formulations, nanocomposites, thin films and coatings, etc.) market volume of approximately 50 billion for 2010. In particular, the nanotechnology machinery segment is expected to grow by 30% per annum" underlines the SRA. In the three detailed scenarios, SusChem describes outcomes of sustainable chemistry in health care, energy efficient housing and industrial bioprocesses. Personalized health care scenario appears to be the most nano-related. "Using future nano and biotechnologies and materials, sustainable chemistry will help accelerate intervention using remote monitoring and intervention systems, improve diagnostics through advanced medical imaging techniques, and reduce the intrusiveness of the medical treatment overall", believes SusChem.

www.suschem.org

### Carbon nanotube-based heat-sink for semiconductor chips

Fujitsu says it has developed the world's first carbon nanotube-based heatsink for semiconductor chips. The company used bumps made from nanotubes in a flip-chip structure. The move is claimed to enable the realization of high-performance amplifiers with high frequency and high power for next-generation mobile-communication systems. Fujitsu hopes to deploy the new technology in mobile base stations in around three years' time. The company presented its research at the IEEE International Electron Devices Meeting in Washington, US.

www.fujitsu.com/global/

## Life & Death

### Hosokawa Powder Technology Research Institute to construct new functional nanocomposite manufacturing plant in Nara

Hosokawa Powder Technology Research Institute, a subsidiary of Hosokawa Micron of Japan, is to build a nanocomposite manufacturing plant in Nara prefecture. The facility, which will cost ¥500 m ($4 m), will make functional nanocomposite materials for cosmetics and hair-growth drugs. Commercial operation is due to begin in April 2006.

www.hosokawa.com

### NanoHorizons secures $2.2 Million in additional funding

NanoHorizons (US) has raised around $2.2 m in its final A round of funding. Private investors joined original investors Pulsar Ventures, Life Sciences Greenhouse and Ben Franklin Technology Partners in contributing to the round. "The completion of our new manufacturing facilities, and the accelerating adoption of our products in the textile industry bear witness to our capabilities in delivering innovative nanotechnology solutions to real-world problems," said Stephen Fonash, chairman of NanoHorizons. "The future will see an expansion of our SmartSilver product line and development of other custom specialty additives for materials improvement."

www.nanohorizons.com

## Business News

# Photonics21 launched

The European Technology Platform (ETP) Photonics21 was officially inaugurated last month in Brussels (Belgium). ETP Photonics21 has been launched as a result of previous consultations between high-level representatives of the European photonics industry, European Commissioner for Information Society and Media, and Commissioner for Research. The ETP is based on the vision document "Photonics for the 21st Century", which has been published in spring and which proposes a coordinated action plan at the European level to explore the future applications of light and to reap the expected benefits in terms of creating both jobs and wealth. The Platform undertakes to establish Europe as a leader in the development and deployment of Photonics in five industrial areas (Information and Communication, Lighting and Displays, Manufacturing, Life Science, and Security) as well as in Education and Training. The strategic Research Agenda will include a coordinated approach for R&D investment at the European, the national and the regional levels.

# ACOL Technologies expanding worldwide sales

ACOL Technologies, S.A., a Geneva-based LED lighting company announces the appointment of Fritz Meyne, as North American Sales Manager.

http://www.acol.biz/

# DOE announces funding opportunity for its SSL program

The U.S. Department of Energy has released its second Product Development funding opportunity as part of its Solid-State Lighting (SSL) program. The National Energy Technology Laboratory (Office of Energy Efficiency and Renewable Energy, Building Technologies Program) is soliciting applications in support of this SSL program area. SSL Product Development focuses on using the knowledge gained from basic or applied research to develop or improve commercially viable materials, devices, or systems. The defined areas of interest in this funding opportunity are:

