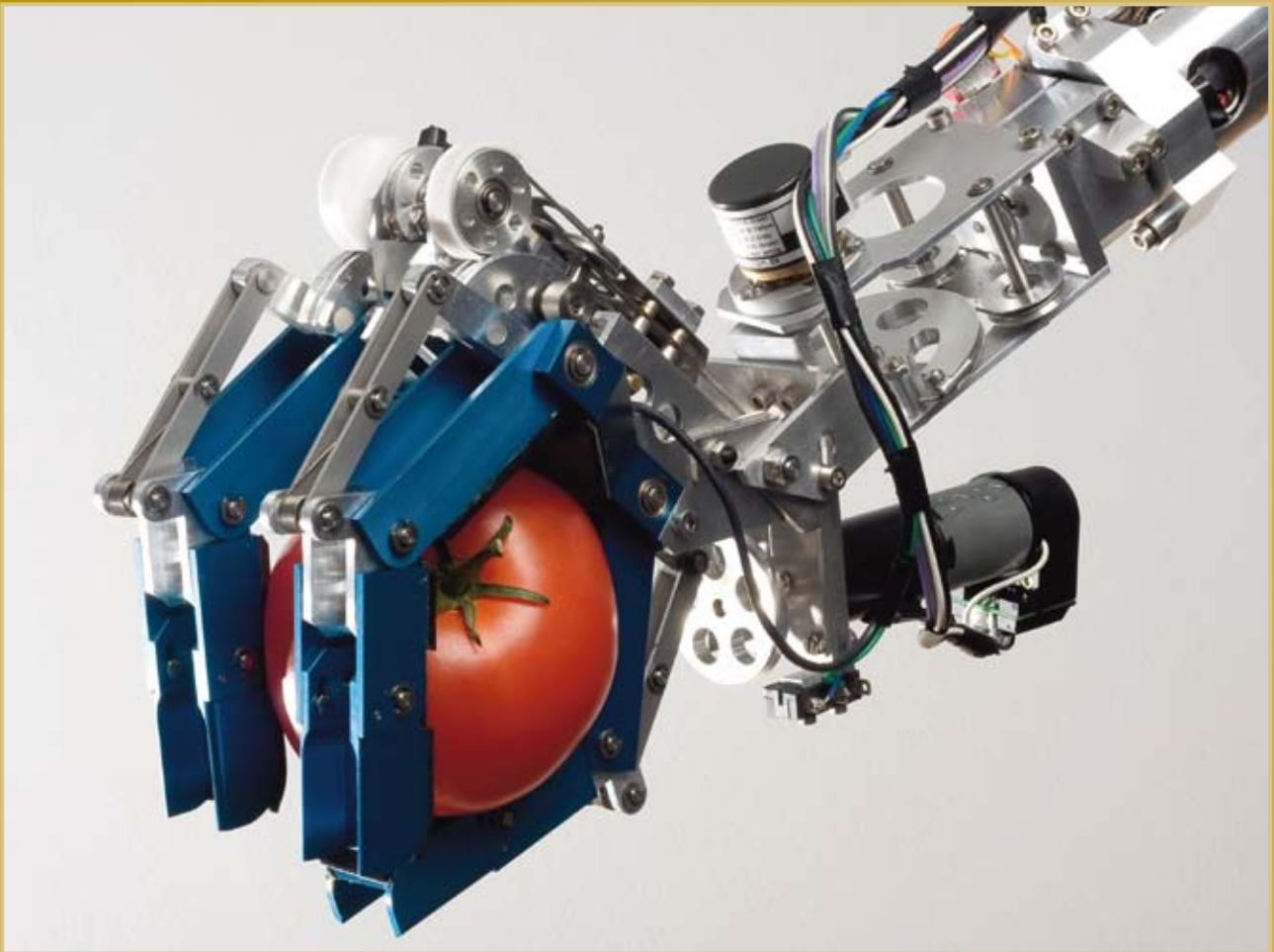


# Mikroniek

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## Precision Fair Veldhoven, the Netherlands 30 November and 1 December 2011



  
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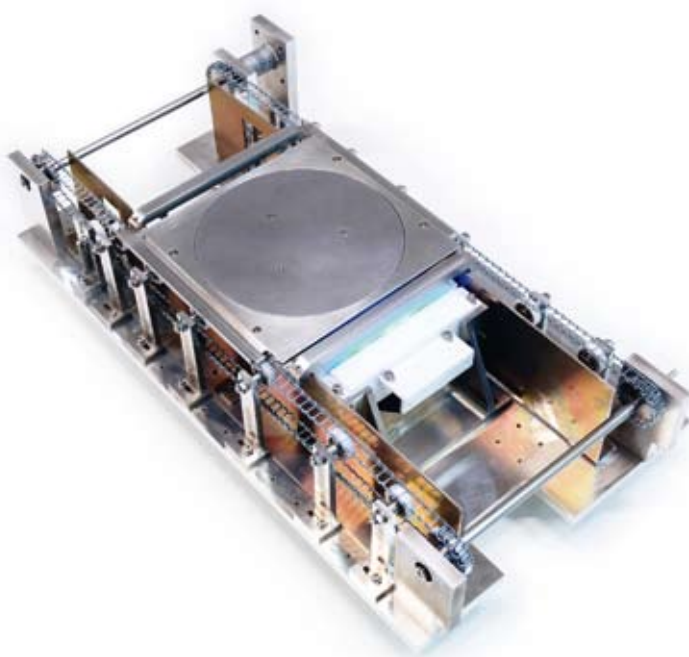
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**The Delft Hand: designing adaptive grippers • Official fair catalogue**  
**Large-stroke planar 2-DoF flexure-based positioning stage for vacuum environments**  
**Bakker Fijnmetaal: Craftsmanship perfects CNC cutting technology**  
**New book: "The Design of High Performance Mechatronics"**



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## In this issue

### Publication information

#### Objective

Professional journal on precision engineering and the official organ of DSPE, the Dutch Society for Precision Engineering. Mikroniek provides current information about scientific, technical and business developments in the fields of precision engineering, mechatronics and optics.

The journal is read by researchers and professionals in charge of the development and realisation of advanced precision machinery.



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The cover photo (Delft Hand 1) is courtesy Delft University of Technology.

04

#### Editorial

Hans Krikhaar, president of DSPE, on collaboration within the multi-system high-tech ecosystem.

05

#### The Delft Hand

Design and construction of adaptive grippers for automated handling of products that are very diverse in size, shape, position and orientation.

12

#### High-precision positioning mechanisms

Design and realisation of a large-stroke planar 2-DoF flexure-based positioning stage for vacuum environments.

18

#### Craftsmanship perfects CNC cutting technology

Company profile of Bakker Fijnmetaal.

25

#### Mikrocentrum

Including: Rapid developments in additive manufacturing.

26

#### DSPE

Singapore and the Netherlands, big in precision engineering.

28

#### Upcoming events

Including: RapidPro 2012.

30

#### News

Including: New book, "The Design of High Performance Mechatronics".

35

#### Tapping into Each Other's Expertise

Technolution – innovative design solutions.

37

#### Precision Fair 2011

The official fair catalogue, including:

39

#### Programme overview

General focus and visitor information.

40

#### Who supplies what

Classification of the exhibitors according to disciplines.

47

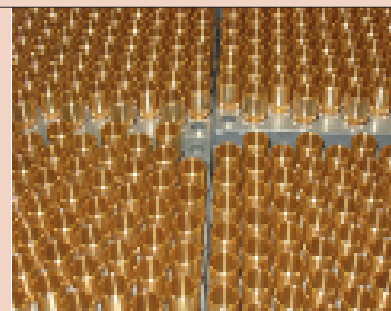
#### Exhibitor profiles

Concise profiles of all exhibitors.

124

#### Product catalogue

Information on specific products of exhibitors.



# Ecosystem

The world is changing every day. One trend in precision engineering is that different companies are working more extensively together on projects. Increasing numbers of companies are collaborating on new business programmes without the significant guidance of major OEMs, and more and more examples of this are emerging. This is a positive trend for the Dutch high-tech systems industry, as it will increase the added value of the partners in the chain. It will change the chain from a supply chain to a design and production one. The customer base will be more global and the supply chain will be international. Brainport Industries can play an important role in the Dutch industrial ecosystem managing these trends to enable international growth for high-tech suppliers in a much more open market when compared to one that is dictated only by the big OEMs.

We need to establish how our different companies can work together and still have their own development systems. If not, we will have to define standard ways of working for all collaborating parties. For example, if we are unable to deal with each party having their own CAD system, we will need to standardise our business and create one CAD system. We will also need to standardise several other systems.

I believe, however, that this is not feasible. In fact, I witnessed the impossibility of this at one big company, namely Philips in the 1990s. Therefore, we need to prepare how to work together without giving up our own development systems (i.e. CAD systems, standardisation databases, ways of working, ways of designing, system architectures, design principles, logistic systems, integration of modules into the final systems, etc.). This will be a major, yet rewarding challenge.

Let us create a new way of working for our multi-system ecosystem and find a way to collaborate without needing to rigidly standardise our different companies. And what better opportunity to discuss this, than at the Precision Fair 2011?

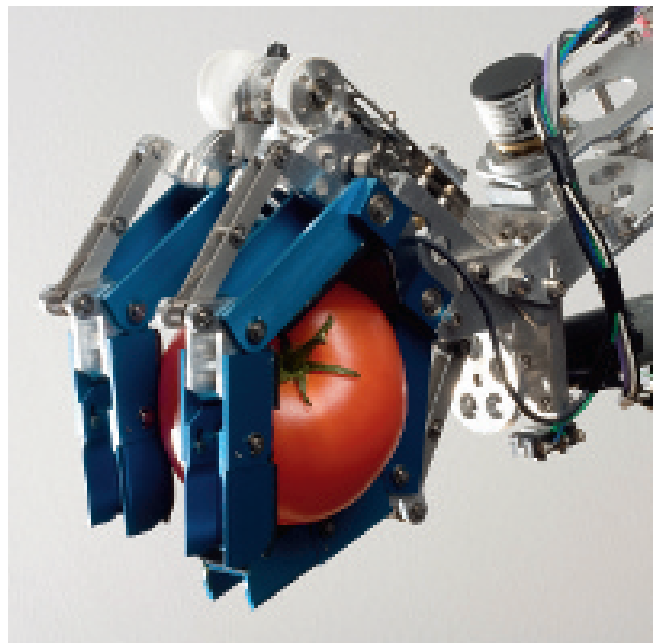
Dr Hans Krikhaar  
President of DSPE



# The Delft Hand

*In industry, every day millions of products are picked up in one location and placed at another location. Automation of this process is straightforward when these products are of roughly the same shape and size, and when their position and orientation are known. However, when the products are very diverse in size, shape, position and orientation, robotic grasping becomes complicated and expensive. Inspired by the human hands and their grasping capabilities, Delft University of Technology has developed simple yet versatile robotic hands based on a force-directed design method. This design method and the results are presented in this article.*

• *Cory Meijneke and Gert Kragten* •



## Authors' note

Cory Meijneke works as a research engineer and part-time M.Sc. student in the department of Biomechanical Engineering at Delft University of Technology, the Netherlands. His work mostly involves developing research prototypes of robotic hands and exoskeletons. Gert Kragten obtained his Ph.D. Degree (2011) in Mechanical Engineering from Delft University of Technology. His research mostly involved underactuated grasping, prosthetic and robotic hands, and compliant mechanisms. He is currently employed as engineer New Development at Lely Industries, Maassluis, the Netherlands, manufacturer of dairy equipment and grassland machinery.

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**R**obust, adaptive robotic hands that can easily and safely grasp a large variety of products are still a research and design challenge. Grasping can be approached from roughly two perspectives: motion and forces. On the one hand, the fingers have to make different motions to conform to the shape of various objects and to achieve different kinds of grasp postures. On the other hand, the fingers have to apply contact forces to the objects in order to achieve stable grasp equilibrium and to hold the objects. Conventionally, adaptive hands are designed from the perspective of motion. Many motors and sensors are applied to let the fingers make all the desired motions and to prevent the contact forces from exceeding threshold values. Amazing results have been achieved following this approach, but the effort to control these hands is generally too high for application in industry. Furthermore, the large number of motors and sensors makes these hands vulnerable and expensive. The motion-directed design approach does not seem to converge to solutions that

satisfy the need for simple, cheap and reliable adaptive hands.

### Force-directed design

Design directed by forces is still a rather unexplored but promising perspective. For grasping, there is no need to fully control the motion of all phalanges. Basically, the phalanges or fingers need to apply forces to the object such that it is stably grasped and held. Passive mechanisms that distribute a single driving force to multiple phalanges are sufficient for this task. The application of this paradigm has led to a special class of robotic hands that are underactuated, i.e. having more degrees of freedom than actuators. At Delft University of Technology, several prototypes of underactuated hands with three fingers and only one motor have been built (see Figure 1). These prototypes demonstrate that the force-directed design approach yields adaptive hands that are simple to control, relatively cheap to build and maintain, and robust and reliable to grasp a large variety of products.

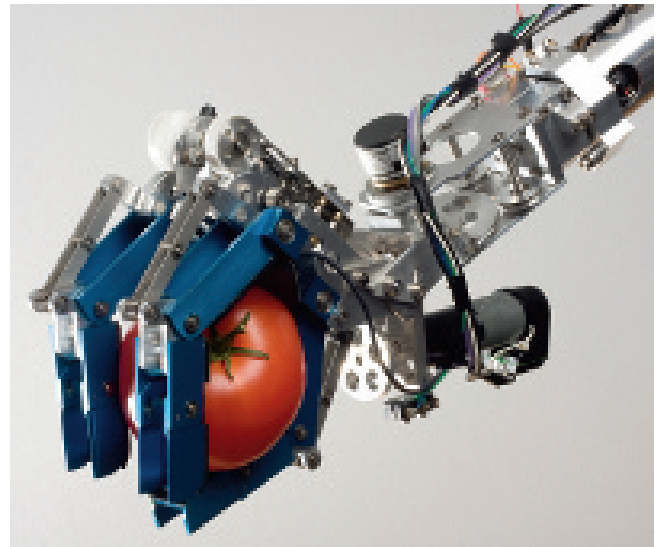
The objective of this article is to demonstrate the application of the force-directed design approach to the development of adaptive hands. It will be shown that different grasp behaviours can be achieved by a judicious choice of the dimensions of the finger phalanges, the distribution of the actuation force to the phalanges, and the placement of mechanical stops and return springs.

### Delft Hand Generations

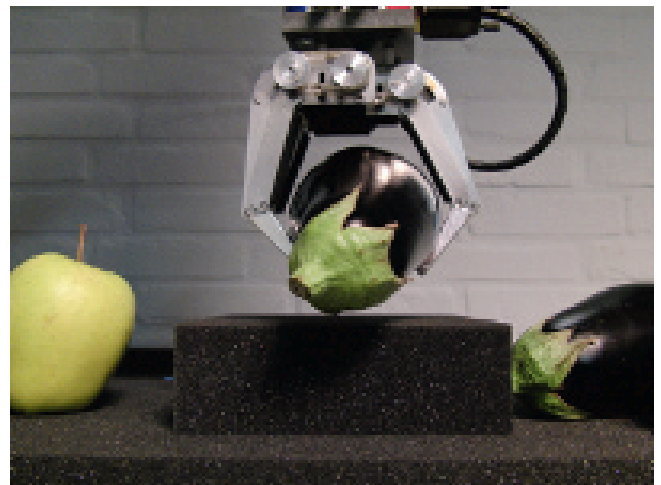
Three generations of underactuated hands have been built in the past three years at Delft University of Technology. In each generation, the force-directed design method has been applied to enhance its simplicity, versatility and robustness.

#### *Delft Hand 1*

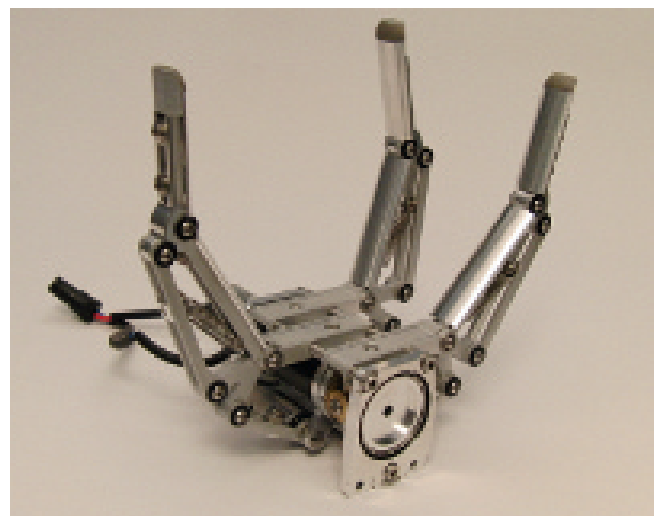
A prerequisite for grasping is that the objects as well as the fingers are in stable equilibrium, while the fingers apply compressive contact forces to the objects. In the development of the first generation, the Delft Hand 1 (DH1), the design was mainly driven by the requirement to obtain grasp equilibrium for a large range of object sizes. It was assumed that the hand should consist of three fingers, each having two phalanges of equal length and moving in parallel planes. Cylindrical objects with various diameters were taken as model objects. This allowed simple planar



Delft Hand 1 (2008).



Delft Hand 2 (2009).



Delft Hand 3 (2011).

Figure 1. Three generations of the Delft Hand.





Figure 3. Schematic representation of the two-fold grasp behaviour of Delft Hand 3.

grasp small or slender objects, it is required to allow the fingers to grasp objects between the distal phalanges only in a so-called precision or pinch grasp. Delft Hand 1 was significantly better in performing this grasp type than Delft Hand 2, which led to researching how to obtain this two-fold grasp behaviour, without the need for additional motors, sensors or mechanisms. Analysing this behaviour with the force-directed design approach resulted in the Delft Hand 3 (DH3), of which the fingers are still driven by only one motor and no sensors, but have the capability to grasp objects either in a precision grasp or enveloping grasp, also shown in [3].

Observation of the fingers of the DH1 showed that precision grasps were possible when every finger acts as one rigid body. In other words, when the distal phalanges can not rotate with respect to the proximal phalanges, objects can be grasped in a pinch grasp. Force analysis was applied to the fingers to obtain the following behaviour, purely based on action and reaction forces and moments: when the tips of the fingers make contact to the object, the distal phalanges remain against their mechanical opening limits. When the initial contact point with the object is somewhere else on the contact surface of the fingers, the phalanges start to envelope the objects to obtain an enveloping grasp like the fingers of the DH1 and DH2. This behavior is explained by the drawings in Figure 3.

A further simplification in the construction of the DH3 is the 1:1 coupling between the motor torque and the torque applied to the fingers. This is achieved via an additional

parallel four-bar mechanism, which is very suitable for a limited range of motion as in a robotic hand.

### Discussion and conclusions

This article shows the application of a force-directed design method to create adaptive hands. In this method, the desired contact forces applied by the fingers to the objects are taken as a starting point. Then a mechanism is designed primarily based on the desired moment transmission and distribution from the motor to the fingers, to obtain the desired contact forces. This method has led to robotic hands that can grasp various objects in different grasp configurations without the necessity to actively control all motions and individual contact forces of the phalanges. In fact, each Delft Hand has six independent degrees of freedom, driven by only one motor, which makes it *underactuated*.

Underactuated robotic hands are designed from a force perspective. The fingers adapt themselves to the shape of the object. The contact forces follow from the configuration in which the object and fingers together achieve grasp equilibrium. This behavior leads to delicate grasps, where the fingers are always in contact with the object and where the contact forces are always within the desired range. Underactuation does not allow the manipulation of the objects, where the orientation of the object within the hand can be actively controlled by the fingers. However, underactuation has the ‘power’ to yield simple robotic hands that can easily grasp and hold many different objects in a reliable and robust way.

This line of development has led to sufficient interest from industry for starting a spin-off company called Lacquey [4], devoted to developing commercial versions of the Delft Hand for picking & placing fruits and vegetables. Because these kinds of products can not all be approximated by a planar cylinder, e.g. an apple is better approximated by a sphere, Lacquey also concentrates on the question how to orient the fingers in three-dimensional space. It is expected that future research efforts will be directed towards extending the knowledge gained through planar models to three dimensions.

Another line of research in which a lot can still be gained concerns the shape and compliance of the contact surfaces between object and finger. For instance, convex or concave

phalanges can significantly influence grasp performance. The shape of the contact surface can also be made adaptive by adding compliance. This means that the rough adaptations are still achieved by an underactuation mechanism in the finger, but the fine adaptation is now facilitated by reshaping the surface of the phalanges.

In recent years, a framework of design guidelines, performance metrics and application examples was made for the implementation of underactuated mechanisms in adaptive robotic hands [5]. This has provided a basis for further research and commercial implementations in the future, which will hopefully lead to a next step in automation.

