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IVAM Product Market “Micro, Nano & Materials” at MicroNanoTec/HANNOVER MESSE

April 19-23, 2010, hall 6/booth H16

Energy-efficient systems and wireless sensor technologies at the IVAM Product Market

“2010 will be” is the official slogan of this year’s HANNOVER MESSE.

From the micro industry’s point of view, 2010 will definitely show the current trends for different industrial applications in the field of microsystems technology. This spring, the IVAM Product Market “Micro, Nano & Materials” at MicroNanoTec/HANNOVER MESSE again presents the highlight exhibits of leading companies in this industry. The joint pavilion is organized by the **IVAM Microtechnology Network**.

Just as in the previous years, IVAM lines up the forum “Innovations for Industry” again, whose individual sessions will be dedicated to the various major topics the IVAM Product Market features. The exhibition will include numerous product highlights, which are introduced in the following.

Measurement technologies for demanding quality inspection in the micro and nano range

At MicroNanoTec 2010 **Polytec GmbH** presents its latest solutions for high-sensitivity measurements and intuitive visualization of ultra-high-frequent motions of micro- and nanostructures. The award-winning optical measurement technology of the company allows acquiring smallest amplitudes in the sub-pm-range with GHz frequencies. This makes it an indispensable tool for the development of state-of-the-art products with micro- and nanomechanical functions. These are, for instance, MEMS, MOEMS and RF-MEMS components, or ultra-sonic transducers, as used in today’s high-tech professional and consumer products. Besides the out-of-plane and in-plane motion data, the Polytec Micro System Analyzer also measures the 3-D topography of the tested device.

This year, **NanoFocus AG** again presents innovative 3D measurement methods for surface inspection in the quality assurance process. In particular, the confocal 3D measurement, for example with the microscope µsurf explorer, is adapted optimally for measuring topography and roughness in laboratories and the production process. With the µsurf explorer, the enterprise offers a complete package including the software µsoft analysis for the first time. NanoFocus systems are already used for the monitoring of surfaces in the automotive, steel and printing industries.

InfiniteFocus is a high-resolution optical 3D measurement device to measure form and roughness in one system, presented by the Austrian exhibitor **Alicona**. Amongst others, the system is used in the tool and dental industry. In the field of precision manufacturing the optical microCMM (coordinate measurement machine) is successfully used to measure e.g. extremely small radii. Mark Raleigh, CEO of EDM Department Inc., is a leading supplier in micro machining. At EDM, the measurement system is used to measure micro machined components. “Since we use InfiniteFocus, our abilities have dramatically changed. Now, we can provide solutions as well as components. Reverse engineering has grown into an integral service, as well as a shared resource, for all levels of manufacturing.”

FRT, Fries Research & Technology GmbH presents a new 3D microscope with confocal and interferometric technology in Hanover. Dual Technology, shortly DT, completes the name of the new MicroSpy Topo from FRT. This surface metrology tool combines spinning-disc confocal microscopy with whitelight interferometry. This allows non-contact and fast measurements of both slightly and strongly structured surfaces. The new product is especially attractive for users in micro- and nanotechnology due to its versatility and its high resolution. The tool is used in R&D and production control and measures roughness, contour, 3D topography and more.

New industrial production processes

IMT Masken und Teilungen AG from Switzerland, a leading supplier of custom-made microstructures, exhibits in Hanover for the first time this year. In the recent years, the company has continually expanded its services. The result is an advanced know-how in manufacturing sub-µm gratings and optical wave guides, in applying and microstructuring optical and metallic coatings, and in manufacturing micro channels and electrodes. This versatility in combination with its capabilities for large-scale production makes IMT a valuable partner and supplier of microstructures for companies active in bio-photonics, life sciences, microfluidics, optics, measurement technology and sensor fabrication.

The Dutch precision supplier **Etchform BV** presents customized solutions for metal precision parts at HANNOVER MESSE. The production of thin metal precision parts by means of precision etching and electroforming is as much part of the product portfolio as are standard copper and stainless steel alloys. Etchform also develops specialties such as beryllium copper, Elgiloy/Phynox, gold, Invar/Kovar, molybdenum, silver and titanium. One-off and mass production are just as possible as additional surface and heat treatments and precision mechanical, assembly and logistic services. The exhibitor presents micro and nano metal and precision parts and tools, such as molding tools, stamps, shims, micro stencils, filter sieves, vaporizer nozzles, ink-jet nozzles, apertures, probes and gears.