1. LED Materials Issues – Device Materials
2. LED Device Issues – Optical
3. OLED Efficient Materials Development
4. OLED Architectures that Improve Device Robustness, Lifetime, and Efficiency

http://www.energy.gov/engine/content.do

## Business News

### Novaled secured 15 million

Novaled GmbH, the German developer of organic light-emitting diode (OLED) technologies, raised 15 million in its 2nrd round of financing to commercialize its proprietary PIN OLED technology. Novaled GmbH has closed the round with an international investment syndicate lead by the venture branch of Credit Agricole Private Equity (France) completed by venture funds of Caisse des Dépôts et Consignations (CDC Entreprises Innovation, France), KfW Bankengruppe (Germany), eCapital New Technologies Fonds (Germany) and a German private investor.

http://www.novaled.com/

## Alliances & Mergers

### Osram and Lednium sign white LED license agreement

Osram GmbH, the Germany-based lighting manufacturer, has entered into a patent license agreement with Lednium, an LED manufacturer based in Melbourne, Australia. Lednium has acquired the rights to use the technology contained in a series of white LED patents owned by Osram GmbH. The agreement covers Lednium's LED lamp products, a unique series of multi-chip geodesic dome-shaped LED lamps.

http://www.lednium.com/
http://www.osram.com/

### Continuum Photonics, Polatis agree to merge

Continuum Photonics Inc. of Billerica, Mass., and Polatis Ltd. of Cambridge, UK, finalized their merger in September 2005. They will combine their personnel and product lines to create a single business, called Polatis Inc., which will provide a full range of optical switch components and systems for the defense, data networking and telecommunications industries. The new entity will maintain offices in the US and the UK. Continuum Photonics offers products based on its DirectLight switching technology, while Polatis contributes its microactuation and sensing system.

http://www.polatis.com/

### A Sony/NEC joint venture in 2006?

Consumer electronics giants Sony and NEC plan to establish a joint venture designing and selling optical disc drives by April 2006. Sony will hold a 55% stake in the venture with NEC taking the remainder. The new company will combine NEC's strength in LSIs with Sony's expertise in optical pick-ups.

http://www.nec.com/ http://www.sony.net/

### Emcore has purchased Phasebridge

Emcore of the US has purchased privately-held Phasebridge of California for an undisclosed sum. Emcore says it will integrate Phasebridge into its Ortel division and expects its projected fiscal 2006 revenue to increase by $2 million as a result of the transaction. Phasebridge specialises in fiber-optic gyroscopes for weapons and aerospace guidance.

http://www.emcore.com/

### Nuvonyx buys Thales Laser Diode

Nuvonyx, a manufacturer of high-power direct-diode laser components, subsystems and sources for use in aerospace, defense, industrial manufacturing and research applications, has acquired Thales Laser Diode (TLD), a laser division of Paris Orsay, France-based Thales.

http://www.nuvonyx.com

### Anritsu has purchased Nettest

Anritsu has purchased Nettest, the Danish company specialized in optical telecoms test and instrumentation equipments. It is a total of 480 people which are concerned by this buy-out.

http://www.nettest.com

## Techno News

### Plastic Logic fabricates largest plastic Active-Matrix Display

Plastic Logic, the UK-based developer of plastic electronics using nano-particulate metal systems, said it has developed the world's largest flexible organic active matrix display. The display consists of a flexible, high resolution, printed active-matrix backplane driving an electronic paper frontplane from US-based E Ink Corporation. The displays are 10” diagonal SVGA (600 x 800) with 100ppi resolution and 4 levels of greyscale. The thickness of the display when laminated with E Ink Imaging Film™ is less than 0.4mm. The backplane substrate is made from low temperature PET supplied by DuPont Teijin Films which is more flexible and easier to handle than alternatives such as thin glass or steel foil, said Plastic Logic. Plastic Logic added it will partner with manufacturers to bring the process to mass production.

http://www.plasticlogic.com/

## Techno News

# Three photons make submicron shapes

Scientists in Greece believe they are the first to fabricate three-dimensional structures by three-photon polymerization (3PP). Having produced components with a resolution of 500 nm, Maria Farsari and her colleagues from FORTH in Crete are now improving their optical setup and hope to build practical devices using the approach (Optics Letters 30 3180).