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- [3] Delft Biorobotics Lab Youtube channel: [www.youtube.com/user/DelftBioroboticsLab](http://www.youtube.com/user/DelftBioroboticsLab)
- [4] [www.lacquey.nl](http://www.lacquey.nl)
- [5] G.A. Kragten, "Underactuated hands: Fundamentals, performance analysis and design". Ph.D. thesis, Delft University of Technology, ISBN 978-94-6169-091-3

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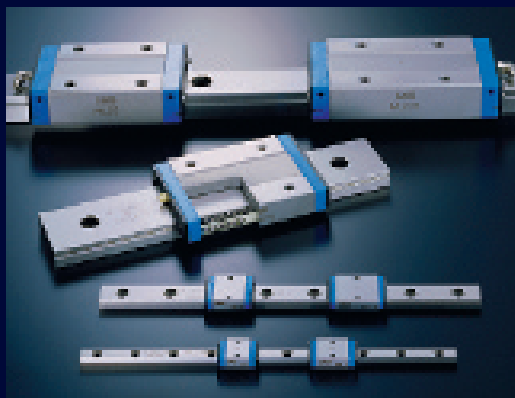
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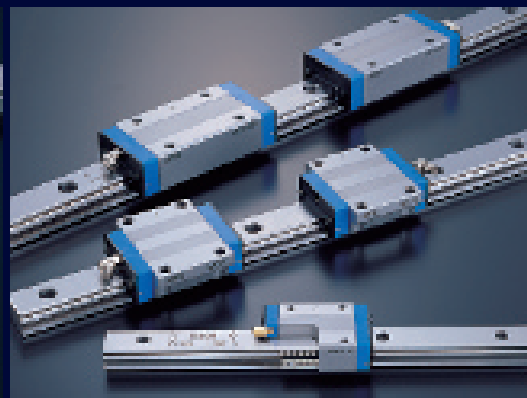
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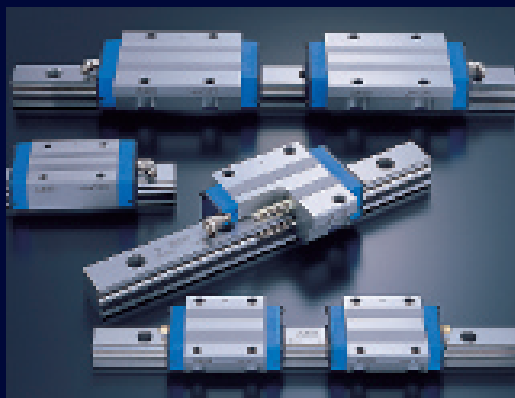
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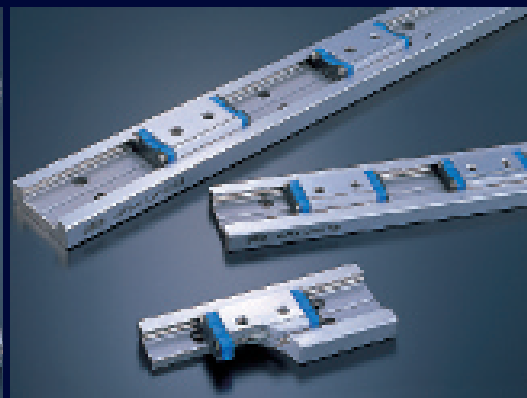
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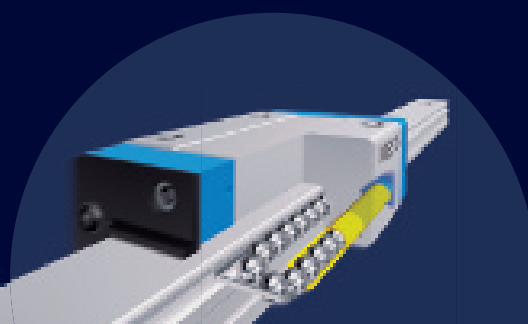
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# Advisory Board Engenia

Engenia is a provider of courses on an academic level for companies within the technology industry or process technology. Engenia is part of Mikrocentrum and is situated at the High Tech Campus in Eindhoven. Courses which open to individual registration as well as in-company courses are scheduled all over the Benelux.

Engenia intends to set up courses which are unique within the Benelux and which are innovative. To manage this process Engenia has set up an Advisory Board. This Advisory Board consists of nine Benelux professors and they will meet once a year. The first meeting will be on the second day of the Precision fair: the 1st of December 2011. The meeting will be held every year under another presidency.

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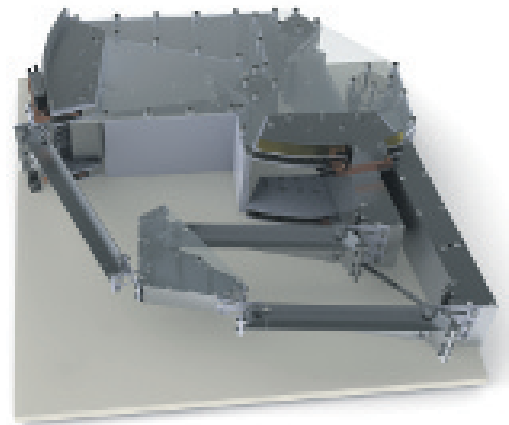
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# A large-stroke planar positioning stage for

*The growing demand from industry for high-precision systems introduces new challenges for positioning mechanisms. High accuracy and repeatability down to the sub-micron scale are not uncommon. This is often combined with extreme environments, like high UV light sources, electron beams or vacuum. This article focuses on the flexure mechanism for a large-stroke planar XY-positioning system. Applications can be found in for example lithography, micromachining or microscopy.*



• Ger Folkersma, Steven Boer, Dannis Brouwer, Just Herder and Herman Soemers •

Common large-stroke stages include friction or roller bearings to guide the motion. The friction is normally minimised by applying lubricants. In a vacuum environment however, this lubricant slowly evaporates and will contaminate the vacuum and its surroundings. This will result in excessive wear and increased friction, and reduces the accuracy of the positioning mechanism itself. This can be resolved by using solid lubricants for example [1]. Friction can be avoided by using magnetic or air bearings [2]. However, these methods increase the mechanism complexity considerably.

Flexure hinges for guiding the motion do not have this problem, since these elements do not need any lubrication and maintenance. Other advantages of flexure hinges are no backlash, diminished friction and high resolution [3]. Challenges of flexure hinges are their limited range of motion and reduced stiffness against disturbances. The mechanism described here combines a large stroke with elastic cross hinges.

## Authors' note

Ger Folkersma is a Ph.D. student in the field of micro-assembly for optical systems in the group of Mechanical Automation and Mechatronics at the University of Twente, Enschede, the Netherlands. The work described in this article was part of his Master's thesis at the same university. Steven Boer is a Ph.D. student in the field of multi-body modeling of dynamic systems, also in the group of Mechanical Automation and Mechatronics. Dannis Brouwer is assistant professor in the same group and project manager at DEMCON, based in Oldenzaal, the Netherlands. Just Herder is professor in the same group and associate professor at Delft University of Technology, Delft, the Netherlands. Herman Soemers is professor in the Twente group of Mechanical Automation and Mechatronics and Technology Manager Mechatronics at Philips Innovation Services in Eindhoven, the Netherlands.

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# 2-DoF flexure-based vacuum environments

## Mechanism layout

The specifications for this mechanism state a square workspace of  $100 \times 100 \text{ mm}^2$ , and a maximum size for the complete mechanism of  $500 \times 500 \times 85 \text{ mm}^3$ . For high-precision applications, the stiffness of the stage is important, which translates to a minimum natural frequency of 100 Hz, with blocked actuators. Without actuators, this is the third natural frequency of the mechanism, since the first two modes are the desired X and Y planar translations of the end-effector.

A conceptual layout is shown in Figure 1. The mechanism is a parallel kinematic machine (PKM), where two parallelograms in series (E-C-G and G-F-D) restrict the in-plane rotation of the end-effector. An actuator is placed at hinge 2. The remaining degree of freedom (DoF) is restricted by arm-pair A-B, with an actuator at hinge 1. This approach allows placement of the actuators at the base, which reduces the negative effect of the weight of the actuator on the third natural frequency.

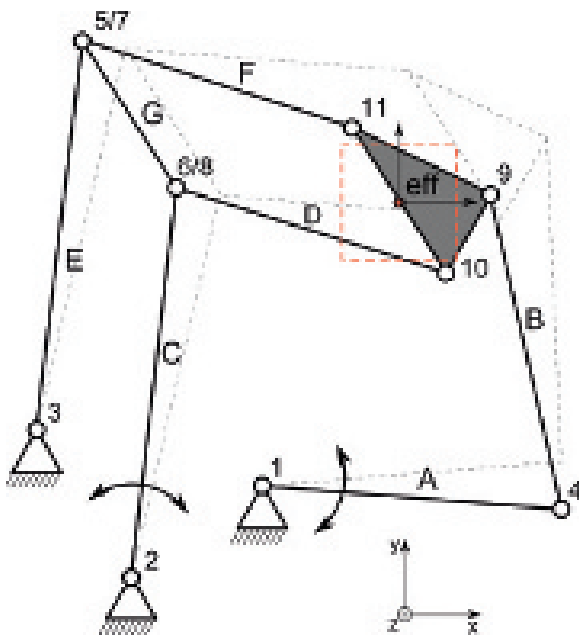


Figure 1. Schematic layout of the mechanism. Flexure hinges are indicated by numbers, connecting arms by letters.

The hinge positions are optimised by an algorithm that minimises the total mechanism size and constrains the rotation of the hinges to be within the material stress limits.

## Cross hinges

Cross hinges (also known as cross-flexural hinges) consist of multiple-leaf springs mounted perpendicular to each other. Having only one degree of freedom, these elements function like regular hinges, albeit with some travel of the instantaneous centre of rotation. The simplest cross hinge consists of two leaf springs; see Figure 2.

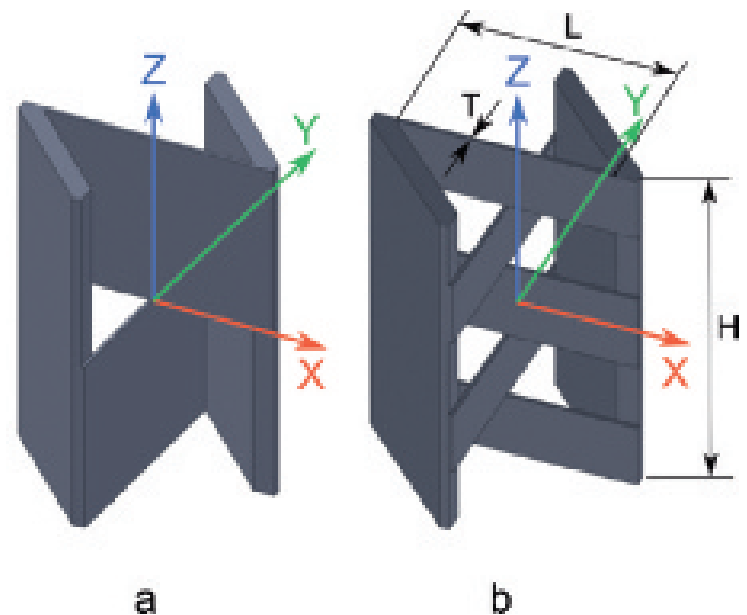


Figure 2. Various configurations of cross hinges.

(a) 2-leaf.

(b) 5-leaf.

Figure 3 shows the stiffness versus the hinge rotation, for the two variations of a cross hinge. The dimensions of the leaf springs are listed in Table 1. The stiffness is calculated in the geometrical center of the cross hinge, with the directions orientated as indicated by the local axes in the figure, where for example CRx denotes the rotational stiffness about the X-axis.

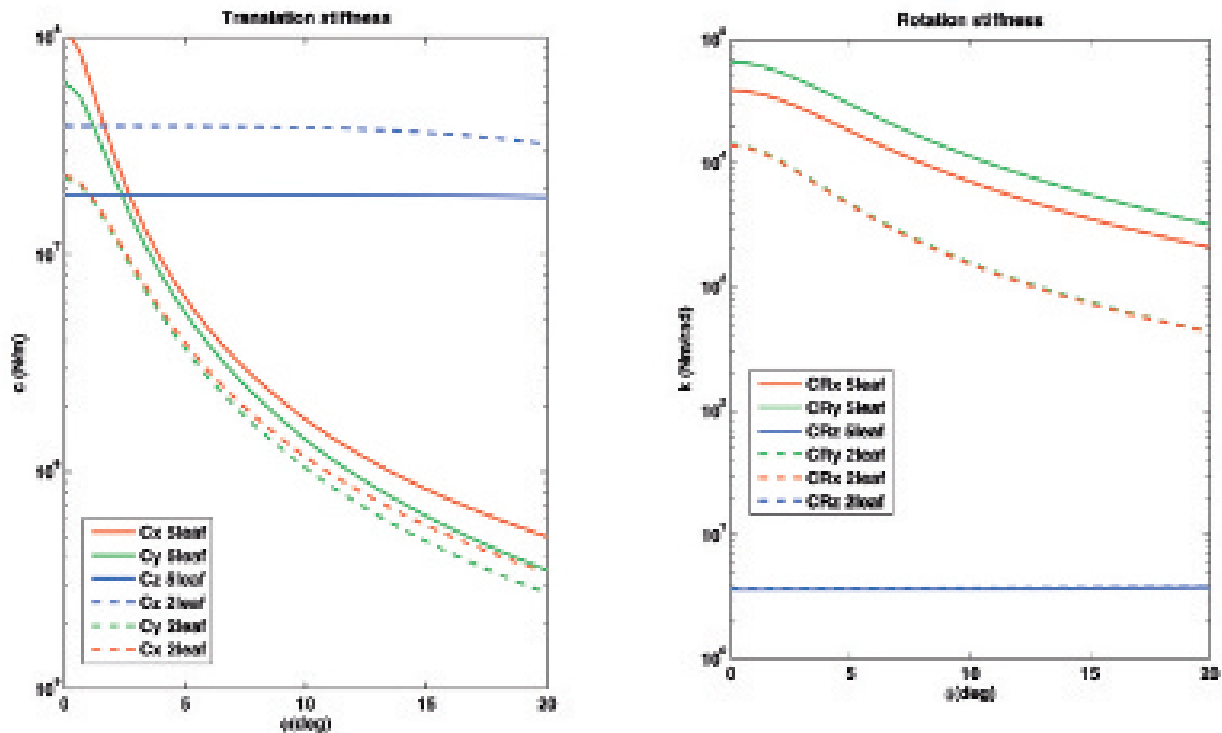


Figure 3. SPACAR simulation of stiffness vs. hinge deflection  $\phi$ , for the two cross-hinge variations.

Table 1. Dimensions of analysed cross hinges.

Type	H (mm)	L (mm)	T (mm)	leaf spring height (top to bottom) (mm)
2-leaf	85	50	0,5	42; 42
5-leaf	85	50	0,5	15; 10; 33; 10; 15

Ideally, the stiffness is high in all directions except for the desired hinge rotation  $CR_z$ , where a low stiffness is desired. This desired situation is best satisfied in the neutral position (zero deflection as shown in Figure 2). However, with increasing deflection the stiffness in all directions, except for rotation about the Z-axis and translation along the Z-axis, drops considerably. This will result in reduction of the lowest unwanted natural frequency of the mechanism when it moves outside the nominal position.

To optimise the supporting stiffness, the leaf springs are divided in multiple parts (see Figure 2b). The rotational stiffnesses around the X- and Y-axis are now higher over the full hinge rotation. This comes at the price of losing translational stiffness in the Z-direction. However, since the expected dominant load at the cross hinges is a moment around the X- and Y-axis, this is of low influence. As a result of the nonsymmetrical geometry, the rotational stiffness of the optimised cross hinge is higher around the Y-axis as compared to the X-axis. This difference is taken into account in the mechanism design, by rotating the cross hinges in such a way that the maximum supporting stiffness is in the direction of the maximum expected load.

## Mechanism design

The mechanism is designed to be exact constraint, which means that there are no over- or underconstraints in the complete mechanism. Overconstraint mechanisms usually have internal stresses due, for instance, to manufacturing imperfections or aligning problems. These internal stresses can influence the dynamics of the system [4], resulting in an undeterministic design and loss of supporting stiffness. Underconstraints lead to internal vibration modes at relatively low frequencies. In exact constraint design, the overconstraints are released at pre-defined locations. Therefore misalignment does not lead to a large internal stress. This ensures the mechanism exhibits deterministic behaviour, even when parts are misaligned.

To examine the over- and underconstraints in this mechanism, at first it is assumed that each arm is rigid, and each hinge releases one DoF. Now each pair of upper and lower arms (AB, CD, EF, see Figure 1) with three hinges (1-4-9, 2-6-10, 3-5-11) releases three DoFs: translations in X- and Y-direction, and one rotation about the Z-axis, see Figure 4.

Without arm G, the end-effector therefore has the same three released DoFs. With the X- and Y-translation actuated, the rotation about the Z-axis should be constrained by arm G. This means this arm should only fix one DoF to be exactly constrained. This is accomplished by a combination of leaf springs, sprites and notch flexures; see Figure 5.



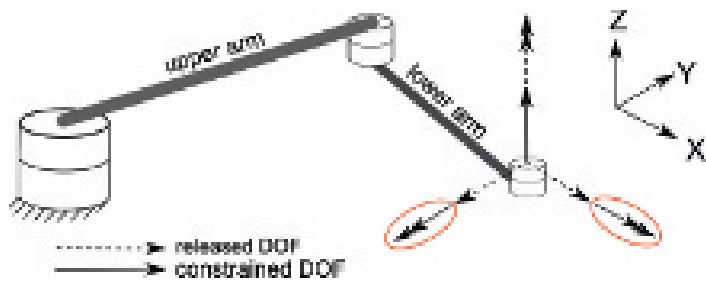


Figure 4. DoFs of one pair of arms (arms assumed rigid).

With three constraints per arm pair, and one from arm G, the end-effector now has  $(3 \cdot 3) + 1 = 10$  constrained DoFs, and is therefore overconstrained. Since two DoFs are actuated there are  $10 - (6 - 2) = 6$  overconstraints in the mechanism. This means that two DoFs should be released per arm pair. For the arm in Figure 4 these are the encircled DoFs, the rotation about the X- and Y-axis. This analysis allows to design the arms to have compliances in the desired directions. Arms A, C and E are

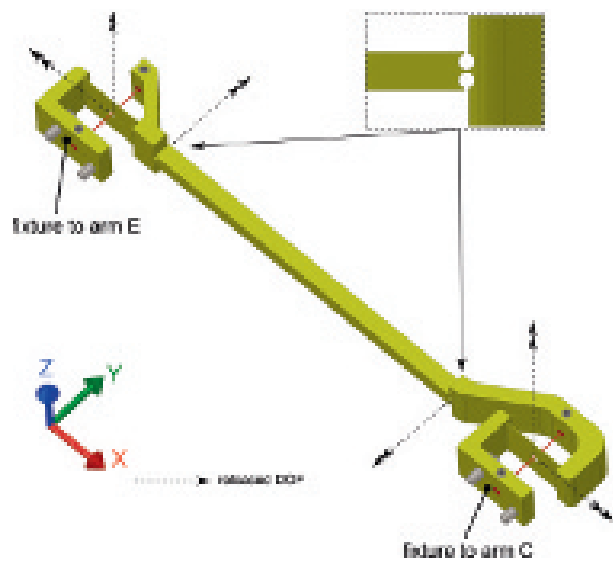


Figure 5. Released DoFs in arm G.

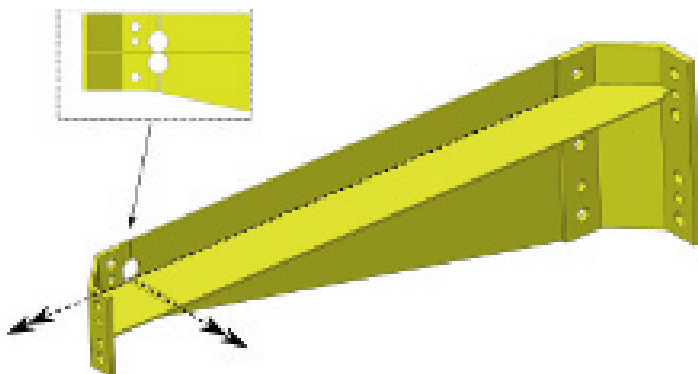


Figure 6. Compliances in lower arms.

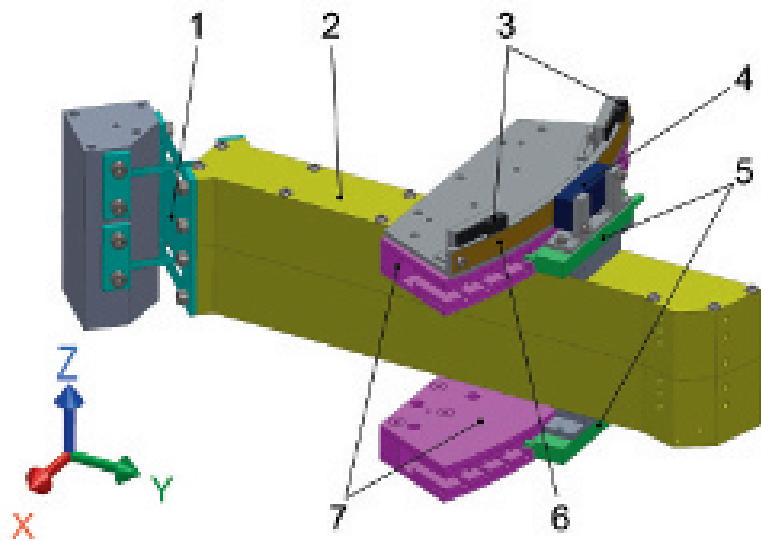


Figure 7. Actuators mounted on an upper arm.

- 1: Cross hinge
- 2: Upper arm
- 3: Limit switch
- 4: Encoder head
- 5: Motor coil units
- 6: Encoder scale
- 7: Motor magnet yokes

supposed to be stiff and lightweight. This can be achieved by creating a closed 'box' structure [5]. The lower arms (B, D, F) connect hinges 4-9, 6-10 and 5-11. As analysed, two compliances need to be added in these arms. It is chosen to realise a torsion-compliant beam by creating a T-shaped cross section. The other compliance is added with a notch-flexure at one end; see Figure 6.

### Actuation and feedback

As indicated in Figure 1, the mechanism is actuated by rotating arms A and C about hinges 1 and 2, respectively. Actuators that introduce friction or backlash are not suitable, and in order to do experiments with the mechanism a direct-drive actuator is required. This actuator delivers a force in one direction, while small motions in the other directions are possible. This allows for modal measurements on the mechanism, without coupling to the fixed world through the actuators. For this purpose, linear ironless motors are modified to have an arc-shaped trajectory by redesigning the magnet yokes; see Figure 7 #7. The (standard) coil units are fixed to the arm. Per arm two motors are used, which makes sure the force is distributed symmetrically about the length axis, and prevents an unnecessary torque on the cross hinges; see Figure 7 #1.

The position of the arm is measured directly at the actuators by optical linear encoders. The steel measuring scale is bent along the same arc as the actuators. This

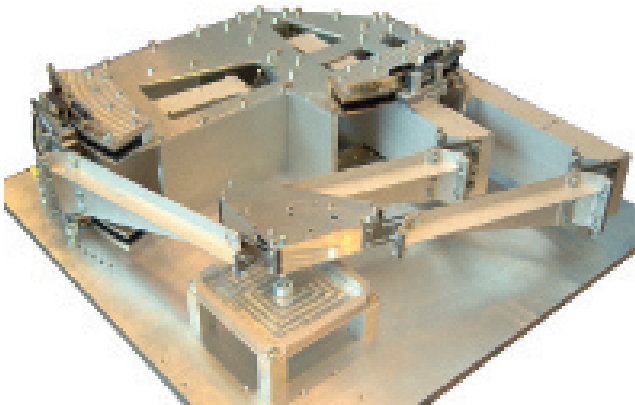


Figure 8. The experimental set-up.

effectively measures the angle of rotation of the cross hinge at the base; see Figure 7 #1. The position of the end-effector is not measured, so a kinematic model from the encoders to the end-effector is used to control its position. Figure 8 shows the experimental set-up.