The new L³ LIMO Line Lasers technology from **LIMO Lissotschenko Mikrooptik GmbH** enables the development of customized production processes. The line lasers are based on process-optimized beam shapes and allow the selection of the optimum process window for scaling the system to the industrial production level with most efficient operation and shortest return on investment time. Due to a variety of processing heads the devices can be used for any types of materials. In addition to process development, these laser sources are also designed for improvement of new thin films (e.g. solar cells, semiconductor devices) and other applications with strongest demand for high energy efficiency. The line lasers are optimized for annealing, crystallization and tempering of thin films with high-speed linear scanning processes. Furthermore, the lasers can also be used for rapid thermal inspection and quality assurance.

WWINN (World Wide Innovations) is a holding company from Almelo, the Netherlands, with two subsidiaries: IMS for turn-key manufacturing solutions and INNLab for product and process development. At HANNOVER MESSE, IMS will present its latest development N-GAP, the Next Generation Assembly Platform. This platform is realized within a short lead time and manufactures very complex, small products at high speed. N-GAP is co-financed by the European Fund for Regional Development (EFRO). INNLab's engineering services turn products into producible products with innovative assembly processes, of which several innovative examples for high volume electronics and medical devices will be shown at HANNOVER MESSE.

Industrial solutions for positioning

Elliptec Resonant Actuator AG presents new linear and rotatory positioning units at MicroNanoTec 2010. These new modules offer a very high resolution of only a few micrometers. Furthermore, new multifunctional drive kits for the Elliptec Motor X15G are introduced. The driver-kits feature an USB-port for controlling the Elliptec Motor by PC software. The communication commands are available to the customer for integration in his own applications.

Micro sensors for acceleration and angular rates

Fraunhofer Institute for Silicon Technology ISIT will showcase innovative inertial sensors at the MicroNanoTec. The core competence of the institute is the development of miniaturized, high-precision acceleration and angular rate sensors (gyroscopes) with a very high device density and functionality. By chip-level integration of multiple sensors types and sensor axes, compact combined MEMS sensor systems can be manufactured very cost-efficiently. The combination of three accelerometers and gyroscopes into an inertial measurement unit (IMU) enables the real-time orientation and position tracking of a moving body. In a car these signals can be utilized for vehicle

dynamic control systems like ESP. Autonomous position tracking can be used also for robotic navigation. Other applications are, e. g., position sensing in buildings or interactive interfaces for PCs for virtual reality animations.

Micro precision for component processing

At the MicroNanoTec in Hanover **KUGLER GmbH** presents industrial solutions that combine surface technology and high-precision coordinate measuring technology. For instance, the company will showcase mirror optics on metal substrates, transmissive optics made of transparent plastics, spherical and aspherical functional surfaces, 3D components that combine tolerances of macroscopic geometry elements with tolerances of micro structures as well as coordinate measuring machines with multi-sensor technology. One of the company's most accurate measuring machines is the LEGEX 776 by MITUTOYO. It is characterized by a linear measurement tolerance of MPEE = 0.35 + (L/1000) µm and a scan tolerance of MPEP = 0.45 µm for tactile measurements. Further special options for micro components are optical measuring heads with different magnifications, focused laser sensors and an ultrasonic micro switch.

Dispensing with nano precision

microdrop Technologies GmbH presents its newest pipette for dispensing fluids in the range of picoliters and nanoliters as its latest innovation at HANNOVER MESSE. The glass capillary has a longer design and can be dipped at a length of up to 9.5 mm. The fluid level inside is easily readable at any time due to the transparent body. Further advantages are good cleaning behaviors and the possibility to change fluids quickly. microdrop Technologies is the leading provider of dispensing systems for minimum quantities in the picoliter to nanoliter range. Next to dispensing and positioning systems microdrop provides software packages, dispensing tests and customized solutions.