http://www.forth.gr/

# Japanese team develops alternative LED structure

Researchers from Meijo University, Japan, claim that they have doubled the efficiency of white LEDs, according to the Japanese web-site Nikkei.net. The report says that the device, which delivers a 130 lm/W output, uses a purple-emitting LED combined with a "structured" SiC substrate that converts this emission into white light. This approach contrasts that taken by many LED manufacturers, which use blue-emitting devices and color-converting yellow phosphors. The Japanese researchers have submitted patent applications for the structure of the SiC substrate, and team-member Satoshi Kamiyama is intending to launch a company in January to market these LEDs, according to the Nikkei.net. With investment of 40 million yen ($ 330,000), the start-up plans to ship samples such as a 800 lumen light source.

http://www.meijo-u.ac.jp/english/

# 3-D photonic crystal structures: COM-DTU joins NewTon FP6 project

The Nanophotonics group at COM-DTU (Technical University of Denmark) will participate as partner in NewTon, a FP6 European project to be initiated in January, 2006. The project will investigate fabrication of 3-D photonic crystal structures with embedded optical functional elements. Other partners are Laser Zentrum Hannover (Germany), Thales Aerospace Division, BASF Aktiengesellschaft (Germany), Photon Design Ltd (UK), and Ecole Nationale Superieur des Telecommunications des Bretagne (France). The manufacturing of the 3-D photonic crystals will be based on templates of nano-scale colloids of polymer materials. The optical confinement will be defined by defects that will be inscribed in the material with nanometer resolution by laser processing. The photonic crystals are realised by infiltration and inversion techniques. The aim is to fabricate devices which include basic optical functions like waveguides, splitters, and filters for telecom applications. On the long term this technology is expected to enable volume fabrication of compact optical integrated circuits. An important part of the project is devoted to development of simulation and design tools for photonic crystal structures which are adapted to the manufacturing technology for a fast realisation of the devices and for better understanding of influencing factors in the manufacturing process. COM will be the task leader of a work-package on simulation tools, and receive an EU funding of 273K.

http://www.com.dtu.dk/

## Life & Death

# Pirelli subsidiary launched

Pirelli Broadband Solutions SpA, a company within the Pirelli Group of Milan, Italy, was officially launched at the European Conference on Optical Communication (ECOC) in September. The company released its first products -- the City8 coarse wavelength division multiplexer and a dynamically tunable laser -- at the Glasgow, UK, event. City8 is a carrier-class platform that provides high-bandwidth services over a single fiber pair. With eight or 16 channels, it supports time division multiplexing and data communications interfaces. The DTL C13 series dynamically tunable continuous-wave, external-cavity laser for advanced dense wavelength division multiplexing systems is housed in hermetically sealed 26-pin butterfly packaging. The C-band laser source meets Telcordia GR-468-CORE qualification requirements, with no moving parts required for tuning. Supported by Pirelli Labs, which was founded in 2001 with an initial investment of 135 million, Pirelli Broadband Solutions reported revenues of approximately 64 million in the first half of 2005.

http://www.pirelli.com/e

## Alliance & Mergers

### Caliper and Bio-Rad sign a second collaboration agreement

Caliper Life Sciences, Inc. (Hopkinton, MA, USA) and Bio-Rad Laboratories, Inc. (Hercules, CA, USA) announced a new collaboration, under which the companies will study the feasibility of developing a new microfluidics system platform. Details of the new product concept are not being disclosed at this time. The two companies' previous collaboration, initiated in mid-2003, resulted in the successful launch of a first microfluidics-based electrophoresis product, Experion, in the fall of 2004.