### Characterisation

The first unwanted (third) natural frequency of the mechanism in the central position is determined by FEM analysis (see Figure 9), and is found to be 115 Hz. To verify this, a mechanism identification is carried out on the experimental set-up. The actuators are supplied with independent pseudo-random binary signals (PRBS), to create excitations in a range between 1 and 500 Hz. A MIMO spectral model and state-space parametric model of order 8 are derived from the in- and output data, using the Matlab Ident toolbox. Figure 10 shows the bode-magnitude plots of both transfer functions. The transfer is between motor force inputs  $F_x$  and  $F_y$  to encoder outputs  $Y_x$  and  $Y_y$ . The first two natural frequencies are visible in both models at 1.3 Hz and 2.6 Hz. For higher modes however, the signal-to-noise ratio is low, and no definite conclusion can be drawn for the third natural frequency.

The low signal amplitude is a result of the local motion direction of the vibration. According to the mode shape

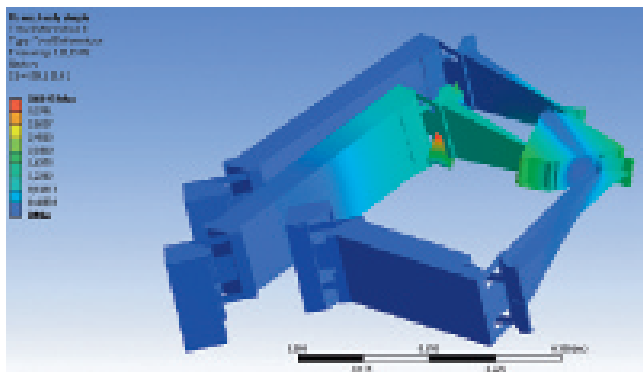


Figure 9. Third mode shape of the mechanism, at 115 Hz.

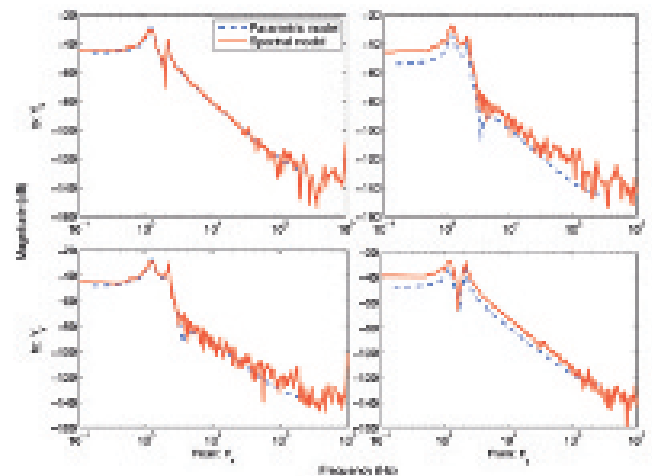


Figure 10. Bode plot of the identification results. With  $Y_x$  and  $Y_y$  the encoder positions, and  $F_x$  and  $F_y$  the forces supplied to the actuators.

from the FEM model, the higher modes are mostly vibrating in a direction almost perpendicular to the measurement direction of the encoders and to the actuation direction of the motors. Since the encoders cannot measure the motion of the third mode precisely enough, an additional sensor is needed. An inductive sensor is placed at hinge #9 (see Figure 1) to measure the relative movement of the end-effector in the Z-direction at this point. Also the actuators cannot excite those modes with enough energy to get a good measurement signal. To get a better signal, the mechanism is excited by means of a simple hammer, striking in the same position and direction as the inductive sensor.

This measurement is repeated in a grid over the workspace of the end-effector. The third natural frequency is plotted for each position in Figure 11. Maximum frequency of this mode is 105 Hz and it is located in the center of the workspace. This result is close to the simulated natural frequencies from Ansys and SPACAR. Outside the center this frequency drops fast, due to the decreasing supporting stiffness of the cross hinges.

### Conclusion

In this article the design and evaluation of a 2-DoF elastic stage is discussed. The specification of a third natural frequency higher than 100 Hz has only been met around the central position of the end-effector. Outside this central position, the supporting stiffness of the cross hinges decreases, and therefore the third natural frequency of the mechanism decreases. Ansys FEM and SPACAR models show good agreement on mode shapes and frequencies, but with the current models it is difficult to do accurate modal analysis outside the central position. While this result is not satisfactory according to the specifications, this behaviour was expected beforehand and confirms the theory. The results can be used to get a better insight in the behaviour

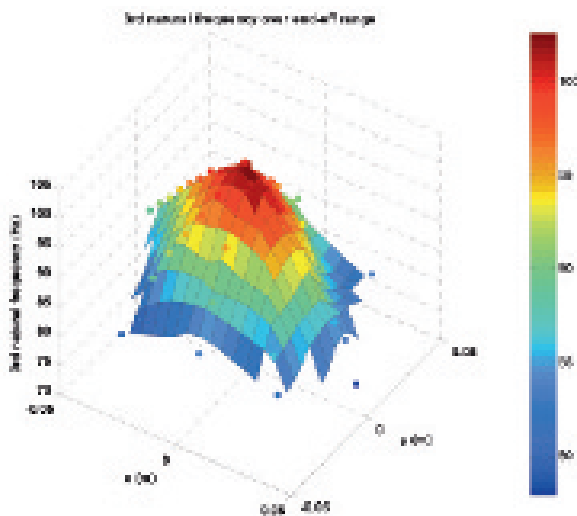


Figure 11. Measured third natural frequency over the workspace.

of large deflections in mechanisms. Furthermore, the set-up and measurements can be used to validate future modeling techniques.

To improve the performance of the mechanism, new research has been started to investigate other flexure hinges that have a lower drop in stiffness when rotated.

For more information and some movies of the mechanism, go to <http://goo.gl/HUV6i>.

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# Craftsmanship CNC cutting

*Some people might think that modern CNC cutting technology would make old-fashioned craftsmanship redundant, considering that even a child could put a well-made computer program into a CNC machine to start an automatic cutting cycle with the aim of creating a precision product. Nothing is further from the truth, however, given the unpredictable factors that could influence the ideal cutting process, e.g. when trying to achieve a wall thickness of no more than 100 µm, resulting in deformation. Bakker Fijnmetaal in Son, near Eindhoven, the Netherlands, makes full use of the craftsmanship of experienced cutting specialists to overcome the problems that are inherent when deviating from the ideal process.*

• Frans Zuurveen •

Joop Bakker founded his precision workshop in 1970. Born in 1942, he considered stepping down from his position as an active director at the turn of the 21st century. He also thought about the future of his firm in a market with increasingly stringent and challenging precision technology

#### Author's note

Frans Zuurveen is a freelance text writer who lives in Vlissingen, the Netherlands.

demands. As part of his evaluation process, he held intensive brainstorming sessions with John Settels and Gustaaf Savenije of Settels Savenije van Amelsvoort, an engineering office with management and technology consultants specialised in the design of precision products.

As a result of these talks, Settels Savenije van Amelsvoort invested in Bakker Fijnmetaal, creating a new future for the company. The company invests in new precision cutting machinery, see Figure 1, and is cooperating with designers of Settels Savenije's company.

# perfects technology



Figure 1. Latest investment at Bakker Fijnmetaal, the Swiss-type automatic turning machine Cincom.

## New management

As a logical consequence of the new Bakker Fijnmetaal philosophy, a young, inventive and ambitious managing director called Dirk Dona was appointed. As the son of former Philips Research inventor Rine Dona, creating and manufacturing precision technology products is in his genes; see Figure 2. He states that Bakker Fijnmetaal concentrates on cutting technology, in particular milling and turning. Precision honing is a rather new process in the firm, especially for improving the accuracy of long and narrow borings.

Dona: "We want to offer unique solutions for cutting problems. Crossing the boundaries of our precision technology, we create products that seem to be impossible to manufacture. For our medical clients we manufacture products on our precision machines, and finish them by hand using microscopes. We have no qualms about using a



Figure 2. Bakker Fijnmetaal's director Dirk Dona showing a precision product in the firm's measuring room with a Zeiss computer-aided measuring microscope.

wooden stick with abrasive paste to remove nearly invisible burrs that might impact the application. Therefore, it is mostly women doing this work with their keen eyes and perceptive fingers (see Figure 3).

We also have some slightly older, experienced craftsmen, who instruct younger cutting machine operators. They teach them to make small adjustments to the ideal cutting process of CNC programs. Deviations from that process might be due to material deformations by cutting tool forces and generated heat. Other problems we tackle in this way are related to the use of 'difficult & complex materials' like oxygen-free copper, titanium, special steels, etc."





Figure 3. One of the women at Bakker Fijnmetaal packing very small medically applied needles. She is also very experienced in finishing products by hand.

### Design together

A fine example of a manufacturer and a designer collaborating – in this case Bakker Fijnmetaal and K.U. Leuven University (Belgium) – is the design and manufacture of the frame for a metrological AFM (Atomic Force Microscope). The drawing made by Leuven University of the upper plate of the frame shows position tolerances of 20  $\mu\text{m}$  for most of the borings. Figure 4 shows the final product according to that drawing.

For Bakker, this manipulation stage is a ‘one-off’. However, most of Bakker’s products are manufactured in small or medium-sized batches. The company is fully equipped to work in a 24/24 operation, see the loading robot of Figure 5. The rough blanks of Figure 6 are provided with a kind of dovetail for fixing them on the robot carrousel. Figure 7 shows a CNC lathe, which may also function in connection with an automatic loading and unloading mechanism.



Figure 4. A final workpiece of the AFM frame.

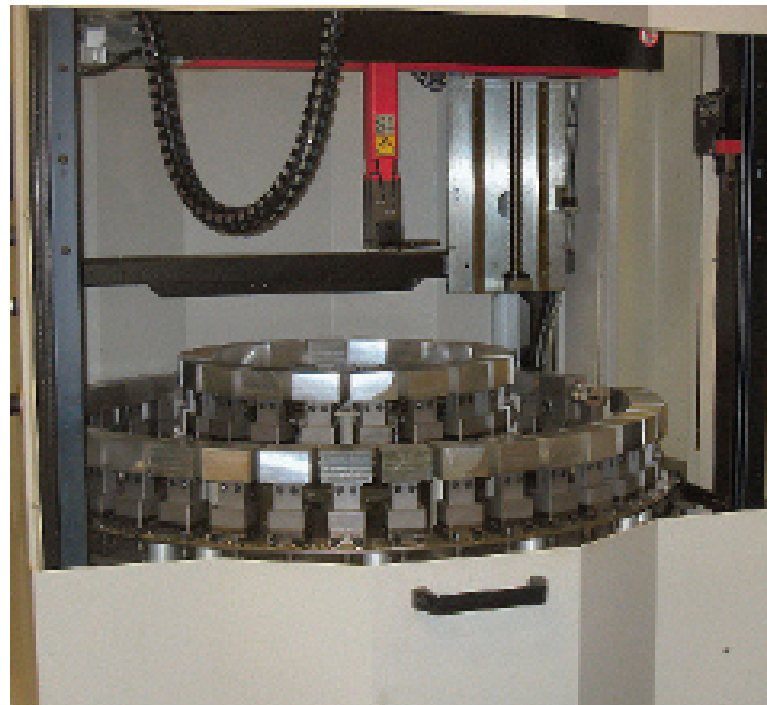


Figure 5. A System R loading robot for feeding rough blanks into a milling machine and taking out the milled products.

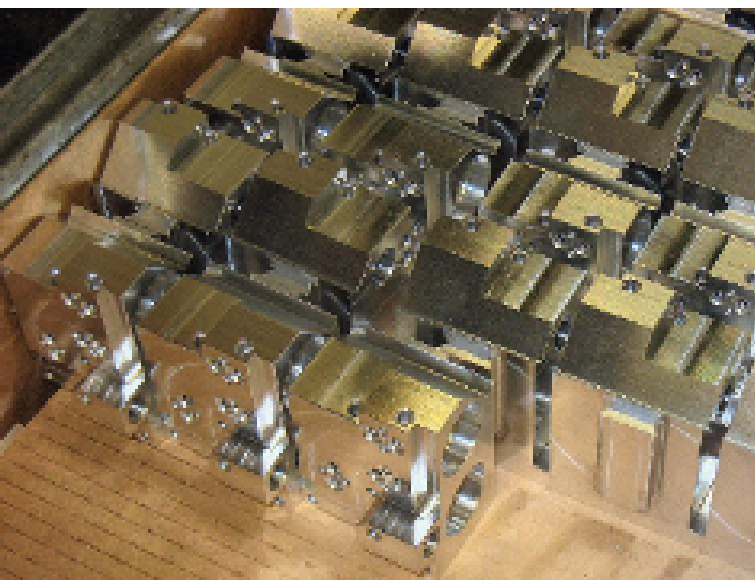


Figure 6. Products with the rough blank 'dovetail' shown at one side.



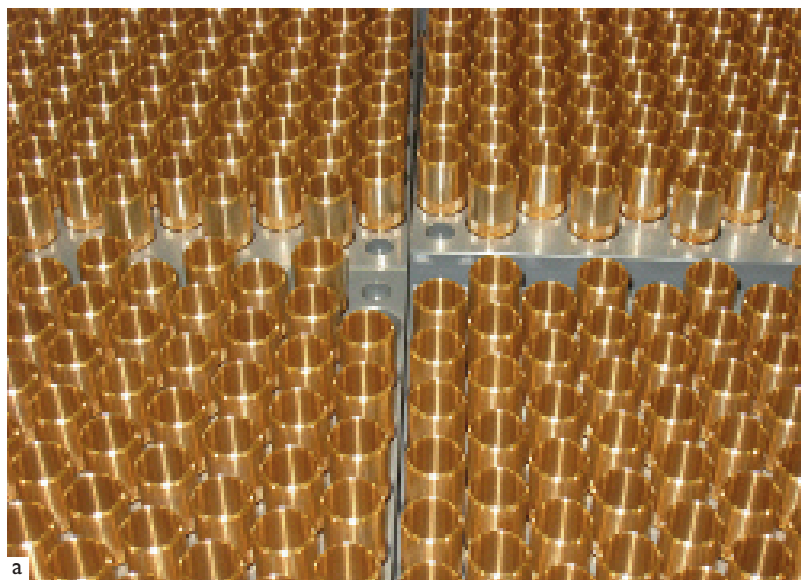
Figure 7. A Deco 13A (Tornos) CNC lathe for turning long products.

### More examples

As you might expect, information regarding many of the products manufactured by Bakker Fijnmetaal is confidential. Nevertheless, to the interested precision engineer, the pictures in Figures 8 and 9 tell their own story.

Figure 8. Samples of Bakker Fijnmetaal's areas of expertise.

- (a) Automotive parts with a small wall thickness made from brass.
- (b) A small part for electronic components.
- (c) Milling a product with aluminium cooling fins does not impose any problem.



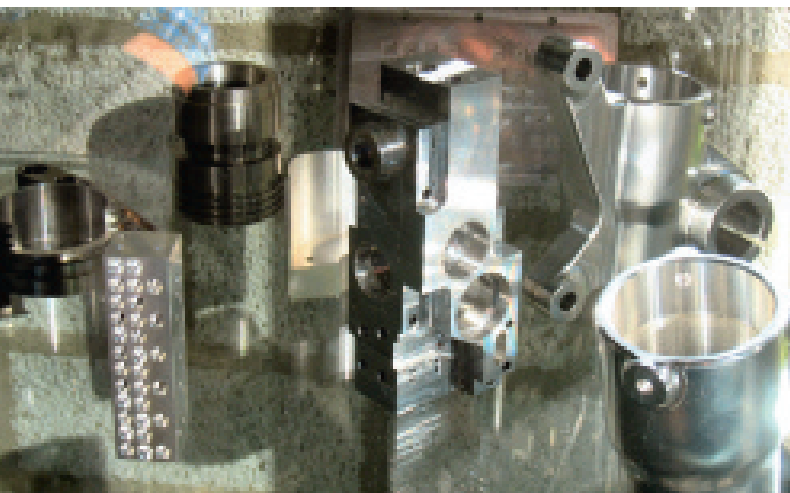


Figure 9. An overview of the precision products produced by Bakker Fijnmetaal using advanced cutting technology.

### To conclude

Should craftsman- or womanship really be deemed old-fashioned? Strictly speaking, no. That's why it's better to regard Bakker Fijnmetaal's skilled finishers as an essential addition to modern sophisticated CNC cutting machinery, rather than unjustly viewing their work as old-fashioned.

### Information

[www.bakkerfm.nl](http://www.bakkerfm.nl)



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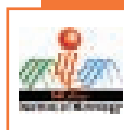
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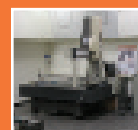
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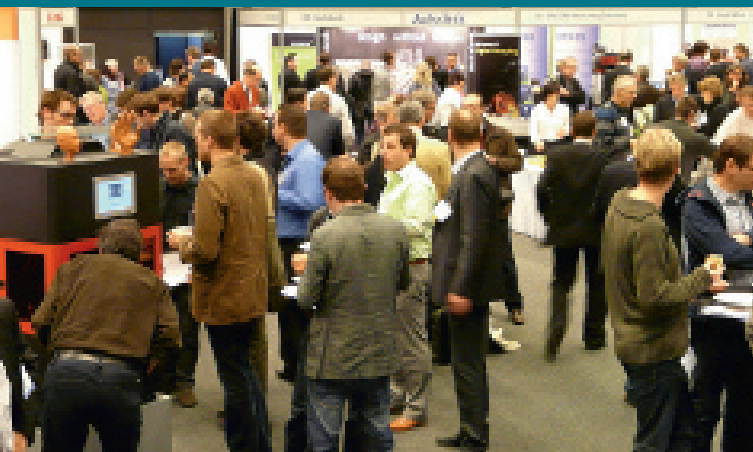


# Rapid developments in additive manufacturing

**T**he application areas of additive and 3D technologies are growing rapidly, both in industry and in consumer markets. Major applications can already be found in medical devices, the dental industry, design, art, the jewel industry, machinery, tooling, automotive, aerospace, construction and model architecture. These technologies are also used whenever prototyping, low-volume manufacturing, mass customisation and a shorter time to market play an important role. Access to these techniques for consumer applications is on the verge of a breakthrough. The growing variety of applicable materials, increasing accuracy, larger building volumes and lower costs have improved commercial availability.

However, not enough people are aware of these rapid developments, which enable wider applications of additive manufacturing and other 3D technologies. RapidPro, therefore, is bringing industry and science together to inform visitors about the latest developments and possibilities of the various technologies. RapidPro is the annual event for the entire chain of rapid product development, rapid prototyping and rapid production.

RapidPro visitors include designers, prototyping specialists, technical directors, developers, product managers, purchasing officers, consultants, R&D people and other specialists working in the application areas mentioned above and in other relevant markets. RapidPro 2012 will



Impression of RapidPro 2011.

be held on Wednesday, 25 and Thursday, 26 January 2012 at the NH Conference Centre Koningshof in Veldhoven, the Netherlands.

[www.rapidpro.nl](http://www.rapidpro.nl)

## Engenia Advisory Board

Engenia provides academic courses for companies in the high-tech or processing industry. Engenia is part of Mikrocentrum and is situated at the High Tech Campus in Eindhoven, the Netherlands. It runs open registration courses as well as in-company ones all over the Benelux.

Engenia's aim is to run unique and innovative courses within the Benelux. To oversee course development, Engenia has set up an Advisory Board, members of which include Prof. Fred van Houten, Chair in Design Engineering, University of Twente; Prof. Bert Lauwers, Division Production Engineering, Machine Design and Automation, K.U.Leuven University, Belgium; Prof. Daniel Rixen, Department Precision and Microsystems Engineering, Delft University of Technology;

and Ir Herman Soemers, Mechatronics Technology Manager, Philips Innovation Services. The board will appoint a new president every year. This year's president is Dr Egbert-Jan Sol, Director of Innovation, High-Tech Systems and Materials, TNO.

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This year's Engenia Advisory Board president, TNO's Egbert-Jan Sol.

# Singapore and big in precision

*In the past, the Swiss were famous for precision in mechanical systems, watch making. Today, the Dutch play a world-class role in precision in High Tech Systems. ‘Dutch Precision’, is the slogan with which the Netherlands wants to claim this leading role in the world. The ‘Dutch Precision’ slogan attracts Singapore, the most competitive country in Asia, to come to the Netherlands and find R&D, technology, manpower and business partners in the Dutch precision engineering sector.*

On 14 October, a roundtable discussion was held between SPRING Singapore-Precision Engineering division and the Dutch Society for Precision Engineering (DSPE). This meeting also included the Enterprise Europe Network, Syntens, the Chamber of Commerce The Hague, and other sector-related companies. SPRING Singapore is the enterprise development agency for growing innovative companies and fostering a competitive SME sector.

## DSPE

Hans Krikhaar, president of DSPE, welcomed the representatives from Singapore and shared the latest sector developments in the Netherlands by emphasising: “DSPE is the joint effort of a precision engineering community, SMEs, institutes and universities. We aim to promote technology, innovation and knowledge transfer, leading to a professional network with peer recognition”. DSPE is actively promoting the Dutch precision engineering sector via multiple channels, like the Young Precision Network, Supply Chain Program, Summer school, Certification Program and the informative magazine Mikroniek. Hans Krikhaar invited SPRING Singapore’s companies to join the summer school programme for knowledge exchange. SPRING Singapore also welcomed the shipping of Mikroniek magazines to the precision engineering community in Singapore.

## Brainport

Hans Krikhaar highlighted the Brainport industries in the Eindhoven region, which was recently appointed the “Intelligent Community of the Year” by the Intelligent Community Forum. Precision engineering and other high-tech clusters are well facilitated in this region. The Brainport industries provide a powerful supply chain base for a worldwide high tech network. Ernst Treffers, Director Business Development of Eindhoven-based Xpress Precision Engineering, presented a case study on his company. Xpress is unique in focusing on probing systems for ultra-precision metrology. It started in December 2007 as a spin-off from Eindhoven University of Technology and has customers in Europe, Asia and the USA. The company is very open to cooperation with Singaporean business partners.

## SPRING Singapore

In addition to highlighting the industry trends and developments in Singapore, SPRING Singapore’s Centre Director (Europe) Yee Teck Tan, as well as Manager (Precision Engineering) Michelle Lee also shared on the many common areas of interest and focuses in the precision engineering industries between the Netherlands and Singapore. They also presented the businesses on behalf of ten Singaporean enterprises from the precision engineering sector to the Dutch participants.