Lasertechnology solutions

The **Fraunhofer Institute for Laser Technology ILT** will demonstrate remote laser fine cutting and high-speed cutting for prototyping and small lot sizes within seconds. The manufacturing of precise metallic parts is currently performed by milling, stamping and etching. These processes require long processing times or large efforts in tooling technology. For small lot sizes and prototypes, laser remote fine cutting is a versatile tool, which allows very short processing times and which does not require complex manufacturing machines. With high-power fiber lasers, highly dynamic scanning mirror systems and precision focusing optics, short cycle times can be achieved with processing times less than 100 ms for mm-sized parts. The processing accuracy can be set to < 10 µm so that this technology can also be used for precision components.

Forward-looking energy-efficiency

The **Fraunhofer Research Institution for Electronic Nano Systems ENAS** will show research developments for environmental and condition monitoring at HANNOVER MESSE 2010. Using a mobile infrared spectrometer, the analysis of fluidics will be demonstrated based on their spectral components. This spectrometer can support environmental or food monitoring. As a second analysis tool, Fraunhofer ENAS presents the award-winning Fabry Perot interferometer. It can be used for monitoring gases and gas mixtures in the infrared range. For engines condition monitoring, the Fraunhofer researchers developed an autarkic sensor system which can be integrated in mechanical parts. Fraunhofer ENAS will also present a printed battery as one possible solution for clean and versatile power source.

Foundry services for microtechnology

The **Fraunhofer Institute for Photonic Microsystems IPMS** provides services for applying Micro-Electro-Mechanical Systems: The Fraunhofer IPMS features everything needed for the development, fabrication and integration of technologies for micro-electro-mechanical systems (MEMS) and micro-opto-electro-mechanical systems (MOEMS): outstanding technology know-how, expertise in industrial manufacturing projects and the necessary infrastructure, including state-of-the-art equipment and

1,500 m^2 class 10 clean room facilities. With this potential, which makes the institute stand out from both commercial MEMS foundries and competing research institutes, IPMS wants to support especially small and medium-sized companies in applying innovative MEMS technologies.

Nanotechnology for surfaces and materials

The **CAN GmbH** is an incorporated Center for Applied Nanotechnology, which is located in Hamburg, Germany. CAN offers contract research and development services in the field of nanotechnology to companies and institutions and participates in national and international research programs. These activities are focused on the utilization of new concepts in chemical nanotechnology and nanoanalysis in the areas of consumables, individual polymers and health care products. The main areas of expertise are the production of nanoparticulate and nanocomposite materials like magnetic, conducting, fluorescent, X-ray opaque, metallic and ceramic nanoparticles, the encapsulation of active ingredients and the development and characterization of nanoparticle conjugated biological markers.

The **PANADUR GmbH** will showcase innovative, intelligent, solvent-free coating materials based on polyurea at the IVAM Product Market 2010. The use of nanoparticles in the PANADUR-system allows a targeted functionalization of the surface. Currently properties such as flammability, scratch resistance and conductivity can be generated by the use of nanoparticles. Through the use of nanoscaled silver, the company offers a permanent anti-microbial coating which is one way to combat the hospital germ. This system offers a variety of applications in the fields of automotive, leisure or fire protection. In-house laboratory prototypes can be manufactured in order to develop application-specific formulations.

Technology development

Micromachine Center (MMC) is a Japanese non-profit organization who supports micro- and nano-related industry development. Following companies are associated as examples: Panasonic, Sony, Omron, Canon, Denso, Fuji and many more. For this purpose, the initiative named MEMS Industry Forum (MIF) has been launched. The Exhibition Micromachine/MEMS presents current Japanese research projects in the field of micro- and nanotechnology.

KIT is a merger of Forschungszentrum Karlsruhe and university of Karlsruhe. KIT stands for top research and excellent scientific education, unrestricted exchange of know-how, and sustainable innovation culture. Within KIT, NANOMICRO is a Helmholtz Research Programme and dedicated to research and development of advanced multi-material micro and nano technologies. NANOMICRO activities span the entire range from fundamental science to high-performance technologies and integrated systems. NANOMICRO is facilitating innovation through the Karlsruhe Nano Micro Facility (KNMF), which offers free access to a unique set of technologies for structuring and characterization technologies on a peer-reviewed proposal base.