www.caliperls.com
www.bio-rad.com

### New collaborations for GenTel BioSurfaces to access the life-science markets

GenTel® BioSurfaces, Inc. (Madison, WI, USA), a leader in protein microarray technologies contracted with Pierce Biotechnology, a unit of Fisher Biosciences. Pierce will distribute GenTel's PATH™ brand thin-film nitrocellulose slides and has licensed the use of GenTel technology in developing new protein arrays for life-science research and drug discovery based on its existing SearchLight™ multiplex protein-profiling systems. GenTel also announced it has partnered with Abnova Corporation (Taiwan) to combine Abnova's high throughput protein and antibody content manufacturing capabilities with GenTel's PATH™ Protein Microarray System to develop new custom multiplex immunoassays. GenTel's PATH technology is based on ultra-thin nitrocellulose surface chemistry developed specifically for protein-array applications. GenTel applies an ultra-thin nitrocellulose film to a standard 3" x 1" glass slide. This film is 50 times thinner than conventional nitrocellulose slides and offers significant improvements over traditional glass slides.

www.piercenet.com
www.abnova.com
www.gentelbio.com

### Agilent Technologies enhances its focus as a pure-play measurement company

Agilent Technologies Inc. (Palo Alto, CA, USA) announced it has acquired privately held Molecular Imaging Corp. (Tempe, Ariz, USA), a developer and manufacturer of nanotechnology measurement tools. Financial details were not disclosed. Molecular Imaging is known for its atomic force microscopes (AFMs), the principal imaging and measurement instruments used by researchers working in nanotechnology. Called the "eyes of nanotechnology," AFMs are used to measure the shape and properties of materials at the nanometer scale. Agilent already has a solid position in the laser interferometer market to precisely measure distances at the nanometer scale. The acquisition of Molecular Imaging marks the next step in strengthening Agilent's market position in nanomeasurement by extending the company's portfolio into imaging at the nanometer scale through AFMs.
Agilent Technologies also announced that it has completed the divestiture of its Semiconductor Products business to Kohlberg Kravis Roberts & Co. (KKR) and Silver Lake Partners for $2.66 billion, subject to various closing-related adjustments. The divestiture includes 6,500 employees and operations in Asia, the United States and Europe.

www.agilent.com

## Techno News

### Toshiba Develops MEMS-based Cell Manipulation Method

Toshiba (Tokyo, Japan) has developed an innovative cell manipulation method, which uses a micro electromechanical system (MEMS) device to incorporate nano silica particles into yeast cells.
In the new method, nano particles are minutely vibrated using the MEMS device so that they can adhere to cell surfaces in a solution containing the particles and the cells. As the particles are continued to be vibrated while being attached to the cell surfaces, the vibrations are converted into heat and the particles are physically acted upon and are subsequently incorporated into the cells.
The company has prototyped a MEMS device which is built on a silicon-on-insulator (SOI) chip with a 4x4mm mechanical diaphragm that has 130x130 water-repellent diode vibration dishes, about 20x20 microns square each. Toshiba expects that the new method will contribute to a wide range of research in biological and medical sciences. Specifically, it aims to establish a new method that can selectively act on cells without resorting to chemical methods.

www.toshiba.com

## Business News

### JPK Instruments founds subsidiary for NanoBiotechnology Instrumentation in Dresden

JPK Instruments AG (Berlin, Germany), a leading supplier of Scanning Probe Microscopes (SPM) for life science and soft matter applications, announced the foundation of a new subsidiary, nAmbition GmbH, focused on the development of nano instruments for biological applications, especially in medicine and pharmaceutical research, and aimed to become a mayor player in the nanobio sector. nAmbition and TU Dresden have acquired one of the biggest technology grants in the history of the funding of NanoBiotechnology in Germany, with more than 3 M  from the Innoregio and BioMeT initiative of the BMBF. nAmbition is located in the Biotechnological Centre (BIOTEC) in Dresden, Germany and in the initial phase will employ more than 12 highly skilled scientists and engineers.

www.jpk.com

### IMT forms division to develop silicon-based biosensors

MEMS manufacturer Innovative Micro Technology (IMT) (Santa Barbara, CA, USA) announced the formation of a Division to develop new biosensor technologies using its advanced MEMS technologies. The Silicon Biosensor Division's initial aim is to develop resonating beam sensors in partnership with Professor Scott Manalis of the Massachusetts Institute of Technology (MIT). The work will be funded by a $2M grant awarded to MIT and IMT by the Institute for Collaborative Biotechnologies (ICB), a partnership among universities, industrial partners (including IMT), and the Army. The three-year project will focus on detecting pathogens at extremely high sensitivities for food safety applications.