# the Netherlands, engineering

“Singapore’s geographical location, connectivity to other parts of Asia, as well as its diverse supplier base and well-established R&D infrastructure makes it an attractive location for market access and partnerships. We are a key hub for precision engineering and complex equipment manufacturing, supporting not only the manufacturing sector in Asia but also the global market. Our companies in the precision engineering field have strong engineering and manufacturing capabilities, and are keen to explore partnerships with Dutch companies with strong technologies and design capabilities to jointly serve the Asian and European marketplace.” In view of the increasing activities for the engineering and manufacturing industries in South-East Asia, there are opportunities for Dutch-Singapore business and technology collaborations. SPRING Singapore will follow up with DSPE to explore link-ups with its 300 member companies.

## Holland Gateway

This event was organised and facilitated by Holland Gateway. The network point for international business founded by the Dutch government as well as private parties, aims to help creating an environment that is conducive to doing international business, as well as a

dialogue for international governmental organisations, knowledge institutions and enterprises.

(report by Kaikai Jing of Holland Gateway)

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DSPE president Hans Krikhaar addresses the Singaporean delegation.

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### **29 November 2011, Delft (NL) Zuid-Holland Instrumentation Event**

The focus of the event will be on sensor technology innovation. See also the article on Holland Instrumentation Delta in the previous Mikroniek issue.

[www.tno.nl](http://www.tno.nl) , [zie@fme.nl](mailto:zie@fme.nl) (information)

### **30 November - 1 December 2011, Veldhoven (NL) Precision Fair 2011**

Eleventh edition of the Benelux premier trade fair on precision engineering. Some 200 specialised companies and knowledge institutions will be exhibiting in a wide array of fields, including optics, photonics, calibration, linear technology, materials, measuring equipment, micro-assembly, micro-connection, motion control, surface treatment, packaging, piezo technology, precision tools, precision processing, sensor technology, software and vision systems. The Precision Fair is organised by Mikrocentrum, with the support of DSPE, NL Agency and media partner Mikroniek.



See the official fair catalogue in this issue.

[www.precisiebeurs.nl](http://www.precisiebeurs.nl)

### **30 November - 1 December 2011, Bremen (DE) Lamdamap 10th International Conference and Exhibition**

Event focused on laser metrology, machine tool, CMM and robotic performance.

[www.lamdamap.com](http://www.lamdamap.com)

### **25-26 January 2012, Veldhoven (NL) RapidPro 2012**

The annual event for the total additive manufacturing, rapid prototyping and rapid tooling chain. See also the Mikrocentrum page in this issue.

[www.rapidpro.nl](http://www.rapidpro.nl)



### **27-28 March 2012, Nieuwegein (NL) Fotonica Evenement**

The sixth edition of the Photonics Event is organised by Mirocentrum and Photonics Cluster Netherlands. The event forms the bridge between new technologies (such as LEDs, microscopy and lasers) and innovative applications, and is targeted at researchers, scientists, entrepreneurs, CEOs, policy makers and science students. Conference themes include Health & Life Science, Information & Communication Technology, Photonics in Daily Life, Lighting, Industrial Photonics, and Solar.



[www.fotonica-evenement.nl](http://www.fotonica-evenement.nl)

**29 March 2012, Veldhoven (NL)  
Hightech Mechatronica 2012**

Techwatch, publisher of Bits&Chips and Mechatronica Magazine, organises the sixth edition of this event. Research, development and implementation of mechatronic systems are the main themes of the conference and exhibition.

[www.hightechmechatronica.nl](http://www.hightechmechatronica.nl)

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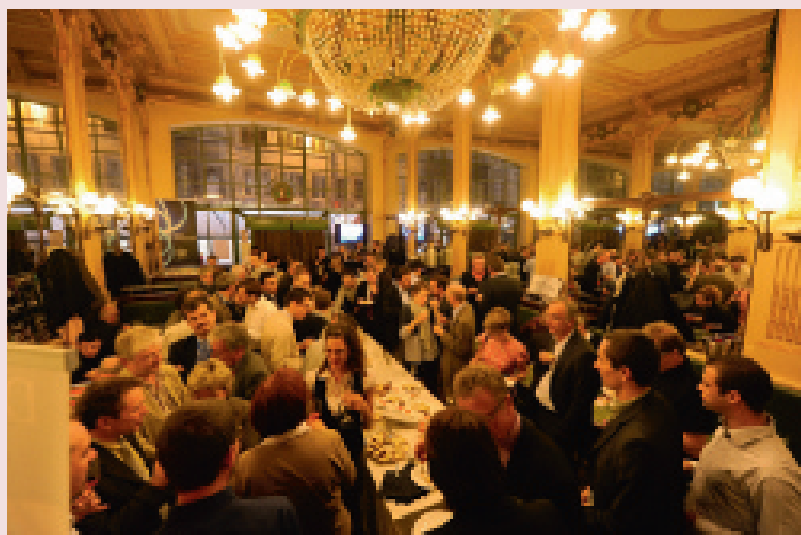


Impression of the euspen 11th International Conference and Exhibition, May 2011 in Italy. (Photo courtesy euspen)

**25-28 September 2012, Besançon (FR)  
Micronora 2012**

The biennial microtechnology and precision trade fair features multiple activities – from assembly, engineering and machining to metrology and nanotechnology – for markets with high technological value, including aerospace, (bio)medical, microelectronics and telecommunications. The event includes conferences and a European technology brokerage event on micro- and nanotechnology. Micronora 2010 attracted over 14,000 visitors and 565 direct exhibitors (200 from abroad), with a further 300 firms or brands represented.

[www.micronora.com](http://www.micronora.com)



Overview of the social event of Micronora 2010 in a very nice art-deco restaurant in the old town of Besançon. (Photo: ARIST)

## New book: “The Design of High Performance Mechatronics”



Delft University of Technology, the Netherlands, and previously worked at Philips and ASML. Georg Schitter is

professor in Industrial Automation at Vienna University of Technology, Austria, specialised in the control and design of extremely fast precision motion systems. Jan van Eijk is the Delft professor in Advanced Mechatronics and an industrial advisor with experience at Philips.

An in-depth review will be published in the forthcoming issue of Mikroniek.

Robert Munnig Schmidt, Georg Schitter and Jan van Eijk, “The Design of High Performance Mechatronics – High-Tech Functionality by Multidisciplinary System Integration”, Delft University Press (an imprint of IOS Press), ISBN 978-1-60750-825-0 (print), ISBN 978-1-60750-826-7 (online).

[www.dupress.nl](http://www.dupress.nl)

For over half a century, the application of mechatronics has enhanced our lives with functionality based on the integration of electronics, control systems and electric drives. A new book by professors Munnig Schmidt, Schitter and Van Eijk deals with the special class of mechatronics that has enabled the exceptional levels of accuracy and speed of high-tech equipment applied in the semiconductor industry, realising the continuous shrink in detailing of micro-electronics and MEMS.

As well as the more frequently presented standard subjects of dynamics, motion control, electronics and electromechanics, this book includes an overview of systems engineering, optics and precision measurement systems, in an attempt to establish a connection between these fields under one umbrella.

Robert Munnig Schmidt is professor in Mechatronic System Design at

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Robert Munnig Schmidt is professor in Mechatronic System Design at Delft University of Technology with industrial experience at Philips and ASML in research and development of consumer and high-tech systems.



Georg Schitter is professor in Industrial Automation at Vienna University of Technology with a standing track record in research on the control and design of extremely fast precision motion systems such as video rate AFM systems.



Jan van Eijk is professor in Advanced Mechatronics at Delft University of Technology and an industrial advisor with experience at Philips in the research and development of consumer and high-tech systems.



ISBN 978-1-60750-825-0 (print)  
ISBN 978-1-60750-826-7 (online)

Delft University Press is an imprint of IOS Press

## TNO supports NTS-Group's developments toward precision

As a system supplier, the Dutch NTS-Group not only provides engineering and assembly services but also produces critical components, using such techniques as precision machining. For that reason, the recently acquired Schaijk-based machining company GMZ Precision was merged with NTS Mans in Bergeijk. Having since moved to Eindhoven, the newly created NTS Precision meets all the precision machining needs of the OEMs.

To speed up the further development of this precision machining competence, the NTS-Group entered into a joint venture with TNO.

TNO has years of experience with high-precision machining, for which it has its own dedicated machines. TNO's high-precision Hembrug machine will be moved to NTS Precision, where TNO will instruct employees on its use. The resulting knowledge transfer is very much in line with TNO's objective. At the same time, the machine will still be available for TNO to carry out research into machining of new materials, for example, keeping TNO's options open to share the resulting knowledge with other SMEs.

[www.nts-group.nl](http://www.nts-group.nl)  
[www.tno.nl](http://www.tno.nl)



## Measuring changes in length in the order of 1/1000 of an atom

TNO researchers have developed a fibre-optic strain sensor that can detect a change in strain in the order of pico-strain. This extremely sensitive sensor is based on fibre laser technology. For a 30mm fibre laser, for example, one pico-strain corresponds to a change in length of one billionth of 30 mm. This is approximately 1/1000 of an atom.

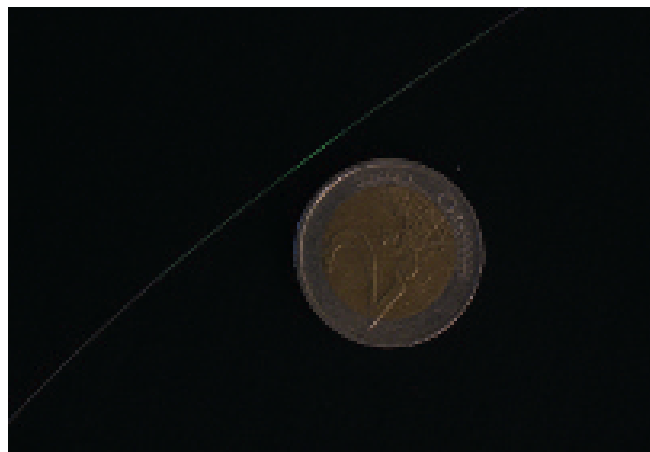
Possible applications for this ultra-sensitive sensor technology can primarily be found in the markets for lithography, space travel, astronomy, defence and the oil & gas industry. In the lithography market, a fibre laser strain sensor system could determine the slightest distortion of critical parts of a lithography machine, thereby ensuring that an even more precise design can be made for better and quicker computer chip production. When developing instruments for space travel and astronomy, there is a constant demand for more stable and fixed instruments such as telescopes. With the aid of the fibre laser strain sensor, distortion can be measured in a significantly better manner and, therefore, also be corrected. By using

a fibre laser in a hydrophone array, which would enable submarines to be tracked for example, it is possible to significantly reduce the dimensions and weight of the array whilst maintaining system sensitivity. There is also interest in a hydrophone system for monitoring oil fields.

TNO has a long tradition of developing fibre sensor systems based on fibre interferometry and fibre Bragg grating (FBG) technology. An FBG contains a grating, or screen, that reflects a certain wavelength. When that screen is stretched, the wavelength shifts somewhat. That shift is an indicator for the strain. TNO has developed a detection system for FBG with which subnano-strain can be measured. Along with a specially designed mechanical construction, sensors can be produced for other derived parameters, such as pressure and acceleration. For example, recently TNO presented the smallest FBG pressure sensor in a series for measuring blood pressure in blood vessels, the heart and the brain. However, an even higher sensitivity is required for many other applications,

for which fibre laser sensor development was launched in 2010. With the aid of this new fibre laser technology, sensors that are 100 times more sensitive than a standard FBG sensor can be developed and built.

[www.tno.nl](http://www.tno.nl)



TNO's extremely sensitive sensor is based on fibre laser technology.

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## Optical measurement system with white light interferometer

Mitutoyo showcased an innovation in the field of optical measurement during the international measurement technology trade fair Control 2011 in Stuttgart – a first for the European market. It combined optical measurement with a ‘white light interferometer’.

The Quick Vision optical systems have been designed for automatically checking medium to large series of products in metrological laboratories and production environments. They produce clearer images with effective border detection. A special projection method enables focusing on surfaces with little contrast. In addition to the optical system, the Quick Vision Hyper WLI model is equipped with a ‘white light interferometer’, a sensor that is capable of recording surfaces with a very high resolution with a single move of the instrument. This makes it possible to recognise, move and turn microstructures and microgeometries on the workpiece surface.

The white light interferometer is used for contact-free measurement of the topography of workpieces with a high spatial depth resolution. It can also measure multi-stage surfaces or even rough ones. A measurement accuracy in the order of a few nanometers is possible for smooth surfaces. The combination of a white light interferometer with optical

measurement offers major advantages in comparison with stand-alone white light interferometers, as the image recording position can be determined and achieved with high precision. Individually recorded images or scatter plots can be easily combined at a later stage.

[www.mitutoyo.nl](http://www.mitutoyo.nl)



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## Solution for difficult-to-measure silicone samples

American company FMI produces molded silicone components for medical applications. Intricate features and key dimensions of tiny silicone prototype and (pre-)production parts are measured optically using a Nikon Metrology iNexiv system. According to FMI engineers investigating parts under Nikon optics and illuminations results in superior digital imaging that guarantees high accuracy, despite the typical light glow covering the transparent silicone material. Automatic iNexiv inspection (based on intelligent search capabilities and pattern recognition, and using fast stage controls) triples measurement productivity and eliminates human error, so Nikon Metrology claims.

To comply with qualification processes that ensure silicone material cleanliness, part shape integrity and the lowest

failure rates, FMI uses the table-top iNexiv system from Nikon Metrology, a high-performance CNC precision video measuring system. FMI demands an optical system because silicone parts are too soft to be measured using a touch probe.

Over the years, the complexity of the parts has increased tremendously. FMI invests in state-of-the-art processes and equipment to deliver the sophisticated ultra-clean silicone product required for surgical implantation. "High precision and process validation is key in the medical device business, to make sure critical silicone parts can be confidently incorporated into lifesaving medical devices and state-of-the-art laboratory equipment", remarks Harold Sant, Engineering Manager for FMI.

[www.nikonmetrology.com](http://www.nikonmetrology.com)



The Nikon Metrology iNexiv system generates high-quality images of difficult-to-measure silicone samples.



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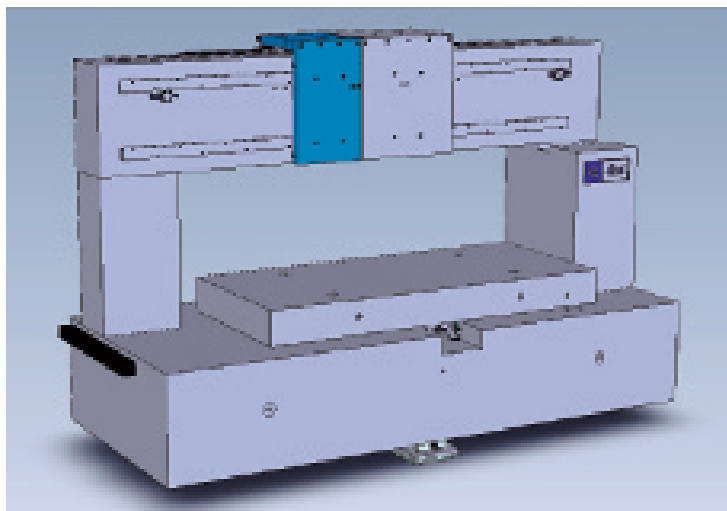
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## Long Trace Profilometer



Following the success of similar systems in European synchrotrons, Q-Sys recently secured the contract to supply a Long Trace Profilometer bench to Brookhaven National Laboratory (BNL) in New York, NY, USA. BNL are in the process of constructing NSLS II, a new state-of-the-art light source as a successor to

the existing 30-year old facility at the historic Long Island site.

The mirrors used in a light source of this size and power must all be characterised precisely to ensure their performance in steering and focussing the beam. The Q-Sys optical metrology bench is a key tool in this measuring

process. The mirrors can be anything up to a meter or more in length with a mass of up to 150 kg. The bench carries the mirror on its lower slide, which enables it to be positioned precisely before each longitudinal scan. Then the specially designed upper carriage scans a pentaprism along the length of the mirror to enable laser instruments to record the surface profile. The solid granite structure ensures a stiff and stable relationship between the two axes and produces a system with a high resistance to minor thermal variations.

The length of travel required dictates a long optical path, meaning that the precision of the motion platform is critical, particularly with regard to angular errors. The system has to measure both flat and curved mirror surfaces in the nanometer range with superb stability and repeatability.

[www.q-sys.eu](http://www.q-sys.eu)

## High-quality laser cutting and engraving

Kern Lasers, a leading manufacturer of large-format laser cutting and engraving equipment, has adapted their systems for the European market. Kern offers a laser system with 150 W laser power, that can cut both acryl and wood (up to 19 mm thick) as well as steel (RVS 1.9 mm and soft steel 2.5 mm thick). The system ensures high-performance markings/engravings with photo-quality. The vast number of 3D functions in the software allow very precise depth control. The systems combine fast engraving speeds and consistent beam power and beam quality over the

entire table top for laser cutting and laser engraving.

For Laser 2000, specialised in the distribution of lasers, laser-based systems and other optical equipment, this is a welcome addition to the existing line of laser cutters from Universal Laser Systems.

[www.laser2000.nl](http://www.laser2000.nl)

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# Technolution – innovative design solutions

*Since almost 25 years, Technolution provides innovative design solutions to major high-tech companies, specialising in the development of innovative and cost-effective technology for complex problems.*

Technolution invests time and effort in order to find the path to success for our clients and to help them follow it. Our ambition is to create lasting partnerships with our clients based on joint success. The development of solutions is organised in projects. Clear agreements are made in advance regarding functionality, performance, costs and planning. If desired, we offer feasibility studies and analysis of requirements and specifications. Technolution can also arrange the entire supply chain for the products developed, as well as performing life cycle management.

## Passion for technology

Technolution's employees are technically gifted and have a passion for technology. They like to dig right down to bit level, they work as a team and they are constantly developing new skills. Integrated project management of multidisciplinary teams, including partner companies, is embedded in our development approach. This is the key success factor in devising high-quality solutions to challenging problems within the high-tech industry.

### Expertise

- Requirement analysis
- Feasibility studies
- System architecture
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  - analog and mixed-signal electronics
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  - electronics for harsh environments
  - power electronics
  - programmable logic and FPGA design
  - embedded software
  - mechanics
- Verification, qualification and certification
- Production preparation and fulfilment

## Competences

Solutions developed by Technolution can be found in many market segments, including medical imaging and treatment solutions, semiconductor equipment, professional printing machines, laboratory equipment and utility machines. The applications focus on high-speed data acquisition and data processing, motion control and complex power supplies. We possess years of expertise in complex and innovative designs that require digital data processing using high-speed data paths, mixed-signal electronic designs and high-efficiency power drives.

## Motion-control platforms

For the development of high-performance motion-control platforms, Technolution combines its analog-electronics expertise in high-efficiency power stages with its knowledge of position, proximity and velocity sensors. The innovative approach to digital signal processing combines flexibility of model-based software-development tools with the performance and reliability of hard-wired solutions. This way, clients can achieve best-in-class control performance at minimal development costs. Technolution's solutions can be applied for all sorts of motor drives, including piezo motors. The medical-grade motion-control platforms comply with the most stringent safety standards and are used in treatment systems.



Technolution headquarters in Gouda, the Netherlands.

### Information

[www.technolution.eu/high-tech](http://www.technolution.eu/high-tech)



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November 30 and December 1

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# Precision Fair 2011

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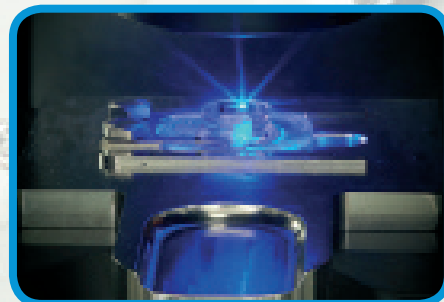
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## Trade fair & Conference

30 November and 1 December 2011  
NH Conference Centre Koningshof, Veldhoven, Netherlands



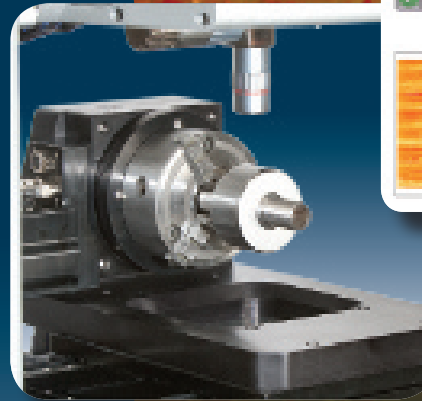
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# Quantifiable Lead Angle Metrology



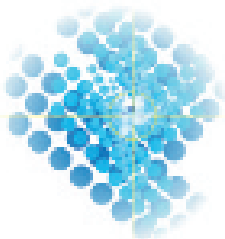
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# Fast and accurate



## Precision Fair 2011

Precision Fair has grown into *the* event on precision technology and has already acquired an international reputation.

### Lecture programme

This year, 'Fast and accurate' will be the recurring theme of the main lectures. The set-up of the lecture programme has been changed to accommodate highly topical subjects. Besides lectures by exhibitors, four topics will be covered by renowned keynote speakers: overactuation/actuators, haptic systems, micromanufacturing, and a selection of IOP projects (IOP is the recently finished Innovation-oriented Research Programme Precision Technology, funded by Agentschap NL).

### Technology Hotspot

For the fifth consecutive year, Mikrocentrum is organising the 'Technology Hotspot' at the Precision Fair. Universities, universities of applied sciences and research institutions from the Netherlands, Belgium and Germany will be presenting their research in the field of precision technology and related areas. Scientists will also play a crucial role in the lecture programme. The Technology Hotspot will be supported by Agentschap NL.

### Brokerage Event for SMEs

For the third year, a Brokerage Event for SMEs from all over Europe will be organised.

### Largest Benelux precision trade fair

During the trade fair, some 200 specialised companies and knowledge institutions from the Netherlands, Belgium, Germany and other countries will be exhibiting in a wide array of fields: optics, photonics, precision etching, high-precision mechanics (micron range), nanotechnology, micro-systems technology (MST), mechatronics, embedded software, micro-assembly, micro-laser processing, micro-connection, sensor technology, motion control, vision systems, materials (composites, ceramics), precision machining, measuring machines, and piezo technology.

### Precision Fair 2011

Organised by Mikrocentrum, the eleventh edition of the Precision Fair (or *Precisiebeurs*, in Dutch) will be held in NH Conference Centre Koningshof in Veldhoven, the Netherlands, on 30 November and 1 December 2011. The

### Date

Wednesday 30 November and Thursday 1 December 2011 from 9.30 a.m. to 5.00 p.m.

### Location

NH Conference Centre Koningshof  
Entrance Beneluxhal  
Locht 117  
5504 RM Veldhoven (near Eindhoven)  
The Netherlands

### Visitor registration

You can register for this event and the congress via [www.precisiebeurs.nl](http://www.precisiebeurs.nl).