Support and location for high-tech companies

Well known for its structural change and technological expertise, **the region of Dortmund** has been integrated into a unique technology and research location. Its strengths include a superb infrastructure, flexible business promotion programs and a huge variety of business development areas. In the field of microsystems technology, Dortmund has turned into a leading European cluster with a large number of companies, private and public service providers, university and non-university research and development institutions involved. A comprehensive overview of microsystems technology “made in Dortmund” is provided by the website www.mikrotechnik-dortmund.de.

At HANNOVER MESSE, the **IVAM Microtechnology Network** will demonstrate the advantages it offers to high-tech suppliers. With IVAM’s help, about 300 companies and institutes from approx. 20 countries open up innovative markets and set new standards. As a communicative bridge, IVAM accelerates the transfer of innovative ideas into profitable products. Apart from technology marketing, IVAM’s activities include lobbying, market research, education and training, and accessing international markets. Current projects will be presented at the IVAM booth in Hanover, in hall 6, booth H16.

More information can be found at www.ivam.eu.

Further information:

Further information and an exhibitor overview including contact data can be found at www.ivam.de/index.php?content=messe_details&id=357&clear=2.

Images for editorial use (including reference) can be downloaded at http://www.ivam.de/2big4mail/Hannover-Messe-Pressebilder_2010.zip

Press contact:

IVAM Microtechnology Network
Mona Okroy
E-mail: mo@ivam.de
Phone: +49 231 9742 7089

Captions and sources:

Polytec_1.jpg
Source: Polytec GmbH.

Polytec_2.jpg
Source: Polytec GmbH.

Alicona_Freigestellt.png
Optical 3D micro-coordinate measurement machine InfiniteFocus to measure form and roughness.
Source: Alicona.

FRT.tif
FRT MicroSpy Topo. Source: FRT GmbH.

IMT_Masken_und_Teilungen_1.jpg
Glass components with grating and optical mirror coating for life science
Source: IMT Masken und Teilungen.

IMT_Masken_und_Teilungen_2.jpg
Electrically conductive structures for sensing application
Source: IMT Masken und Teilungen.

Etchform_1.jpg
Encoder. Source: Etchform.

Etchform_2.jpg
Microsieve. Source: Etchform.

LIMO_1.jpg
LIMO Laser Workstation
Source: LIMO/Markus Steur.

LIMO_2.jpg
Source: LIMO/Markus Steur.

Fraunhofer_ISIT.jpg
MEMS technology enables the cost-efficient and highly integrated production of inertial measurement units (IMU). Source: Fraunhofer ISIT, Itzehoe.

KUGLER_1.jpg
Mirror polygon. Source: KUGLER GmbH.

KUGLER_2.jpg
Electrode. Source: KUGLER GmbH.

KUGLER_3.jpg
Microfluidic structure Source: KUGLER GmbH.

KUGLER_4.jpg
Air-bearing part. Source: KUGLER GmbH.

microdrop_Technologies.jpg
Source: microdrop Technologies

FraunhoferILT.jpg
Source: Fraunhofer ILT.

Fraunhofer_ENAS_1.jpg
Printed battery as serial of two batteries (3 volt)
Source: Fraunhofer ENAS.

Fraunhofer_ENAS_2.jpg
Mobile infrared spectrometer. Source: Fraunhofer ENAS.

Fraunhofer_IPMS_1.jpg
Look into the new clean room for microsystems of the Fraunhofer Institute for Photonic Microsystems in Dresden. Source: Réne Gaens

Fraunhofer_IPMS_2.jpg
The clean room for microsystems of the Fraunhofer Institute for Photonic Microsystems is connected to the institute building. Source: Réne Gaens

Wirtschaftsförderung_Dortmund.jpg
Source: Stadt Dortmund

IVAM_1.jpg
MicroTechnology/HANNOVER MESSE 2009. Source: IVAM.

IVAM_2.jpg
IVAM Product Market overview at MicroTechnology/HANNOVER MESSE 2009. Source: IVAM.

IVAM_3.jpg
Forum „Innovations for Industry“ at MicroTechnology/HANNOVER MESSE 2009. Source: IVAM.