www.imtmems.com

### pSivida launches pSiNutria in the Food Industry

Global bio-nanotech company pSivida Limited (Perth, Australia) created a new spinout company, pSiNutria Limited to develop applications of its silicon technology in the food industry. pSivida will seed fund pSiNutria USD$1.1m as well as grant pSiNutria a royalty bearing exclusive license for the use of BioSilicon™ as an ingestible ingredient in food applications. pSiNutria will also develop patentable intellectual property using silicon in the food packaging area.  BioSilicon™ applications in food primarily pertain to its biodegradability and optical properties. Potential pSiNutria products being developed include: products to detect pathogens in food, for food tracing, for food preservation, and include products to detect variations of temperature in food storage. Gavin Rezos said, "pSiNutria is an important part of realising the value in the BioSilicon™ platform technology. The food industry is a very different business from drug delivery and, like AION Diagnostics our other spinout subsidiary, it will be separately staffed with new appointments from the food industry, whilst pSivida maintains its core focus on the drug delivery market." pSivida also signed a licence deal with Beijing Med-Pharm for the clinical development, marketing and distribution of its lead product, BrachySil™, in China.

www.psivida.com
http://www.beijingmedpharm.com



## Event

### The Observatory for Micro & NanoTechnologies is pleased to announce its next Seminar NanoTechnologies for cell investigation, the 14th march 2006 in Paris (Curie Institute)

International experts will present the state of the art in the new field of "micro-nanotechnologies for cell biology". They will present methods for the manipulation of single cells, use of surface patterning to study the interactions of cells with solid substrates, measurement of biologically pertinent parameters by optical, electrical or mechanical techniques at the scale of single cells and mimicking of cellular functions in artificial structures. Don't miss this opportunity to get a complete and up-to-date picture of this exciting domain!

With the participation of:

Guenter Fuhr, Fraunhofer-Institut für Biomedizinische Technik (IBMT), Germany, Prof. Peter Fromherz, Max Planck Institute, Martinsried, Germany, Albert Folch, Washington University, Seattle, USA, Vincent Noireaux, Université du Minnesotta, USA , Jon Cooper, Glasgow University , Benoit Dubertret, ESPCI, Paris, Pascal Silberzan, Institut Curie, Paris, Michel Bornens, Institut Curie, Paris , Alexandra Fuchs, CEA/DSV, Grenoble, Véronique Baticle, CEA-BEM, Grenoble.

Information: www.omnt.fr, registration will start in January

## Business News

# Soitec's strategy is validated by Japan's move to high volume SOI applications

Soitec, producer of silicon-on-insulator (SOI) substrates for the global semiconductor industry, confirmed that its business strategy to invest and develop SOI production capacity to meet demand is further validated by Japan's move to high-volume SOI applications for consumer markets. The company cites the current manufacturing ramp, the burgeoning SOI-based game console market, and the active promotion of new SOI-based chips for consumer products as key drivers in today's markets. With such strong demand, Soitec remains on track to deliver minimum sales growth for the full year—similar to the growth recorded in the first half, when the company announced an increase of 72.6 percent in consolidated sales on a year-on-year basis. Soitec's sales in the Asia-Pacific region increased to 18 percent of total sales in the first half of the current fiscal year, up from 4 percent in the same period of the previous year. In the coming year, the SOI market is expected to undergo substantial growth in Japan, and in foundries throughout the greater Asia-Pacific region. The emergence of SOI in today's consumer world demonstrates the scalability of this technology in serving as the building block for mainstream consumer electronic devices.

http://www.soitec.com

# TMEC plans to become a centre of excellence in microchip

The Thai Microelectronics Centre will over the next four years move towards commercial development of the next-generation smart control chip. The focus of the centre's roadmap to 2009 would be the development of smart-control technology, which can have applications such as home appliances, automobiles, medical science, agriculture and environmental industries. The smart control chip was a new technology combining intelligent power-integrated circuits and smart sensors in a single chip, for use in automobile and home-appliance products which are based on high-end technology.