After receiving your registration, a confirmation letter will be sent including your badge.

### Free at the Precision Fair 2011

Entrance to the fair – entrance to the lecture programme – valuable (digital) fair reference material – fair catalogue – coffee/tea – parking.

### Organisation and Information

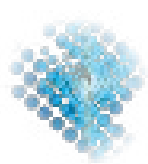
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Visitor information: Jolanda van de Vorst

Exhibitor information: Hans Houdijk



**BRANCHE ORGANISATION**

- 61 DSPE
- 148 DUTCH PRECISION TECHNOLOGY (DPT)
- 46 FMI PRECISION BV
- 165 HOLLAND INNOVATIVE BV
- 65 STICHTING APPLIED PIÉZO
- 190 SYNTENS / ENTERPRISE EUROPE NETWORK NETHERLANDS
- 79 WTS BENELUX BV

**CALIBRATION**

- 121 CARL ZEISS INDUSTRIAL METROLOGY
- 54 D&M VACUÜMSYSTEMEN BV
- 50 FARO BENELUX BV
- 12+13 HEXAGON METROLOGY BV
- 136 IRMATO
- 37 KISTLER BV NETHERLANDS
- 133 LASER 2000 BENELUX CV
- 7 MITUTOYO NEDERLAND BV
- 104 MOLENAAR OPTICS VOF
- 119 MYTRI BV
- 65 NANOMOTION LTD
- 139 PROMIS ELECTRO-OPTICS BV
- 160 RENISHAW BENELUX BV
- 118 ST INSTRUMENTS BV
- 36 STEEN METROLOGY SYSTEMS NV
- 12+13 TESA BENELUX
- 138 VSL
- 121 W.J. ROELOFS MEETINSTRUMENTEN BV
- 102 WENZEL BENELUX

**HIGH-PRECISION MACHINERY**

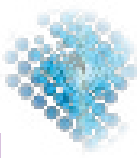
- 195 3TU
- 94 AAE BV
- 6 AALBERTS INDUSTRIES INDUSTRIAL SERVICES
- 80 ACE STÖßDÄMPFER GMBH
- 87 AEROTECH
- 14 ALL MEPP BV
- 143 AXXICON MOULDS EINDHOVEN BV
- 151 BAKKER FIJNMETAAL
- 77 BENDERTECHNIEK BV
- 117 BKL ENGINEERING BV
- 62 BRAINPORT INDUSTRIES
- 25 BRANDT FIJNMECHANISCHE INDUSTRIE BV
- 100 CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
- 120 CERATEC TECHNICAL CERAMICS BV
- 23 CUSTOM SPECIAL TOOLS BV
- 23 CZL TILBURG BV
- 54 D&M VACUÜMSYSTEMEN BV
- 114 DOEKO BV
- 113 DYMATO BV
- 58 EMCMCC
- 116 ERTEC BV
- 184 ESI-CIT GROUP
- 6 F.I.V. BV
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- 28 GELDERBLOM CNC MACHINES BV
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- 172 GILEON TECHNICAL COMPONENTS
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- 43 LEMO CONNECTORS BENELUX
- 156 LEUVEN AIR BEARINGS
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- 167 MAAN GROUP
- 182 MAGNETIC INNOVATIONS BV
- 60 MAKE-MACHINING TECHNOLOGIE
- 38 MARTEK BVBA
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- 24 MECHAPHYSICS BV
- 6 MFK BV
- 182 MI-PARTNERS
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- 6 MOGEMA BV
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- 119 MYTRI BV
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- 65 NOLIAC A/S
- 16 NORMA
- 65 NPOINT INC.
- 26 NTS-GROUP BV
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**HIGH-PRECISION MECHANICS  
(MICRON RANGE)**

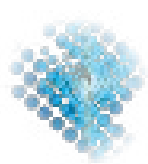
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- 120 CERATEC TECHNICAL CERAMICS BV
- 98 CVI MELLES GRIOT





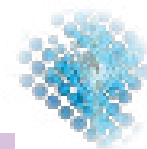
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 156 LEUVEN AIR BEARINGS  
 162 LEVES METAAL BV  
 90 LM SYSTEMS BV  
 130 LOUWERS & HANIQUE  
 134 MA3 SOLUTIONS BV  
 167 MAAN GROUP  
 99 MACHINEFABRIEK GEBRS. FRENCKEN BV  
 24 MECHAPHYSICS BV  
 122 MEVI BV FIJNMECHANISCHE INDUSTRIE  
 6 MFK BV  
 6 MIFA ALUMINIUM  
 182 MI-PARTNERS  
 6 MOGEMA BV  
 104 MOLENAAR OPTICS VOF  
 163 MTSA TECHNOPOWER  
 119 MYTRI BV  
 65 NANOMOTION LTD  
 71 NEITRACO GROUP  
 175 NEWAYS TECHNOLOGIES BV  
 30 NIJDRA GROEP (FMI)  
 65 NOLIAC A/S  
 16 NORMA  
 65 NPOINT INC.  
 26 NTS-GROUP BV  
 99 OPTIWA BV  
 11 PHILIPS INNOVATIVE APPLICATIONS NV  
 65 PIEZOMECHANIK GMBH  
 85 PM-BEARINGS BV  
 180 PRODUTEC BV  
 78 QIOPTIQ PHOTONICS GMBH & CO KG  
 103 Q-SYS BV  
 142 RELIANCE PRECISION MECHATRONICS  
 160 RENISHAW BENELUX BV  
 155 ROMÉDES ENGINEERING BV  
 75 SCHAEFFLER NEDERLAND BV  
 40 SCHNEEBERGER GMBH  
 42 SCHUT PRECISIONPARTS BV  
 118 ST INSTRUMENTS BV  
 159 STT PRODUCTS BV  
 82 TECHNOBIS GROUP  
 6 TECHNOLOGY TWENTE BV  
 145 TECNOTION BV  
 52 TEESING SUBMICRON TECHNOLOGY  
 134 TEGEMA GROUP

97 TER HOEK VONKEROSIE RIJSEN BV  
 57 THE HOUSE OF TECHNOLOGY  
 107 TRIOS PRECISION ENGINEERING  
 45 VACUTECH BV  
 102 WENZEL BENELUX  
 18 WILTING  
  
**INNOVATION SUPPORT**  
 6 AALBERTS INDUSTRIES INDUSTRIAL SERVICES  
 80 ACE STÖßDÄMPFER GMBH  
 151 BAKKER FIJNMETAAL  
 117 BKL ENGINEERING BV  
 100 CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV  
 54 D&M VACUÜMSYSTEMEN BV  
 124 DEMCON  
 58 EMC MCC  
 126 ENERGIEONDERZOEK CENTRUM NEDERLAND  
 116 ERTEC BV  
 46 FMI PRECISION BV  
 185 FRAMO MORAT BV  
 6 GERMEFA BV  
 49 GREENTECH ENGINEERING BV  
 65 HEINMADE BV  
 58 HIPRECISION  
 39 HITTECH GROUP BV  
 65 IMOTEC BV  
 179 IPS TECHNOLOGY  
 136 IRMATO  
 65 JANSSEN PRECISION ENGINEERING  
 47 KMWE PRECISION SYSTEMS & PRECISION COMPONENTS BV  
 43 LEMO CONNECTORS BENELUX  
 162 LEVES METAAL BV  
 90 LM SYSTEMS BV  
 130 LOUWERS & HANIQUE  
 134 MA3 SOLUTIONS BV  
 167 MAAN GROUP  
 105 MATHWORKS  
 58 MATINSPIRED  
 166 MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION  
 2 MAXON MOTOR BENELUX BV  
 24 MECHAPHYSICS BV  
 6 MFK BV  
 182 MI-PARTNERS  
 6 MOGEMA BV  
 104 MOLENAAR OPTICS VOF  
 163 MTSA TECHNOPOWER  
 119 MYTRI BV  
 71 NEITRACO GROUP  
 175 NEWAYS TECHNOLOGIES BV  
 65 NOLIAC A/S  
 16 NORMA  
 26 NTS-GROUP BV  
 11 PHILIPS INNOVATIVE APPLICATIONS NV  
 65 PIEZOMECHANIK GMBH  
 58 PLATOS CONSULTING  
 139 PROMIS ELECTRO-OPTICS BV  
 78 QIOPTIQ PHOTONICS GMBH & CO KG  
 58 SAFFIR, DESIGNERS FOR MANUFACTURING  
 75 SCHAEFFLER NEDERLAND BV  
 5 SICK BV  
 187 SIGMACONTROL BV  
 123 SKF NEDERLAND  
 170 STAMHUIS LINEAIRTECHNIEK BV  
 65 STICHTING APPLIED PIÉZO  
 159 STT PRODUCTS BV  
 134 TEGEMA GROUP  
 57 THE HOUSE OF TECHNOLOGY  
 107 TRIOS PRECISION ENGINEERING  
 32 TSG GROUP



138	VSL
18	WILTING
<b>LINEAR TECHNOLOGY</b>	
80	ACE STOßDÄMPFER GMBH
87	AEROTECH
173	ALIO INDUSTRIES
103	BOTECH BV
100	CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
120	CERATEC TECHNICAL CERAMICS BV
141	FESTO BV
185	FRAMO MORAT BV
172	GILEON TECHNICAL COMPONENTS
33	HEIDENHAIN NEDERLAND BV
73	HIWIN GMBH
4	IEF WERNER GMBH
127	IKO NIPPON THOMPSON EUROPE BV
65	IMOTEC BV
136	IRMATO
156	LEUVEN AIR BEARINGS
90	LM SYSTEMS BV
182	MAGNETIC INNOVATIONS BV
38	MARTEK BVBA
169	MASÉVON TECHNOLOGY BV
2	MAXON MOTOR BENELUX BV
91	MIJNSBERGEN BV
182	MI-PARTNERS
85	PM-BEARINGS BV
139	PROMIS ELECTRO-OPTICS BV
103	Q-SYS BV
142	RELIANCE PRECISION MECHATRONICS
160	RENISHAW BENELUX BV
186	RODRIGUEZ GMBH
75	SCHAEFFLER NEDERLAND BV
40	SCHNEEBERGER GMBH
5	SICK BV
123	SKF NEDERLAND
74	SMARACT GMBH
170	STAMHUIS LINEAIRTECHNIEK BV
36	STEEN METROLOGY SYSTEMS NV
115	VARIODRIVE AANDRIJF- EN BESTURINGSTECHNIEK BV
17	VHE INDUSTRIAL AUTOMATION BV
102	WENZEL BENELUX
72	WIJDEVEN POWER SUPPLIES & INDUCTIVE TECHNOLOGY BV
18	WILTING
<b>MATERIALS (COMPOSITES, CERAMICS, GLASS)</b>	
80	ACE STOßDÄMPFER GMBH
103	BOTECH BV
100	CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
120	CERATEC TECHNICAL CERAMICS BV
126	ENERGIEONDERZOEK CENTRUM NEDERLAND
192	FONTYS HOGESCHOLEN
140	FRIATEC TECHNISCH KERAMIEK / GLYNWED
130	LOUWERS & HANIQUE
2	MAXON MOTOR BENELUX BV
16	NORMA
11	PHILIPS INNOVATIVE APPLICATIONS NV
160	RENISHAW BENELUX BV
58	SAFFIR, DESIGNERS FOR MANUFACTURING
123	SKF NEDERLAND
57	THE HOUSE OF TECHNOLOGY
84	W.L. GORE & ASSOCIATES GMBH
102	WENZEL BENELUX
<b>MEASURING MACHINES AND MEASURING EQUIPMENT</b>	
31	AIR-PARTS BV
14	ALL MEPP BV
41	ARGON MEASURING SOLUTIONS

103	BOTECH BV
22	BRUKER
121	CARL ZEISS INDUSTRIAL METROLOGY
100	CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
171	CTECH METROLOGY
98	CVI MELLES GRIOT
58	EMCMCC
116	ERTEC BV
184	ESI-CIT GROUP
50	FARO BENELUX BV
46	FMI PRECISION BV
177	GLOVEQB
49	GREENTECH ENGINEERING BV
33	HEIDENHAIN NEDERLAND BV
150	HELMUT FISCHER MEETTECHNIEK BV
12+13	HEXAGON METROLOGY BV
129	IBS PRECISION ENGINEERING
111	IGS GEBOJAGEMA
56	IMAGO GROUP BENELUX BV
65	IMOTEC BV
48	INSCOPE BV
8	IRIS VISION BV
136	IRMATO
65	JANSSEN PRECISION ENGINEERING
37	KISTLER BV NETHERLANDS
133	LASER 2000 BENELUX CV
43	LEMO CONNECTORS BENELUX
156	LEUVEN AIR BEARINGS
162	LEVES METAAL BV
134	MA3 SOLUTIONS BV
167	MAAN GROUP
38	MARTEK BVBA
58	MATINSPIRED
182	MI-PARTNERS
7	MITUTOYO NEDERLAND BV
104	MOLENAAR OPTICS VOF
163	MTSA TECHNOPOWER
119	MYTRI BV
174	NANOFOCUS AG
171	NDI EUROPE GMBH
175	NEWAYS TECHNOLOGIES BV
110	NIKON METROLOGY
106	OLYMPUS NEDERLAND BV
11	PHILIPS INNOVATIVE APPLICATIONS NV
139	PROMIS ELECTRO-OPTICS BV
160	RENISHAW BENELUX BV
75	SCHAEFFLER NEDERLAND BV
40	SCHNEEBERGER GMBH
1	SCHUT GEOMETRISCHE MEETTECHNIEK BV
5	SICK BV
123	SKF NEDERLAND
118	ST INSTRUMENTS BV
159	STT PRODUCTS BV
82	TECHNOBIS GROUP
6	TECHNOLOGY TWENTE BV
134	TEGEMA GROUP
12+13	TESA BENELUX
32	TSG GROUP
51	VIBA NV
138	VSL
121	W.J. ROELOFS MEETINSTRUMENTEN BV
102	WENZEL BENELUX
154	ZME VOF
152	ZYGO LOT
<b>MICRO-ASSEMBLY</b>	
195	3TU
94	AAE BV
6	AALBERTS INDUSTRIES INDUSTRIAL SERVICES
125	ANTERYON BV
35	BORIT NV



124 DEMCON  
153 EFD INTERNATIONAL  
116 ERTEC BV  
184 ESI-CIT GROUP  
141 FESTO BV  
183 FRAUNHOFER INSTITUTE FOR PRODUCTION TECHNOLOGY IPT  
65 HEINMADE BV  
194 HOGESCHOOL UTRECHT  
4 IEF WERNER GMBH  
88 IMS BV  
136 IRMATO  
47 KMWE PRECISION SYSTEMS & PRECISION COMPONENTS BV  
10 KUGLER GMBH  
188 LAYERWISE NV  
156 LEUVEN AIR BEARINGS  
134 MA3 SOLUTIONS BV  
167 MAAN GROUP  
169 MASÉVON TECHNOLOGY BV  
166 MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION  
24 MECHAPHYSICS BV  
175 NEWAYS TECHNOLOGIES BV  
16 NORMA  
65 NPOINT INC.  
106 OLYMPUS NEDERLAND BV  
21 OPTIKRON GMBH  
85 PM-BEARINGS BV  
142 RELIANCE PRECISION MECHATRONICS  
155 ROMÉDES ENGINEERING BV  
40 SCHNEEBERGER GMBH  
42 SCHUT PRECISIONPARTS BV  
74 SMARACT GMBH  
52 TEESING SUBMICRON TECHNOLOGY  
107 TRIOS PRECISION ENGINEERING  
32 TSG GROUP  
45 VACUTECH BV  
18 WILTING

**MICRO-CONNECTION**

195 3TU  
6 AALBERTS INDUSTRIES INDUSTRIAL SERVICES  
103 BOTECH BV  
23 CUSTOM SPECIAL TOOLS BV  
126 ENERGIEONDERZOEK CENTRUM NEDERLAND  
116 ERTEC BV  
135 ILT INDUSTRIËLE LASER TOEPASSINGEN BV  
88 IMS BV  
188 LAYERWISE NV  
43 LEMO CONNECTORS BENELUX  
134 MA3 SOLUTIONS BV  
166 MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION  
175 NEWAYS TECHNOLOGIES BV  
52 TEESING SUBMICRON TECHNOLOGY  
32 TSG GROUP  
108 V.A.C. MACHINES

**MICRO-LASER PROCESSING**

94 AAE BV  
6 AALBERTS INDUSTRIES INDUSTRIAL SERVICES  
87 AEROTECH  
131 APPLIED LASER TECHNOLOGY BV  
23 CUSTOM SPECIAL TOOLS BV  
126 ENERGIEONDERZOEK CENTRUM NEDERLAND  
116 ERTEC BV  
135 ILT INDUSTRIËLE LASER TOEPASSINGEN BV  
88 IMS BV  
136 IRMATO  
10 KUGLER GMBH

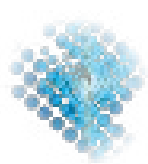
133 LASER 2000 BENELUX CV  
86 LASERTEC BV  
188 LAYERWISE NV  
112 LIGHTMOTIF BV  
167 MAAN GROUP  
26 NTS-GROUP BV  
11 PHILIPS INNOVATIVE APPLICATIONS NV  
103 Q-SYS BV  
109 REITH LASER BV  
44 ROFIN-BAASEL BENELUX BV  
108 TRUMPF NEDERLAND BV  
32 TSG GROUP  
108 V.A.C. MACHINES

**MICRO-SYSTEM TECHNOLOGY (MST/MEMS)**

195 3TU  
125 ANTERYON BV  
116 ERTEC BV  
65 HEINMADE BV  
194 HOGESCHOOL UTRECHT  
88 IMS BV  
19 IMT MASKEN UND TEILINGEN AG  
10 KUGLER GMBH  
134 MA3 SOLUTIONS BV  
2 MAXON MOTOR BENELUX BV  
175 NEWAYS TECHNOLOGIES BV  
65 NPOINT INC.  
118 ST INSTRUMENTS BV

**MOTION CONTROL**

195 3TU  
80 ACE STÖßDÄMPFER GMBH  
87 AEROTECH  
31 AIR-PARTS BV  
173 ALIO INDUSTRIES  
100 CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV  
120 CERATEC TECHNICAL CERAMICS BV  
3 CONTROLLAB PRODUCTS BV  
171 CTECH METROLOGY  
124 DEMCON  
58 EMC MCC  
141 FESTO BV  
185 FRAMO MORAT BV  
33 HEIDENHAIN NEDERLAND BV  
65 HEINMADE BV  
39 HITTECH GROUP BV  
73 HIWIN GMBH  
65 IMOTEC BV  
136 IRMATO  
65 JANSSEN PRECISION ENGINEERING  
133 LASER 2000 BENELUX CV  
156 LEUVEN AIR BEARINGS  
90 LM SYSTEMS BV  
38 MARTEK BVBA  
2 MAXON MOTOR BENELUX BV  
91 MIJNSBERGEN BV  
83 MINIMOTOR BENELUX  
182 MI-PARTNERS  
104 MOLENAAR OPTICS VOF  
65 NANOMOTION LTD  
15 NATIONAL INSTRUMENTS NEDERLAND  
128 NEWPORT SPECTRA-PHYSICS GMBH  
65 NOLIAC A/S  
16 NORMA  
65 NPOINT INC.  
26 NTS-GROUP BV  
11 PHILIPS INNOVATIVE APPLICATIONS NV  
65 PIEZOMECHANIK GMBH  
103 Q-SYS BV  
142 RELIANCE PRECISION MECHATRONICS  
75 SCHAEFFLER NEDERLAND BV



40 SCHNEEBERGER GMBH  
5 SICK BV  
187 SIGMACONTROL BV  
123 SKF NEDERLAND  
92 TE LINTELO SYSTEMS BV  
82 TECHNOBIS GROUP  
57 THE HOUSE OF TECHNOLOGY  
107 TRIOS PRECISION ENGINEERING  
17 VHE INDUSTRIAL AUTOMATION BV  
72 WIJDEVEN POWER SUPPLIES & INDUCTIVE  
TECHNOLOGY BV  
18 WILTING

**OPTICS**

195 3TU  
125 ANTERYON BV  
131 APPLIED LASER TECHNOLOGY BV  
168 AVANTES  
20 BEFORT WETZLAR  
121 CARL ZEISS INDUSTRIAL METROLOGY  
98 CVI MELLES GRIOT  
23 CZL TILBURG BV  
124 DEMCON  
157 DIAMOND KIMBERLIT BV  
116 ERTEC BV  
29 EURO-TECHNIEK EINDHOVEN BV  
46 FMI PRECISION BV  
183 FRAUNHOFER INSTITUTE FOR PRODUCTION  
TECHNOLOGY IPT  
33 HEIDENHAIN NEDERLAND BV  
56 IMAGO GROUP BENELUX BV  
48 INSCOPE BV  
8 IRIS VISION BV  
136 IRMATO  
27 KANTNER PRÄZISIONSOPTIK  
10 KUGLER GMBH  
133 LASER 2000 BENELUX CV  
43 LEMO CONNECTORS BENELUX  
24 MECHAPHYSICS BV  
7 MITUTOYO NEDERLAND BV  
104 MOLENAAR OPTICS VOF  
110 NIKON METROLOGY  
26 NTS-GROUP BV  
106 OLYMPUS NEDERLAND BV  
21 OPTIKRON GMBH  
139 PROMIS ELECTRO-OPTICS BV  
78 QIOPTIQ PHOTONICS GMBH & CO KG  
142 RELIANCE PRECISION MECHATRONICS  
5 SICK BV  
118 ST INSTRUMENTS BV  
92 TE LINTELO SYSTEMS BV  
82 TECHNOBIS GROUP  
6 TECHNOLOGY TWENTE BV  
108 TRUMPF NEDERLAND BV  
102 WENZEL BENELUX  
18 WILTING  
152 ZYGO LOT

**PHOTONICS**

14 ALL MEPP BV  
131 APPLIED LASER TECHNOLOGY BV  
168 AVANTES  
20 BEFORT WETZLAR  
98 CVI MELLES GRIOT  
124 DEMCON  
157 DIAMOND KIMBERLIT BV  
116 ERTEC BV  
27 KANTNER PRÄZISIONSOPTIK  
133 LASER 2000 BENELUX CV  
43 LEMO CONNECTORS BENELUX  
134 MA3 SOLUTIONS BV