TMEC will prepare a production line to build 0.5- and 0.8-micron CMOS devices.

This year, the centre will develop smart power IC and IGBT at 0.8-micro ns and in 2007 will reduce the CMOS; MEMS and IGBT technologies from 0.8- to 0.5-microns.

The TMEC's 40 employees have the capacity to make 500 six-inch wafers for 0.8-micron microchips per month, or 6000 wafer/year.

## Business News

# Veeco received orders for its GEN2000 MBE system

Veeco Instruments announced that it has received orders for GEN2000&trade Molecular Beam Epitaxy (MBE) systems from two leading suppliers of radio frequency integrated circuits (RFICs) for mobile applications. The customers will use the multi-wafer 7x6" MBE systems to increase production of gallium arsenide-based compound semiconductors for wireless communications applications, most notably power amplifiers and integrated circuits used in wireless handsets and wireless local area networks (WLANs). The Semiconductor Industry Association predicts continued growth for RFICs over the next three years, fuelled by mobile handsets and WLAN applications.

http://www.veeco.com

# SIA announced sales of semiconductor over $20 billion in October 2005

According to the Semiconductor Industry Association (SIA), worldwide sales of semiconductors surpassed $20 billion in October, a new milestone for the industry. Worldwide semiconductor sales of $20.0 billion increased by 6.75 percent from the $18.8 billion reported for October 2004. Sales were up 2.5 percent sequentially from the $19.6 billion reported for September. “Strong demand for consumer electronics drove worldwide chip sales over $20 billion in October,” said SIA President George Scalise. “A sharp rebound in consumer confidence was reflected in strong sales of a broad range of consumer products, such as cell phones, MP3 players, digital cameras, digital TVs, and personal computers”. “Industry sales continue to track with our forecast of 6.8 percent growth to $228 billion in 2005. Inventories are in balance, and production capacity utilization remains in the healthy 90 percent range,” Scalise concluded.

http://www.sia-online.com

October 2005 ($ Billions)

| Month-to-Month Sales | | | |
|---|---|---|---|
| Market | Last Month | Current Month | % Change |
| Americas | 3.45 | 3.59 | 4.3% |
| Europe | 3.29 | 3.42 | 4.0% |
| Japan | 3.70 | 3.73 | 0.8% |
| Asia Pacific | 9.12 | 9.31 | 2.1% |
| TOTAL | 19.55 | 20.05 | 2.5% |
| Year-to-Year Sales | | | |
| Market | Last Year | Current Month | % Change |
| Americas | 3.51 | 3.59 | 2.5% |
| Europe | 3.46 | 3.42 | -1.1% |
| Japan | 3.90 | 3.73 | -4.5% |
| Asia Pacific | 7.91 | 9.31 | 17.6% |
| TOTAL | 18.78 | 20.05 | 6.8% |

Source: SIA, December 2005

## Life & Death

# Suss MicroTec expands training facilities

SUSS MicroTec, a supplier of lithography systems for the semiconductor and related industries, announced that it has opened additional new product training facilities at its headquarters in Munich, Germany, in order to meet the increasing demand for operator and maintenance training for SUSS precision lithography systems. Through both theoretical and practical training, prospective operators, process engineers and service personnel receive instructions on the set-up, operation, adjustment and service of SUSS mask aligners and coaters, including troubleshooting and maintenance. Two full time training specialists and a pool of highly skilled product and process engineers ensure that the users will get full benefit from the purchased systems.

http://www.suss.com

## Techno News

# SCHOTT Lithotec’s mask blanks support qualification for the EUVL

Extreme UltraViolet Lithography (EUVL) Technology Insertion is dependent on evidence of overall process technology on the basis of Full Field Exposure Tools. All Exposure Tool Makers have started to develop so called Demonstrator Tools for EUVL and the Dutch company ASML is expected to be first in supplying such tools in 2006. Qualification of these tools requires first EUVL masks which are made by patterning EUVL mask blanks. The ASML Demonstrator Tools will utilize masks made from SCHOTT Lithotec mask blanks. SCHOTT Lithotec was using the most advanced tools available for cleaning, metrology and multilayer sputtering for fabrication of the ASML mask blanks.

http://www.schott.com/lithotec

## Techno News

### Quantiscript delivers on 30nm nano-imprint templates with QSR-5™

Quantiscript, a developer of novel resist solutions for the semiconductor industry, released results demonstrating commercial viability of nano-imprint templates with pattern features down to 30 nanometers, using its novel QSR-5™ Resist solution. Quantiscript has developed novel resist solutions that use evaporation and plasma-based deposition techniques to achieve ultra-thin layers of resist down to 30nm, not achievable with today's spin-coated deposition processes. Thin resists have demonstrated benefits in achieving high resolution dense patterns with low LER and are key to achieving the 32nm technology node specifications.
Quantiscript patterned its own 1stImpression™ standard template design on a thin 30nm layer of QSR-5™ using a Leica VB6 UHR e-beam system at 100 keV. Quantiscript is a member of NILCom, a consortium supported by leading technology companies and research centers with the mission to establish a high volume manufacturing NIL platform.

http://www.quantiscript.com

### Melexis introduces a new 380 to 450 MHz transmitter chip

Melexis extends its line of low-power and low-cost RF ICs with a new transmitter. The TH72016 works in virtually any FSK, ASK or FM system in the 380-450MHz unlicensed Industrial-Scientific-Medical (ISM) and Short-Range-Devices (SRD) frequency bands. Its extended operating temperature range of -40°C to +125°C and clock output to drive a microcontroller make it fit ideally for automotive applications such as Tire Pressure Monitoring Sytems (TPMS) or Remote Keyless Entry (RKE) that require enhanced data timing.
The TH72016 transmitter IC combines flexibility with high levels of circuit complexity. Compared to a SAW-based solution the PLL-based transmitter offers substantially more frequency stability, according to the company.

http://www.melexis.com

### STMicroelectronics presented smallest NOR Flash cell

STMicroelectronics, Europe-based Semiconductor Company, has presented at the International Electron Devices Meeting (IEDM) in Washington, DC, during December 5 – 7, 2005, the world's first presentation of a 65 nm NOR Flash technology with the smallest cell size of 0.042 square micron and a novel HBT (Heterojunction Bipolar Transistor) architecture, enabling the development of low-cost, high-performance RF CMOS-based platforms for the most demanding applications.

http://ww.st.com

## Key Data

### Book-to-Bill ratio of 1.09 in November

Worldwide equipment bookings amounted to $4.7B in November according to VLSI Research Inc. November's bookings were slightly lower than October's, but were 36.5% higher than those of November 2004. The slight dip in the November bookings belies the fact that the equipment industry has been experiencing remarkable order growth since 3Q05. VLSI Research also found that October's bookings were stronger than originally estimated, which resulted in an upward revision to the data, from $4.5B to $4.8B. Much of the demand is seasonal, but it is important to point out that chip makers are also gearing up for the 65nm ramp.
Front-end capacity utilization softened to 95% in November as the industry winds down from the seasonal build-up. In contrast, Test and Assembly remained at 98%. Back-end utilization is not expected to fall below the 90% level until well into 1Q06.