104 MOLENAAR OPTICS VOF  
139 PROMIS ELECTRO-OPTICS BV  
78 QIOPTIQ PHOTONICS GMBH & CO KG  
142 RELIANCE PRECISION MECHATRONICS  
118 ST INSTRUMENTS BV  
92 TE LINTELO SYSTEMS BV  
82 TECHNOBIS GROUP

**PIEZO TECHNOLOGY**

131 APPLIED LASER TECHNOLOGY BV  
120 CERATEC TECHNICAL CERAMICS BV  
124 DEMCON  
153 EFD INTERNATIONAL  
116 ERTEC BV  
184 ESI-CIT GROUP  
29 EURO-TECHNIEK EINDHOVEN BV  
65 HEINMADE BV  
65 IMOTEC BV  
65 JANSSEN PRECISION ENGINEERING  
37 KISTLER BV NETHERLANDS  
133 LASER 2000 BENELUX CV  
43 LEMO CONNECTORS BENELUX  
134 MA3 SOLUTIONS BV  
91 MIJNSBERGEN BV  
83 MINIMOTOR BENELUX  
182 MI-PARTNERS  
104 MOLENAAR OPTICS VOF  
65 NANOMOTION LTD  
65 NOLIAC A/S  
65 NPOINT INC.  
65 PIEZOMECHANIK GMBH  
85 PM-BEARINGS BV  
74 SMARACT GMBH  
65 STICHTING APPLIED PIÉZO  
82 TECHNOBIS GROUP  
134 TEGEMA GROUP

**PRECISION ETCHING**

34 ADVANCED CHEMICAL ETCHING LTD  
125 ANTERYON BV  
132 ETCHFORM BV  
19 IMT MASKEN UND TEILINGEN AG  
104 MOLENAAR OPTICS VOF  
9 PRECISION MICRO

**PRECISION PACKAGING**

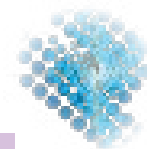
117 BKL ENGINEERING BV  
194 HOGESCHOOL UTRECHT  
179 IPS TECHNOLOGY  
167 MAAN GROUP  
187 SIGMACONTROL BV

**PRECISION PLASTICS PROCESSING**

143 AXXICON MOULDS EINDHOVEN BV  
29 EURO-TECHNIEK EINDHOVEN BV  
185 FRAMO MORAT BV  
183 FRAUNHOFER INSTITUTE FOR PRODUCTION  
TECHNOLOGY IPT  
37 KISTLER BV NETHERLANDS  
10 KUGLER GMBH  
7 MITUTOYO NEDERLAND BV  
32 TSG GROUP

**PRECISION TOOLS (DIAMOND)**

14 ALL MEPP BV  
96 B&S TECHNOLOGY BV  
23 CUSTOM SPECIAL TOOLS BV  
23 CZL TILBURG BV  
184 ESI-CIT GROUP  
179 IPS TECHNOLOGY  
162 LEVES METAAL BV



- 166 MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION
- 182 MI-PARTNERS
- 71 NEITRACO GROUP
- 180 PRODUTEC BV
- 139 PROMIS ELECTRO-OPTICS BV
- 160 RENISHAW BENELUX BV

#### PROFESSIONAL MAGAZINES

- 61 DSPE (MIKRONIEK)
- 58 EMCMCC

#### SENSOR TECHNOLOGY

- 31 AIR-PARTS BV
- 100 CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
- 171 CTECH METROLOGY
- 124 DEMCON
- 58 EMCMCC
- 126 ENERGIEONDERZOEK CENTRUM NEDERLAND
- 33 HEIDENHAIN NEDERLAND BV
- 65 HEINMADE BV
- 12+13 HEXAGON METROLOGY BV
- 194 HOGESCHOOL UTRECHT
- 129 IBS PRECISION ENGINEERING
- 56 IMAGO GROUP BENELUX BV
- 65 IMOTEC BV
- 136 IRMATO
- 37 KISTLER BV NETHERLANDS
- 133 LASER 2000 BENELUX CV
- 43 LEMO CONNECTORS BENELUX
- 134 MA3 SOLUTIONS BV
- 38 MARTEK BVBA
- 24 MECHAPHYSICS BV
- 174 NANOFOCUS AG
- 175 NEWAYS TECHNOLOGIES BV
- 110 NIKON METROLOGY
- 65 NOLIAC A/S
- 26 NTS-GROUP BV
- 65 PIEZOMECHANIK GMBH
- 139 PROMIS ELECTRO-OPTICS BV
- 160 RENISHAW BENELUX BV
- 137 SENTECH SENSOR TECHNOLOGY
- 5 SICK BV
- 123 SKF NEDERLAND
- 118 ST INSTRUMENTS BV
- 82 TECHNOBIS GROUP
- 57 THE HOUSE OF TECHNOLOGY

#### SOFTWARE, TECHNICAL/SCIENTIFIC

- 100 CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
- 171 CTECH METROLOGY
- 124 DEMCON
- 126 ENERGIEONDERZOEK CENTRUM NEDERLAND
- 116 ERTEC BV
- 184 ESI-CIT GROUP
- 50 FARO BENELUX BV
- 12+13 HEXAGON METROLOGY BV
- 65 IMOTEC BV
- 136 IRMATO
- 133 LASER 2000 BENELUX CV
- 105 MATHWORKS
- 15 NATIONAL INSTRUMENTS NEDERLAND
- 175 NEWAYS TECHNOLOGIES BV
- 110 NIKON METROLOGY
- 26 NTS-GROUP BV
- 106 OLYMPUS NEDERLAND BV
- 187 SIGMACONTROL BV
- 123 SKF NEDERLAND
- 102 WENZEL BENELUX

#### SURFACE TREATMENT

- 6 AALBERTS INDUSTRIES INDUSTRIAL SERVICES
- 23 CZL TILBURG BV
- 178 DEKRACOAT BV
- 126 ENERGIEONDERZOEK CENTRUM NEDERLAND
- 116 ERTEC BV
- 6 F.I.V. BV
- 6 GERMEFA BV
- 81 JEVEKA BV
- 27 KANTNER PRÄZISIONSOPTIK
- 86 LASERTEC BV
- 167 MAAN GROUP
- 166 MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION
- 7 MITUTOYO NEDERLAND BV
- 16 NORMA
- 26 NTS-GROUP BV
- 58 PLATOS CONSULTING
- 123 SKF NEDERLAND
- 118 ST INSTRUMENTS BV
- 108 TRUMPF NEDERLAND BV
- 32 TSG GROUP
- 108 V.A.C. MACHINES
- 102 WENZEL BENELUX

#### TRAININGS

- 121 CARL ZEISS INDUSTRIAL METROLOGY
- 54 D&M VACUÜMSYSTEMEN BV
- 58 EMCMCC
- 59 ENGENIA
- 116 ERTEC BV
- 184 ESI-CIT GROUP
- 50 FARO BENELUX BV
- 141 FESTO BV
- 192 FONTYS HOGESCHOLEN
- 65 HEINMADE BV
- 12+13 HEXAGON METROLOGY BV
- 58 HIPRECISION
- 165 HOLLAND INNOVATIVE BV
- 136 IRMATO
- 191 LEIDSE INSTRUMENTMAKERS SCHOOL
- 105 MATHWORKS
- 59 MIKROCENTRUM
- 7 MITUTOYO NEDERLAND BV
- 71 NEITRACO GROUP
- 65 NOLIAC A/S
- 65 PIEZOMECHANIK GMBH
- 58 PLATOS CONSULTING
- 180 PRODUTEC BV
- 58 SAFFIR, DESIGNERS FOR MANUFACTURING
- 75 SCHAEFFLER NEDERLAND BV
- 187 SIGMACONTROL BV
- 123 SKF NEDERLAND
- 138 VSL
- 102 WENZEL BENELUX

#### VISION SYSTEMS

- 20 BEFORT WETZLAR
- 121 CARL ZEISS INDUSTRIAL METROLOGY
- 100 CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV
- 124 DEMCON
- 184 ESI-CIT GROUP
- 141 FESTO BV
- 192 FONTYS HOGESCHOLEN
- 12+13 HEXAGON METROLOGY BV
- 56 IMAGO GROUP BENELUX BV
- 88 IMS BV
- 8 IRIS VISION BV
- 136 IRMATO
- 58 J.A.I.M.S.
- 133 LASER 2000 BENELUX CV

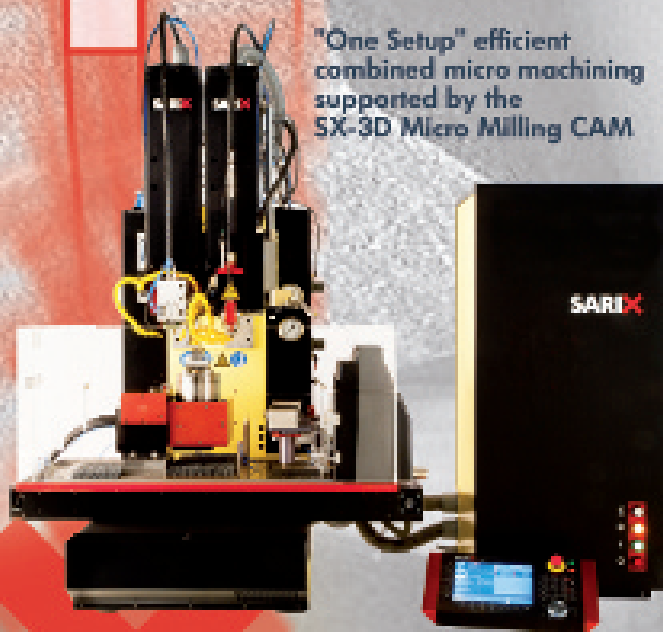


# SX-200 Dual

## HIGH PRECISION MICRO MACHINING PROCESS COMBINATION

High speed micro  
and mill milling  
with  
High precision and  
high quality finishing  
by 3D Micro EDM Milling

"One Setup" efficient  
combined micro machining  
supported by the  
SX-3D Micro Milling CAM



sarix.com

## PRECISION FAIR 2011 – WHO SUPPLIES WHAT

134	MA3 SOLUTIONS BV
7	MITUTOYO NEDERLAND BV
104	MOLENAAR OPTICS VOF
15	NATIONAL INSTRUMENTS NEDERLAND
110	NIKON METROLOGY
26	NTS-GROUP BV
11	PHILIPS INNOVATIVE APPLICATIONS NV
139	PROMIS ELECTRO-OPTICS BV
78	QIOPTIQ PHOTONICS GMBH & CO KG
1	SCHUT GEOMETRISCHE MEETTECHNIEK BV
5	SICK BV
12+13	TESA BENELUX
57	THE HOUSE OF TECHNOLOGY
102	WENZEL BENELUX



**GLYNWED** technical ceramics  
visit booth no. 140



## Technobis Group



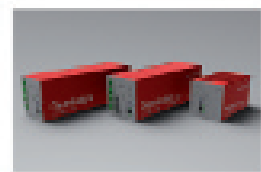
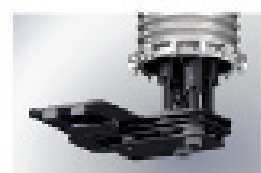
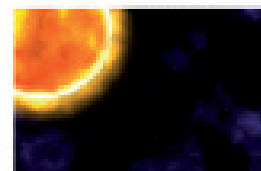
Technobis Group, consisting of Technobis Mechatronics and Technobis Fibre Technologies is a developer and supplier of high-tech instruments and modules for OEM companies.

Technobis Mechatronics is specialized in carrying out complete product development projects from an idea to a successful turnkey product, prototype or series product. With more than fifteen years of experience, we have become a supplier of mechatronic systems for companies in a wide range of markets.

Technobis Fibre Technologies is specialized in the development and supply of total solutions in high-speed, multi-sensor fibre interrogators and sensors.

The combination of technologies found within the Technobis Group and the Technology Platform formed with partners is absolutely unique. Working within this platform ensures fast response, high flexibility and optimal solutions for complex multidisciplinary and interdisciplinary challenges.

Come and see us at Precision Fair 2011, booth 82.



Technobis Group  
Geesterweg 4b  
1911 NB Uitgeest  
T +31 (0)251 248432  
E info@technobis.nl  
W www.technobis.com  
W www.tft-fos.com

**3TU****195**

The three leading universities of technology in the Netherlands – Delft University of Technology, Eindhoven University of Technology and the University of Twente – have joined forces in the 3TU.Federation. This federation maximizes innovation by combining and concentrating the strengths of all three universities in research, education and knowledge transfer. During the Precision Fair we would like to show examples of research that focuses on technologies that, with precision and sensitivity,

can support or take over human action. In our interactive booth located in the Technology Hotspot, you will find a range of research varying from MEMS to Bicycle Dynamics and Telemanipulation to Automated Design Optimization.

**3TU**

Mekelweg 2, 2628 CD DELFT (NL)  
Contact person: Mrs. Lucienne Dado  
T +31 (0)15-2784357  
l.a.j.dado-terhuurne@tudelft.nl  
www.3tu.nl

**AALBERTS INDUSTRIES INDUSTRIAL SERVICES 6**

Aalberts Industries NV is a Stock exchange listed international industrial Group with two main activities, Industrial Services (Industrial products and Material Technology) and Flow Control. Aalberts Industries Industrial Services has contacts in several areas of the medical industry, is a longstanding partner of the semiconductor industry, suspension market, a qualified supplier in the aerospace industry and well-known in the automotive industry. The combination of engineering, surface- and heat-treatment and production technologies makes Aalberts Industries Industrial Services the right partner for many industries.

**AALBERTS INDUSTRIES INDUSTRIAL SERVICES**

Sandenburgerlaan 4,  
3947 CS LANGENBROEK (NL)  
T +31 (0)343-565080  
info@aalberts.nl  
www.aalberts.nl

**AAE BV****94**

The AAE Group is active in the fields of mechatronics and machine design in 4 different segments. With the recent expansion of our facilities, including an ISO7 Cleanroom of 10.000 m<sup>2</sup> we offer tailor-made solutions for a wide range of industries.

**High Precision components**

State-of-the-art turning, milling and micro laser competencies guarantee quality results, with maximum flexibility at highly competitive prices.

**Prototype- and serial machines**

First-tier supplier to OEM customers for outsourcing of high-tech systems and modules. AAE supports product design and development from the concept stage all the way to serial production.

**Assembly and printing machines**

Under the brand name Grauel we offer dedicated solutions for printing and assembly of high-tech (medical) parts.

**Special machines**

AAE ensures intelligent, tailor-made solutions for customer specific specialty machines.

**AAE BV**

P.O. Box 493,  
5700 AL HELMOND (NL)  
Contact persons:  
Mr. H. Tils,  
Mr. R. Janssen, Mr. R. Alink  
T +31 (0)492-541861  
mail@aaebv.com  
www.aaebv.com



**ACE STOSSDÄMPFER GMBH****80**

ACE the well-known deceleration and control equipment company continues to expand their ever increasing range of innovative products. Look out for the extended

range of Stainless Steel products including Gas springs, Hydraulic Dampers and Shock absorbers, plus new models of the popular Tubus profile dampers.

New innovations include the HDB heavy-duty hydraulic brake with independent adjustment in each direction, even during motion and the PMC range of shock absorbers capable of operating in severe environments.

Possibly the most significant new innovation is the new Locked-Z designed to comply with the new

directives for machines with Z-axis movement.

See these Innovations at booth number 80.

**ACE STOSSDÄMPFER GMBH**

Albert-Einstein-Strasse 15,

D 40764 LANGENFELD (D)

Contact person: Mr. Ralf Küppers

T +31 (0)165-714455

benelux@ace-int.eu

www.ace-ace.com

**AEROTECH****87**

Aerotech delivers the essential micro and nano positioning performance for demanding precision engineering applications across all areas of manufacture and research.

The comprehensive range includes technically superior linear and rotary positioning stages and advanced motion controls that are individually supplied or interconnected to form high performance sub assemblies or completely custom engineered systems.

With over 100,000 positioning axes installed world-wide, Aerotech provides low cost of ownership

solutions for challenging motion control in semiconductor, flat panel, medical device, life science, laser processing, electronics manufacture & test, photonics, solar panel, automotive, military/aerospace, and many other markets requiring high precision, high performance motion control solutions.

**AEROTECH**

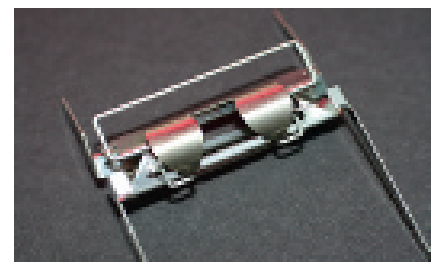
Jupiter House, Calleva Park,  
RG12 0QN ALDERMASTON (UK)

Contact person: Mr. Nicholas Rubies

T +44 (0)118-9409400

sales@aerotech.co.uk

www.aerotech.com

**ADVANCED CHEMICAL ETCHING LTD****34**

Advanced Chemical Etching Ltd. is a manufacturer of metal components by means of photochemical etching. With varying complexity, thickness, form and finish we produce components from a simple round shim to complex high pin count semiconductor leadframes. Technical support is of paramount importance for ACE. We constantly develop new processes for etching of special metals such as titanium, tungsten, molybdenum, hastelloy, constantan and tantalum. Starting from data we produce fully functional, formed, heat-treated and plated first samples within a matter of days.

**ADVANCED CHEMICAL ETCHING LTD**

Kerkhovensesteenweg 420,

B 3920 LOMMEL (B)

Contact person: Mr. Roger Peeters

T +32 (0)11-402872

roger.peeters@cumatrix.com

www.ace-uk.net

**AIRCONET BV****89**

Airconet is a service providing company, certified with ISO 9001, VCA and STEK. Airconet is specialized in sales, rental, service and engineering of compressed air systems of amongst others Boge and Ekomak compressors and industrial process cooling of amongst others MTA waterchillers and liquid coolers. Airconet rents, designs and builds various compressed air and cooling systems and provides service and maintenance to all compressed air and cooling systems.

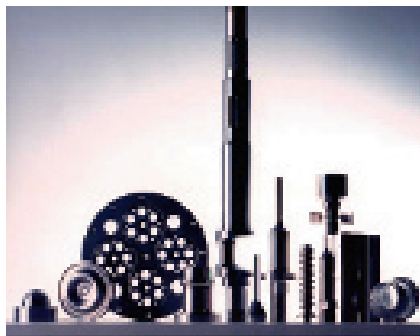
**Custom in compressed air and cooling.**

**AJB INSTRUMENT BV 95**

AJB Instrument BV produces high-precision industrial components and medical instruments.

**AJB INSTRUMENT BV**

Zuidzijde 7,  
3181 LR ROZENBURG (NL)  
Contact person: Mr. A.J. Bouwknecht  
T +31 (0)181-213377  
administratie@ajbinstrument.nl  
www.ajbinstrument.nl

**AIRCONET BV**

P.O. Box 315,  
2740 AH WADDINXVEEN (NL)  
Contact person: Mr. M. Klomp  
T +31 (0)182-633009  
m.klomp@airconet.nl  
www.airconet.nl

**ALL MEPP BV 14**

All MEPP BV develops and builds high-tech systems, special machines and tooling according to client's specifications.



We offer mechatronical engineering services, from concept design to test first products. Our experience is to combine high precision technologies with our years of manufacturing and assembly knowledge. We are able to engineer directly these advantages in the first handling, motion and test systems.

Typical industries where All MEPP operates are: analytical, medical, laboratory, consumer and solar.

**ALL MEPP BV**

Avignonlaan 18,  
5627 GA EINDHOVEN (NL)  
Contact person:  
Mrs. H. van den Hoek  
T +31 (0)40-2488505  
h.v.d.hoek@allmepp.nl  
www.allmepp.nl

**AIR-PARTS BV 31**

Air-Parts BV is specialized in providing high-end products and solutions for:

- data, image and voice communication;
- high, medium and low voltage;
- monitoring;
- military applications and equipment.

With analysis and advice as key elements, Air-Parts BV proves itself as "Value Added Reseller". For monitoring, Air-Parts BV presents the high-end inductive measuring systems from our American supplier KAMAN Instrumentation.

An overview of the measuring systems:

- accurate sensors for measurement of distance, thickness, alignment, static and dynamic displacement and positioning;
- measuring range from 0.5 to 60 mm;
- resolution from 0.01 to 6 micrometer.

**AIR-PARTS BV**

P.O. Box 255, 2400 AG  
ALPHEN AAN DEN RIJN (NL)  
Contact person: Mr. Wim Van Hoof  
T +31 (0)172-422455  
hoof.w@air-parts.com  
www.air-parts.com

# Announcing Mercury™ II with Tape Scale

## The Next Generation High-Performance Encoder



## A Breakthrough in High Performance Encoder Technology

Now with PurePrecision™ Tape & Glass Scales

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1.2nm to 5µm Linear,  
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Tape (Linear): Short Range  $\pm 70\text{nm}$   
Long Range  $\pm 5\mu\text{m/m}$   
Glass (Linear): Short Range up to  $\pm 25\text{nm}$   
Long Range up to  $\pm 1\mu\text{m}$
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# MARTEK

#### MARTEK BVBA

René Comhairelaan 82  
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Phone: +32 2 467 00 40  
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- Broad Alignment Tolerances
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**Easier to Use, More Robust, RoHS Compliant**



**ALIO INDUSTRIES 173**

ALIO, (which is Latin for “A better way”) is an innovator in micro and nano technology motion systems. ALIO's linear and rotary stages were designed to be cost effective and complement the market demand for high quality, nano precision motion. These applications can be used in normal environments, clean rooms, and vacuum chamber environments. ALIO has also developed a series of standard and custom True Nano air bearing stages for nano-precision applications. These robust stages offer the same 5-nanometer resolution capabilities as our standard products with high stiffness and speeds from 1 micron/sec to over 1 m/sec depending on application needs.

**ALIO INDUSTRIES**

11919 West I-70 Frontage Rd.  
N-Unit 119, CO 80033  
Wheat Ridge, Colorado (USA)  
Contact persons: Mr. Dan Crews,  
Mr. André Lammertink  
T 001-303-3397500  
marketing@groneman.nl  
www.alioindustries.com

**ALUMECO NL 147**

AlumecoNL is een groothandel in aluminium halfabricaten, gespecialiseerd in materialen voor de verspanende industrie. Wij leveren rond-, vierkant- en platstaf in diverse legeringen uit voorraad, desgewenst

op maat gezaagd. Daarnaast hebben wij zeer uitgebreide mogelijkheden in platen op maat gezaagd, in diverse legeringen tot en met een dikte van 1.200 mm.

**ALUMECO NL**

Ketelmeer 25, 5347 JX OSS (NL)  
Contact person: Mr. M.J. Huitink  
T +31 (0)412-654430  
moh@alumeco.nl  
www.alumeco.nl

**ANTERYON BV 125**

Anteryon BV has been active in making, processing and assembling high quality glass or ceramics optical elements since 1943. We have access to the best research facilities like Philips Research Laboratory and Philips Applied Technologies. Anteryon's specialty is creating solutions by using precision glass processing technique for industrial, imaging, telecommunication and microsystems. Anteryon is a high-tech company with innovation, precision, creativity and customer service as company values for products and process.

Within Anteryon there are 3 different product groups, each with their own

product specialty and can therefore produce a large range of products can be produced. See [www.anteryon.com](http://www.anteryon.com).

**ANTERYON BV**

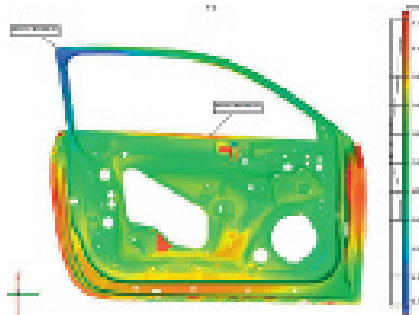
Zwaanstraat 2a,  
5651 CA EINDHOVEN (NL)  
Contact person: Mr. Jos Janssen  
T +31 (0)40-2561500  
info@anteryon.com  
www.anteryon.com





**APPLIED LASER  
TECHNOLOGY BV 131****APPLIED LASER  
TECHNOLOGY BV**

De Dintel 2,  
5684 PS BEST (NL)  
Contact person:  
Mr. E. Keune  
T +31 (0)499-375375  
e.keune@alt.nl  
www.alt.nl

**ARGON MEASURING SOLUTIONS 41**

Argon offers 3D scanning and metrology services to the automotive, aviation, pipe & pipelines and power generation market in the Benelux and Germany. We focus on dimensional quality control, reverse engineering and dimensional verification and

tuning of processes using the most unique diversity of technologies in Europe. On the Precision Fair we will give an overview of our 3D metrology expertise through case studies, interactive software demos and measurements with our most recent scanning equipment.

**ARGON MEASURING  
SOLUTIONS**

Technologielaan 9,  
B 3001 LEUVEN (B)  
Contact person: Mr. Jos Deschagt  
T +32 (0)16-380839  
jos.deschagt@argon-ms.be  
www.argon-ms.be

**LECTORAAT MECHATRONICA  
AVANS HOGESCHOOL BREDA ATM****193**

We are immensely proud that Avans University of Applied Sciences has been proclaimed the best major university of applied sciences in the Netherlands by the leading Dutch magazine Elsevier.

Almost eighty thousand students at institutes of higher professional education assessed their study programmes by completing the National Student Survey. Avans has the most study programmes boasting above-average satisfaction. This puts

Avans head and shoulders above the other universities of applied sciences in the Netherlands.

**LECTORAAT  
MECHATRONICA  
AVANS HOGESCHOOL  
BREDA ATM**

Lovensdijkstraat 61-63,  
4818 AJ BREDA (NL)  
Contact person: Mr. W.C. de Graaf  
T +31 (0)6-17986920  
www.avans.nl

**AVANTES****168**

Avantes is a leading manufacturer of fiber optic spectroscopy instruments and systems with almost two decades of experience developing customer-defined spectrometer configurations. With a long history of consulting with clients across diverse industries and applications, Avantes is an experienced partner, equipped to guide customers who want a solution tailored to their application and research needs.

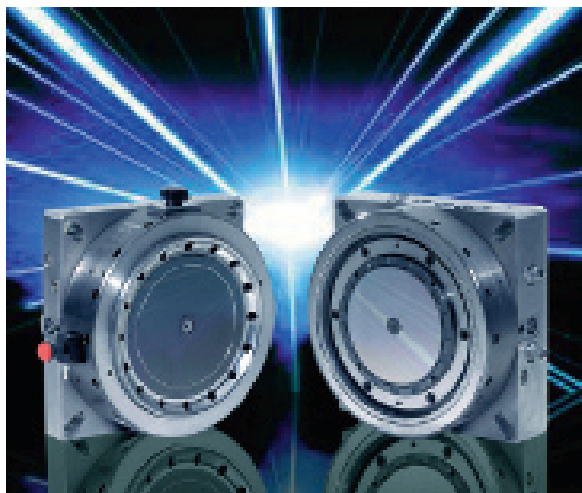


By building best in class, spectrometers and providing unmatched customer service, Avantes

offers customers the peace of mind that the Avantes solutions they purchase will meet, and exceed, their expectations.

**AVANTES**

Oude Apeldoornseweg 28,  
7333 NS APELDOORN (NL)  
Contact person: Mrs. Caroline Bach  
T +31 (0)313-670170  
info@avantes.com  
www.avantes.com

**AXXICON MOULDS EINDHOVEN BV****143**

Axxicon Moulds Eindhoven initially started in the moulding of micro- and nanostructures by manufacturing the

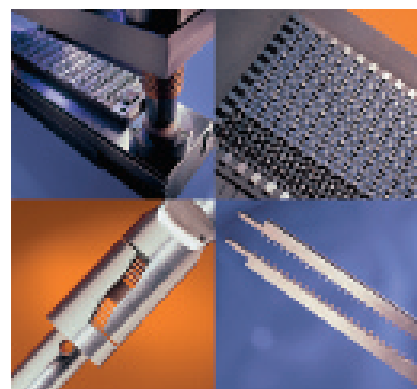
very first moulds for producing optical storage media in the early 80's. Axxicon is able to produce precision components by turning, grinding, lapping and polishing in climate controlled production facilities. Polished surfaces from Axxicon can reach roughness values of less than 5 nm. Such specific values are critical for optical quality. Axxicon uses its knowledge in

the area of injection moulding of ultra-flat, high-precision parts. Our unique selling point is the replication

of microstructures like microfluidic structures.

**AXXICON MOULDS EINDHOVEN BV**

P.O. Box 1717,  
5602 BS EINDHOVEN (NL)  
Contact person: Mrs. C. van de Kamp  
T +31 (0)499-494450  
c.vandekamp@axxicon.com  
www.axxicon.com

**B&S TECHNOLOGY BV 96**

B&S Technology specializes in the design and manufacture of dies, moulds, high precision components and assembled products in the high quality segment of the market. In doing so, B&S offers a total solution and plays an influential role throughout, from the development of a product through to maintenance and after-care. Our customers are found mainly in the market segments of microelectronics, medical pharmaceuticals, automotive, and the glass and packaging industries.

**B&S TECHNOLOGY BV**

Swaardvenstraat 2,  
5048 AV TILBURG (NL)  
Contact person: Mr. J. Schapendonk  
T +31 (0)13-4625809  
j.schapendonk@bstechnology.nl  
www.bstechnology.nl

**BAKKER FIJNMETAAL****151**

Bakker Fijnmetaal produces fine mechanical parts for a wide range of constructions, components and applications. These precision components are meticulously produced and widely tested before they leave our factory. Our completely automated machinery guarantees you a short lead time and

cost-efficient production. The materials used include copper, brass, stainless steel, aluminum, titanium and various plastics.

Bakker has an assembly hall and a clean room. Bakker Fijnmetaal's experienced professionals carry out the assembly work. All the means required to clean and assemble your products are there. To develop customer-specific products, Bakker Fijnmetaal uses CAD software to draw your design. If necessary, Bakker has the use of an engineering department. From first idea to final product, Bakker Fijnmetaal is able to help you.

**BAKKER FIJNMETAAL**

Ekkersrijt 1310,  
5692 AH SON (NL)  
Contact person:  
Mr. D. van Amelsvoort  
T +31 (0)499-473416  
dirk@bakkerfm.nl  
www.bakkerfm.nl



**BEFORT WETZLAR 20**

- Optical and mechatronic design and construction.
- Manufacturing of fine-optics and mechanics.
- Coatings for service.
- Assembly of opto-mechatronic systems.

**BEFORT WETZLAR**

Braunfelser Strasse 26-30,  
D 35578 WETZLAR (D)

Contact person:

Mr. Henner Befort

T +49 (0)6441-92410

hbr@befort-optic.com

www.befort-optic.com

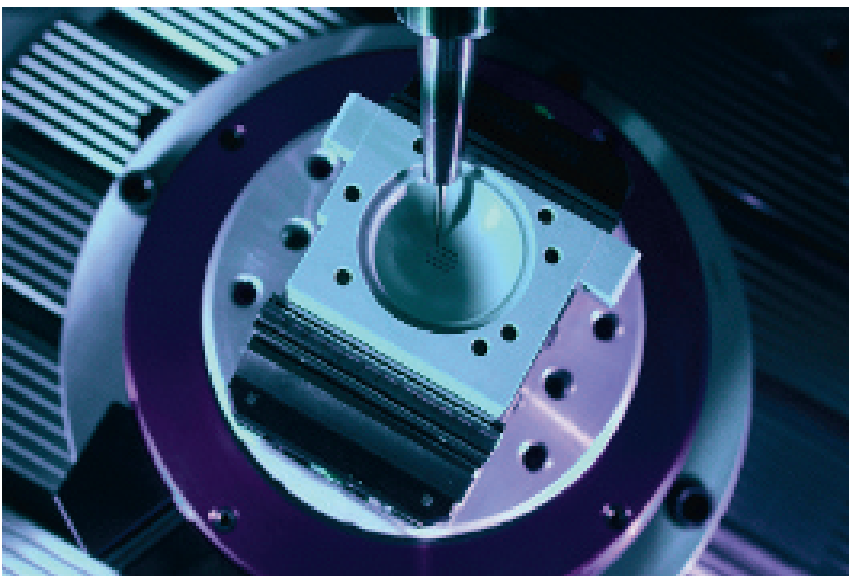
**BENDERTECHNIEK BV 77**

For this exhibition Bendertechnik will focus on milling and mill/turning for the high-end Japanese Matsuura machines. With examples pieces from several respected Dutch Matsuura users Bendertechnik will show the possibilities of the very high accuracy of the Matsuura machines.

Besides a wide range of different spindles Matsuura also offers big toolchangers and palletsystems on almost all the horizontal, 5-axes and Cublex (mill/turn) models. Together with the superb reliability of all the Matsuura models this will guarantee a high productivity and return on investment and one of the best accuracies available in the world.

**BENDERTECHNIEK BV**

Plesmanstraat 32,  
3905 KL VEENENDAAL (NL)  
Contact person: Mr. G.J. Bender  
T +31 (0)318-550200  
info@bendertechnik.nl  
www.bendertechnik.nl

**VAN DEN BERG KUNSTSTOFBEWERKING BV****161**

BKB (Van den Berg Kunststofbewerking) has been a leading and innovative company in processing plastics to customer specifications for years.

We are specialised in working with high-performance plastics such as PEEK, Semitron ESD, Torlon and PEI with properties that include, for example, a high-temperature

resistance. This means we can work with even more precision and enable our customers to achieve even lower tolerances.

We do of course process many other kinds of plastic and we support from the initial concept to the end product. Our work ranges from constructing prototypes to making medium-sized product series. Please visit us at booth 161.

**VAN DEN BERG KUNSTSTOFBEWERKING BV**

P.O. Box 1671,  
5602 BR EINDHOVEN (NL)

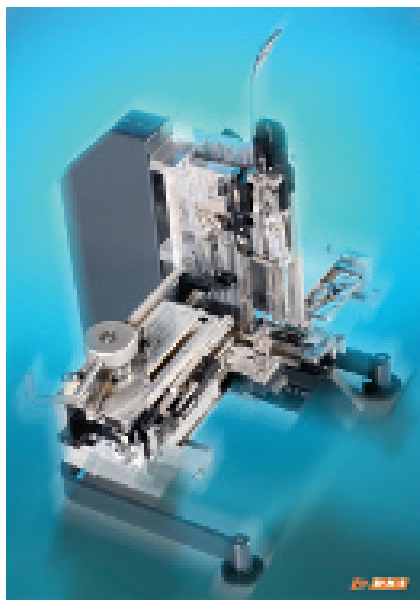
Contact person:

Mr. E.M.B.T. Claassen

T +31 (0)40-2670101

info@vdberg-kunststof.nl

www.vdberg-kunststof.nl

**BKL ENGINEERING BV 117**

BKL Engineering originates from a traditional engineering company, established in 1983. Our company focuses on the engineering and production of special machinery with a specialization in customer specific tooling.

An important part of the tooling is special hoisting equipment. BKL is unique in this field as we cover the full range the OEM may need: development – production – maintenance/repair – inspection – certification.

Inspection is done according to the international standard ISO/IEC 17020 under supervision of the Dutch Accreditation Council (RvA). On request of our customers we can be held CE responsible for the tools they use.

**BKL ENGINEERING BV**

Duivendijk 7,  
5672 AD NUENEN (NL)  
Contact person:  
Mr. Ing. C. Aarts  
T +31 (0)40-2951444  
coen.aarts@bkl.nl  
www.bkl.nl

**BORIT NV****35**

Borit's technology Hydrogate of sheet metal products is based on hydroforming and offers high flexibility, excellent quality and high productivity. We support customers from the early design stage through material and coating knowledge, with state-of-the-art testing and characterization equipment and with a profound knowledge of flow fields.

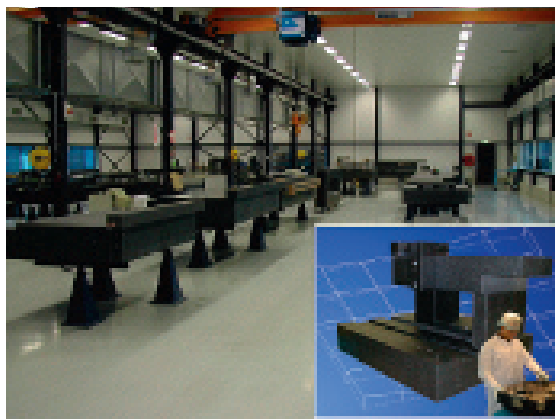


- Plates for (Compact) Heat Exchangers
- Cold Plates & Cooling Plates for liquid or gas cooling
- Half shells for electronic equipment, phones, digital cameras, medical equipment and implants

- Cold plates for high-power electronics
- Bipolar plates and interconnectors, Fuel Cells

**BORIT NV**

Lammerdries 18d, B 2440 GEEL (B)  
Contact person: Mr. Dirk Claeys  
T +32 (0)14-250902  
dirk.claeys@borit.be  
www.borit.be

**BOTECH BV****103**

Our products are used in numerous applications, often combined with airbearings. Our extensive manufacturing facility contains numerous advanced CNC-machine centers for a large range of products, up to 2.5 x 7 meters in one piece. In our conditioned production and assembling areas the products are

finished to micron-precision accuracies.

BoTech provides complete solutions in large and stable high-precision bases, supports and moving parts. We are a high-tech company that specializes in the design, manufacturing and assembly of precision machinecomponents and assemblies. We have over 25 years of experience in products in granite, metal, carbonfibre-epoxy, ceramics and combinations of these.

**BOTECH BV**

P.O. Box 6052,  
5700 ET HELMOND (NL)  
Contact person:  
Mr. C.C.J.M. van der Looij  
T +31 (0)492-551875  
info@botechbv.com  
www.botechbv.com

**BRAINPORT INDUSTRIES**

62

Brainport Industries connects all suppliers in the high tech systems value chain concentrated in the Brainport region around Eindhoven. In a unique 'open supply chain' model, these companies supply complete machines, (sub-)systems, modules and components to world wide leading high-tech OEM companies. Some examples are the wafer steppers of market leader ASML, the world's most precise electron beam microscopes of FEI Company and the highly intelligent medical equipment of Philips Healthcare.

**BRAINPORT INDUSTRIES**

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5611 AZ EINDHOVEN (NL)  
Contact person:  
Mr. John Blankendaal  
T +31 (0)40-7512424  
j.blankendaal@brainportindustries.nl  
www.brainportindustries.com

**BRANDT FIJNMECHANISCHE INDUSTRIE BV**

25

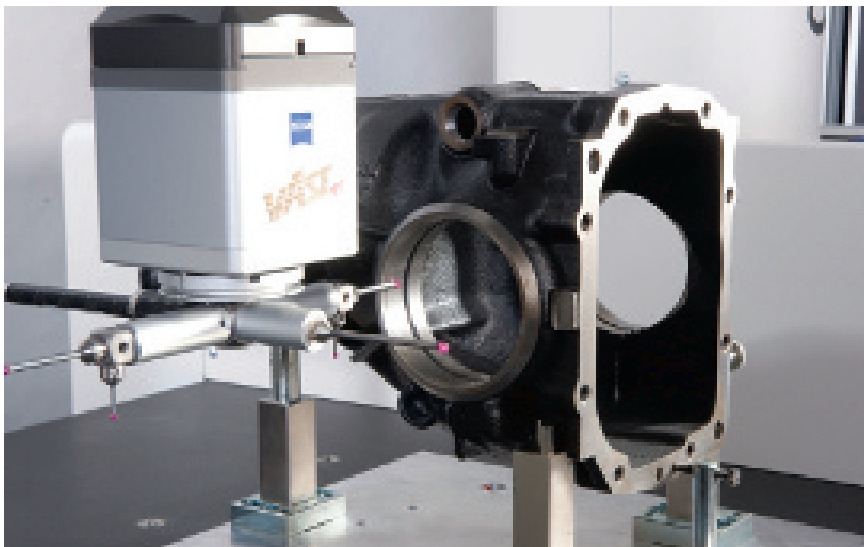
Brandt Fijnmechanische Industrie in Almere (NL) is a supplier and partner for the fine mechanical industry. The portfolio includes the manufacturing of mechanical products of various components in different forms, sizes and materials of complete prototype and serial parts. Additionally Brandt FMI is specialized in assembly, support, modification, overhaul and repair of machined parts, assemblies and equipment to customers specifications for aviation, space, defense and industrial applications. The strength of the organization is based on the guiding principle: "Vision on Precision". Highest quality and precision are the business philosophy. Our processes are AS 9100 Revision C - EN 9100:2009 certified.

**BRANDT FIJNMECHANISCHE INDUSTRIE BV**

De Strubbenweg 15,  
1327 GB ALMERE (NL)  
Contact person:  
Mr. H.A. Hoek  
T +31 (0)36-5231398  
info@brandtfmi.nl  
www.brandtfmi.nl

**CARL ZEISS INDUSTRIAL METROLOGY**

121



Measuring solutions from Carl Zeiss ensure quality in precision manufacturing. Carl Zeiss Industrial Metrology is the world's leader in Coordinate Measuring Machines

(CMMs) and complete solutions for multidimensional metrology in the metrology lab and production. Our product line ranges from horizontal-arm and bridge-type measuring

machines to form, contour and surface measuring instruments. In addition to this extensive range of precise measuring solutions, we support our customers with consultancy, project management and technical services like training, calibration and (re)programming. Our measuring house in Best (near Eindhoven) offers contract measurements, e.g. uncertainty measuring, tolerance analyses, R&R studies, reverse engineering and tomography.

**CARL ZEISS INDUSTRIAL METROLOGY**

Trapezium 300, 3360 AH  
SLIEDRECHT (NL)  
Contact person: Mr. Marcel Trupia  
T +31 (0)184-433551  
m.trupia@zeiss.nl  
www.zeiss.nl



**BRUKER****22**

Bruker Nano Surfaces Division presents metrology systems:

- Atomic Force Microscopes
- Nanoscale characterization of electrical, magnetic, compositional and material properties
- Optical Profilers
- Non-contact 3D measurement of surface texture and roughness
- Stylus Profilers
- Measurement of thin-film roughness, step heights and stress

We offer unmatched metrology capabilities:

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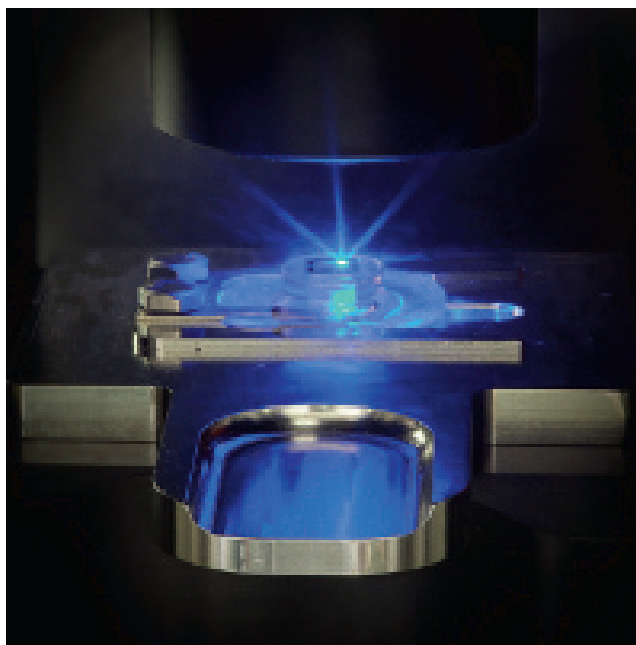
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**CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV****100**

CCM has a long experience in inventing original concepts and is able to realize the entire development process up to a finished product or production equipment.

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**CCM CENTRE FOR CONCEPTS IN MECHATRONICS BV**

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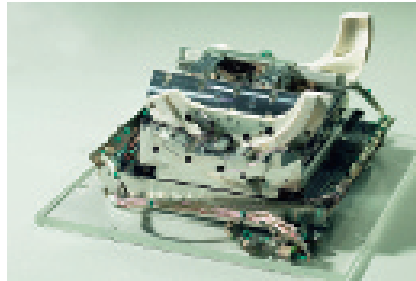
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Mrs. M. de Kimpe  
T +31 (0)40-2635000  
[info@ccm.nl](mailto:info@ccm.nl)  
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During the fair, Ceratec will show her latest ceramic developments in the following industries/applications; Mechatronics, Semiconductor, Piezo, Solar, LEDs, Ceramic Composites and Micro Valves. Properties such as low density, high stiffness, wear



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**CERATEC TECHNICAL CERAMICS BV**

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Contact person:  
Mrs. Sandra Verweij-de Haas  
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**CONNECT 2 CLEANROOMS****189**

Connect 2 Cleanrooms is proud to support a range of industries, both locally and internationally, with critical contamination control solutions. Our freestanding modular cleanrooms are integral to client's processes. We offer bespoke products to suit each application; utilizing in-house design and engineers to manage every aspect of each project.

Working together with Connect 2 Cleanrooms, ProCleanroom have made a huge impact on the cleanroom market, distributing and supporting cleanrooms throughout the Netherlands and Belgium. Their expertise, knowledge and customer-friendly approach have enabled them to develop many satisfied customer relationships.