Semiconductor Equipment Bookings and Billings
(billions of U.S. dollars)

| | Worldwide Bookings | Worldwide Billings | B:B Ratio |
|---|---|---|---|
| October 2005* | 4.827 | 4.042 | 1.19 |
| November 2005** | 4.739 | 4.368 | 1.09 |
| December 2005*** | 4.913 | 4.846 | 1.01 |

* Revised, ** Preliminary, *** Forecast
Source: VLSI Research, December 2005

http://www.vlsiresearch.com

## Alliances & Mergers

# ASM and CEA Leti collaborate on RTP Technology for 45nm and beyond

ASM International reported that CEA Leti recently qualified the 300 mm Levitor® 4300 RTP (Rapid Thermal Process) system that was shipped to Grenoble. At CEA Leti, the Levitor® 4300 will be used in various advanced programs, including Ultra-Shallow Junction formation (spike anneals), Nickel silicidation, and annealing of High-k films. It is expected that this advanced 300mm RTP system will be a cornerstone of the CEA Leti Nanotec 300 program.

http://www-leti.cea.fr
http://www.asm.com

# ASM and Oxford Instruments sign agreement for ALD technology

ASM International and Oxford Instruments announced that they have signed an agreement granting Oxford Instruments a license on ASM's patent portfolio relating to Atomic Layer Deposition (ALD) technology. The license includes over 280 issued and published patents and allows Oxford Instruments Plasma Technology to develop new products and processes exploiting ALD technology under ASM's patents. Terms of the licensing agreement were not disclosed.

http://www.asm.com
http://www.oxinst.co.uk

# Silterra and Essensium to jointly develop European customers companies

Silterra Malaysia and Essensium have agreed to jointly develop and support European semiconductor customers. Essensium will provide system-on-chip (SoC) design and silicon intellectual property (IP) development expertise to integrated device manufacturers (IDM) and fabless semiconductor companies in Europe. Silterra will provide world-class wafer manufacturing services to these customers. The company, which currently offers access to foundries with advanced CMOS technologies of 0.18 µm and 0.13µm, said it will soon offers 90nm.

http://www.silterra.com
http://www.essensium.com

# About Yole Développement

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

- MEMS & Nanotechnology
- Compound semiconductors & optics
- IC manufacturing
- Life science instrumentation

Yole Développement offers various kinds of services:

- Custom market research and technology/strategy analysis
- Edition of market reports and publications (Micronews and MEMSentry)
- Communication services through Micronews

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

Founded in 1998, Yole Développement is 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

- **Photonics West 2006**, San Jose, USA, 21-26 January 2006, please contact Éric Mounier at mounier@yole.fr
- **MEMS 2006**, Istanbul, Turkey, 22-26 January, please contact Jean-Christophe Eloy at eloy@yole.fr
- **3GSM**, Barcelona, Spain, 13-16 February, please contact Jean-Christophe Eloy at eloy@yole.fr
- **Strategies in Light 2006**, San Francisco, USA, 15-17 February 2006, please contact Philippe Roussel at roussel@yole.fr
- **Congress on Microsystem**, Munich, Germany, 7 - 8 March 2006, please contact Jean-Christophe Eloy at eloy@yole.fr

# Our reports

## Power Devices: 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 January 2006.

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

## LifescienceIC: Life sciences industry explained to the semiconductor

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. Is answers to the question: "how could IC and MEMS companies become a key leader of the Life Sciences field?". Available since January 2006.

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

## Silicon Microphone Market 2005: From Si microphone to acoustic modules

Complete analysis of the silicon microphones market players and technologies with unique features like technology and product development for microphones applications, comparison of the different approaches of the device manufacturers (business models and technologies), key manufacturing process requirements and critical manufacturing steps and Industry development status, risk analysis on the existing business model. Available since September 2005.

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

## World MEMS Inertial Sensor Market 2005

Yole Développement has edited a new report describing the major MEMS inertial sensor markets and applications. This is a major update of the 2004 version. This report provides a complete analysis of the micromachined acceleration sensors and gyroscopes applications and markets. Available since May 2005.

Price: Euro 2,900 / US$ 3,500

## And still: MEMS for Mobile, Status of the MEMS industry, SiC 2005, Led2Light 2006...

CONTACT for further information on Yole Développement's activities, David Jourdan, Tel: +33 472 83 01 90, Email: jourdan@yole.fr and website: www.yole.fr

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