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**CONTROLLAB PRODUCTS BV****3**

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**CONTROLLAB PRODUCTS BV**

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T +31 (0)53-4836434  
jolanda.boelema@controllab.nl  
www.controllab.nl

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Contact person:  
Mr. Niels Ferguson  
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info@cvtbv.nl  
www.cvtbv.nl

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Founded in 1994, Custom Special Tools is an international partner for special machining (jobber) and repairs on high-value technical components. Our services includes e.g. certified laser-welding, micro-welding, TIG-



welding, lapping, polishing, precision machining, high speed milling, EDM, precision grinding and superfinishing. All our processes and treatments are executed complying to ISO 9001:2008 and customer specifications. You can find more information at: [www.customspecialtools.nl](http://www.customspecialtools.nl). In 2011 Custom Special Tools has upgraded its machine park with a new Trumpf Trulaser station 5010 (laser welding), a Sodick AQ 900L (wire EDM), a Sodick AQ 750LH (wire EDM) and 2 Jung C630-CM (CNC-grinders).

**CUSTOM SPECIAL TOOLS BV**

P.O. Box 10048, 5000 JA TILBURG (NL)

Contact person:  
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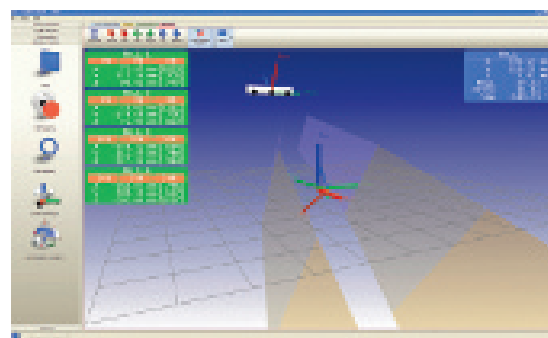
**CTECH METROLOGY 171**

CTech Metrology specializes in software solutions for spatial dynamic measurements.

CTrack is the next generation real-time 3D/6DOF tracking software. It serves applications where 3D and 6DOF motion tracking are needed in real-time.

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D&M is a reliable and independent partner that has a specialized knowledge of high-end applications and related processes. To create this knowledge, D&M has its own engineering department, service workshop and CNC production facility (for prototypes and smaller series) with an experienced team of vacuum specialists. With these competences, D&M has received confidence and credits from various prestigious companies and institutes.

**D&M VACUÛMSYSTEMEN BV**

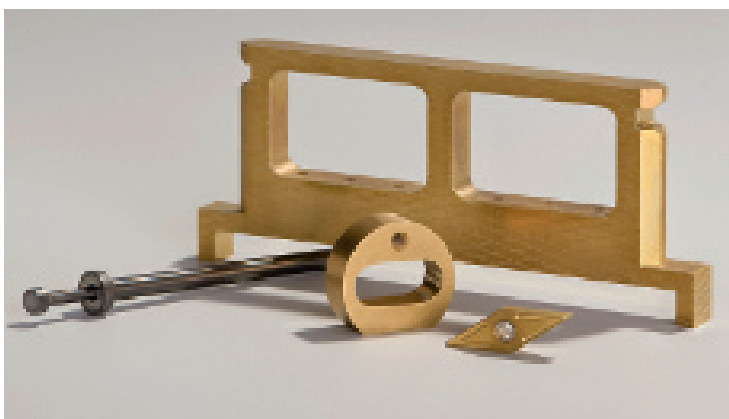
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m.driessen@dm-vacuumsystemen.nl  
www.dm-vacuumsystemen.nl

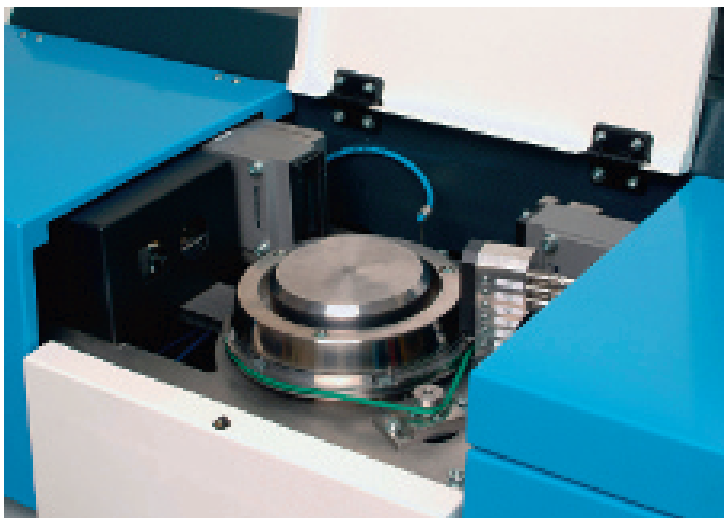
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DEMCON realizes high-tech mechatronic systems and products through research, development and production. With its mechatronic approach to design, DEMCON generates high-end solutions for complex issues in various markets, ranging from semicon and medical to life sciences and defence. DEMCON supplies advanced systems to leading OEMs and is an excellent partner for small and medium-sized

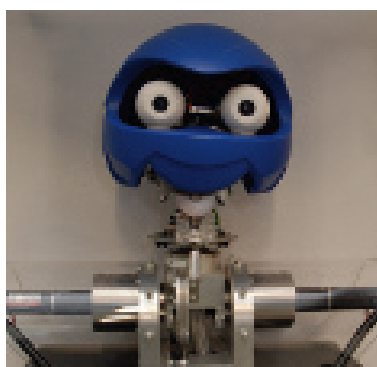
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**DSPE****61**

The Dutch Society for Precision Engineering (DSPE) is a community of precision engineers in industry, university and institute. The mission of DSPE is to stimulate precision technology knowledge innovation, knowledge transfer and networking between professionals. Members of DSPE are companies, institutes and universities that are active in precision technology. The major players in the Netherlands are member of DSPE.



DSPE is the publisher of Mikroniek, English-language professional journal on precision engineering.

**DSPE**

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**DOEKO BV****114****DOEKO BV**

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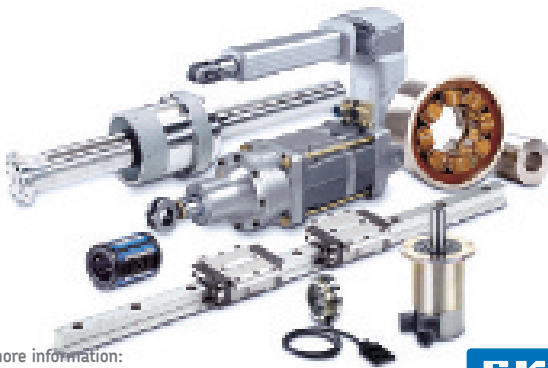
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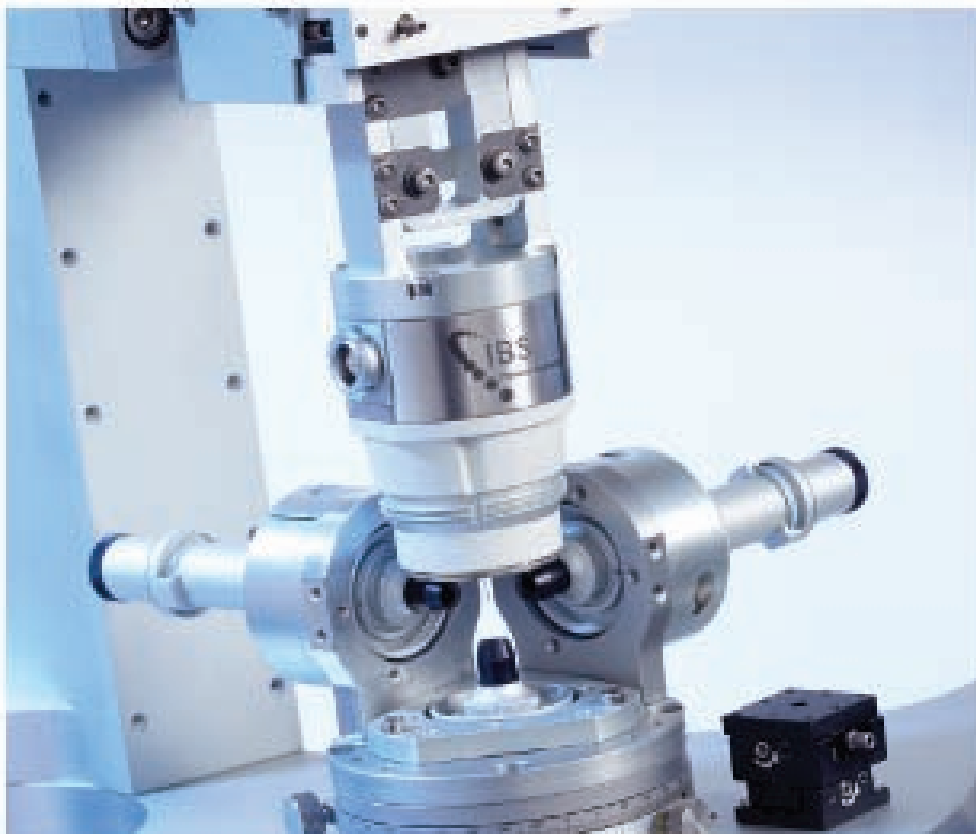
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www.dymato.nl

**DUTCH PRECISION TECHNOLOGY (DPT) 148**

The principal association for precision cutting in the Netherlands. The companies affiliated with Dutch Precision Technology guarantee expertise, quality, flexibility and effective cooperation – at prices that are in line with the market.

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www.emcmcc.nl

**ENERGIEONDERZOEK CENTRUM NEDERLAND****126**

Engineering & Services is the technical support and development group of ECN. This group of about 100 employees supports you in designing, engineering and realizing of experimental installations, prototypes and high-tech components. E&S conducts materials research, takes care of data acquisition, data processing and visualization and realizes scientific and technical software. Besides ECN, this group supports innovative institutes and companies.

Recently, ECN started the Metal Injection Moulding activities. With the MIM process it is possible to produce complex shaped metal parts in small

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Contact person:  
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wardenaar@ecn.nl  
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**ENGENIA****59**

Engenia is supplier of courses on an academic level for companies within the technology industry or process technology. Engenia is part of Mikrocentrum and is situated at the High Tech Campus in Eindhoven. Courses with open registration as well as in-company courses are scheduled all over the Benelux. Engenia can also be found on Foursquare, LinkedIn and Twitter.

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**SYNTENS / ENTERPRISE EUROPE NETWORK NETHERLANDS****190**

The Enterprise Europe Network is the largest information and consultancy network in Europe. The aim of the network is to help small business to make the most of the European marketplace. Enterprise Europe Network is a focal point network consisting of 600 organizations – chambers of commerce, regional development agencies, university technology centers, where about 4,000 professionals are working in over 40 countries worldwide. Enterprise Europe Network Staff assist small business in sourcing new business & technology partners in Europe and advise them on accessing EU Funding.

**SYNTENS / ENTERPRISE EUROPE NETWORK NETHERLANDS**

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rim.stroeks@syntens.nl  
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**E.S. TOOLING NV****116****E.S. TOOLING NV**

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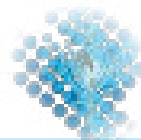
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**ESI-CIT GROUP****184**

ESI-CIT Group, consisting of ES International, CIT Engineering and Dutch daughter company T&M Solutions, designs, builds and installs customer-specific, hi-tech testing, measuring and control systems. Currently, our company employs more than fifty employees in our Hasselt, Arnhem, Eindhoven and Wrocław locations. We are active across Europe and in a whole range of sectors, from automotive, food and telecommunications to the glass, graphical and diamond industries.

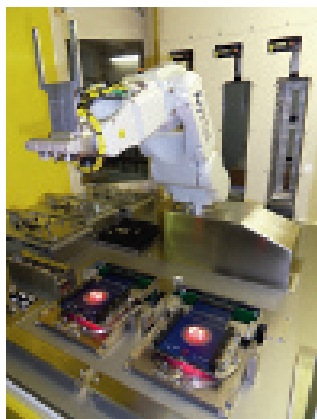
ESI-CIT Group stands for:

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**ESI-CIT GROUP**

Research Campus 8,  
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Contact person: Mr. Steven Dom  
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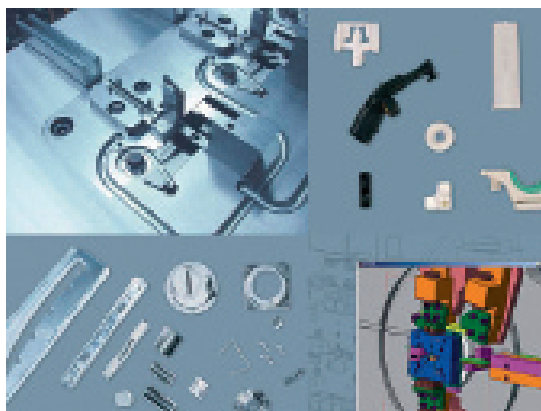
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**ETEL BV****33****ETEL BV**

P.O. Box 92, 6710 BB EDE (NL)  
Contact person: Mr. J. Sturre  
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**EURO-TECHNIEK EINDHOVEN BV****29**

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Euro-Techniek is a specialist in metal forming and plastic molding. In these areas we take care of product and process engineering, design and build tooling, and manufacturing of components by molding and forming. Unique is the combination of these activities under a single roof. We are a technical driven company, take pride in our craftsmanship, knowledge

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**FARO BENELUX BV****50**

FARO (NASDAQ: FARO) develops and markets computer-aided coordinate measurement devices and software. Portable equipment from FARO permits high-precision 3D measurements and comparisons of parts and compound structures within production and quality assurance processes. The devices are used for inspecting components and assemblies, production planning, and inventory documentation, as well as for investigation and reconstruction of accident sites or crime scenes. They are also employed to generate digital scans of historic sites. Worldwide, approximately 10,000 customers are operating more than 20,000 installations of FARO measurement systems.

**FARO BENELUX BV**

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Mrs. Marjolein Bele  
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**F.I.V. BV****6**

FIV in Cuijk, the Netherlands, specialises in the manufacture of small-series turned and milled components from all of the most commonly used materials, with a focus on stainless steel. Thanks to the flexibility of its organisation, its top-of-the-range machinery and the technical expertise of its workforce, FIV is able to offer its customers high product quality and short delivery times.

FIV's customer base boasts a number of high-profile companies operating in the food and luxury goods industry, apparatus engineering, die-making, the aircraft industry and mechanical engineering in general.

**F.I.V. BV**

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**FESTO BV****141**

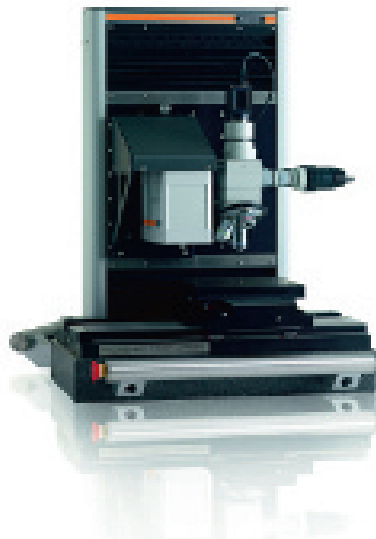
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Festo is a leading world-wide supplier of automation technology and the performance leader in industrial training and education programs. Our aim: maximised productivity and competitiveness for our customers. Around 100 new products launched every year and some 2,900 patents world-wide are a clear indication of the company's innovative strength. For our 300,000 customers around

**HELMUT FISCHER MEETTECHNIEK BV****150**

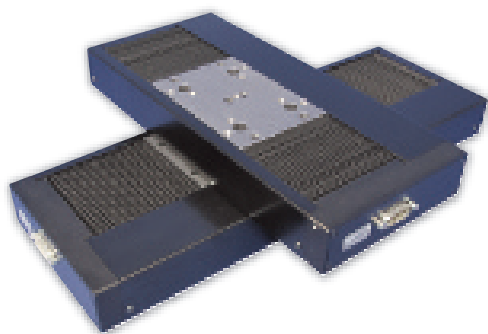
Helmut Fischer is a leading supplier for measurement equipment in the field of coating thickness measurement, material analyses, micro hardness testing and material testing. Fischer provides solutions for both your production environment and R&D laboratory with ED-XRF, instrumented micro and nano indentation, eddy current, magnetic induction, beta-backscatter and many more. Applications in the field of high reliability, RoHS screening, CIGS Solar thin film, wafer production, precious metal analyses can be solved with the advanced FISCHERSCOPE X-RAY systems. Represented all over the world, Fischer guarantees high

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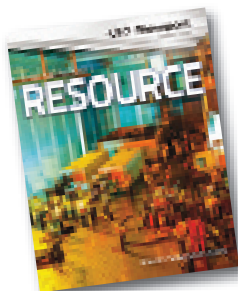
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Newport Spectra-Physics B.V.  
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**FMI PRECISION BV****46**

FMI was originally a manufacturer of stamps, dies and moulds. Gradually the company developed into what it is today: a specialized manufacturer of one-off to medium-sized batches of

fine precision components. FMI Precision works with extremely complex materials such as Hastalloy, Inconel, Duplex and other exotic materials. We manufacture the most accurate and/or complex components in the FMI group and make the impossible possible. FMI Precision delivers products for the semiconductor, oil and gas, petrochemicals, aviation and space branches. Certificates: ISO 9001:2000, ISO 13485 (medical), AS/EN 9100 (Aerospace), FDA Registered.

**FMI PRECISION BV**

Marconilaan 15,  
4622 RD BERGEN OP  
ZOOM (NL)

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T +31 (0)164-213600  
info@fmi.nl  
www.fmi.nl

**FONTYS  
HOGESCHOLEN****192**

The department of Mechatronics is a knowledge center within the Fontys University of Applied Sciences. At the department there is knowhow about mechanical engineering, physics, computer technology and electrical engineering. The department of Mechatronics collaborates with companies in the area that have applied sciences as field of interest. Typical research projects are "Composites in Mechatronics" and "Remote Robotics". An overview of these projects will be shown on the fair.

Fontys Hogescholen, Avans Hogeschool and Hogeschool Utrecht will be sharing a booth.

**FONTYS HOGESCHOLEN**

P.o. Box 347,  
5600 AH EINDHOVEN (NL)  
Contact person: Mr. M. Stappers  
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www.framo-morat.nl





**FRAUNHOFER INSTITUTE FOR PRODUCTION TECHNOLOGY IPT****183**

Fraunhofer IPT is home to a wealth of expertise and experience in all aspects of production technology. At this year's Precision Fair Fraunhofer IPT will exhibit a selection of samples for micro and precision components that can be manufactured by using high/ultra precision diamond machining processes such as Fast-Tool-Servo turning, (micro) milling, fly cutting and planning. This includes components with microstructures on freeform surfaces, mold inserts with nickel-phosphorous coatings, and large-area components

with microstructured surfaces.

Fraunhofer IPT will also demonstrate its capabilities concerning the process chain for the production of polymer optics and glass optics.

**FRAUNHOFER INSTITUTE FOR PRODUCTION TECHNOLOGY IPT**

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D 52074 AACHEN (D)  
Contact person: Mr. P. Kolb  
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philipp.kolb@ipt.fraunhofer.de  
www.ipt.fraunhofer.de

**MACHINEFABRIEK GEBRS. FRENCKEN BV****99**

The roots of Machinefabriek Gebrs. Frencken (MFE) date back to 1947. Since then, a large number of our customers have been served with the supply of high-end precision mechanical machined parts and complex sheet metal products. When you need high-mix, low-volume

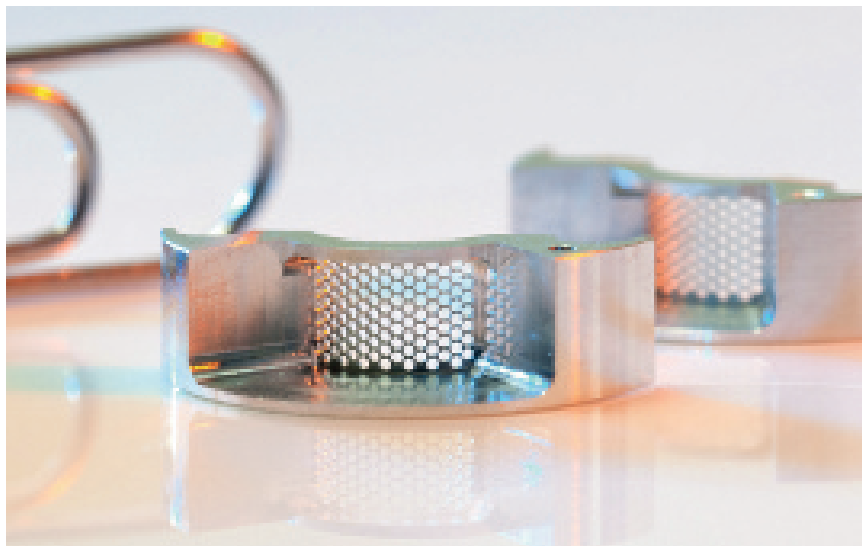
products that require skills and craftsmanship, MFE is your preferred choice.

MFE is an absolute leader in co-designing and making intelligent combinations of sheet metal and machined parts, joined together to form rigid frames or construction

elements. For very small parts with extreme requirements with regard to shape and dimensions, MFE can be considered a leader in the industry.

**MACHINEFABRIEK GEBRS. FRENCKEN BV**

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Mr. P. van der Steen,  
Mr. P. Verhoeven  
T +31 (0)40-2507507  
machinefabriek@frencken.nl  
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**FRENCKEN ENGINEERING****99****FRENCKEN ENGINEERING**

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**GELDERBLOM CNC MACHINES BV****28**

Gelderblom CNC Machines is exclusive and specialized dealer for OKUMA CNC Lathes and Machining Centers from Japan in Belgium, The Netherlands and Luxembourg.

OKUMA Machines are famous for their reliability and quality and therefore a perfect partner for automation. Gelderblom not only delivers standard machines but specializes in delivery of turnkey production cells that contain an Okuma CNC Lathe and/or Machining Center. It is our aim to add value for our customers in order to realize highly efficient and profitable production capacity.

**GELDERBLOM CNC MACHINES BV**

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Germefa can handle almost all material qualities. Almost all kinds of steel, non-ferrous metals, plastics and castings can be machined for you. What this versatility means for you is that you can outsource the complete process to us. Germefa takes care of the whole machining process in house.

**GIBAS NUMERIEK BV****53**

In recent years Gibas has developed into one of the largest importers of machining tool centers within the Benelux. Besides stand-alone machines Gibas delivers a large number of turn-key projects including within the Automotive industry and suppliers to the metal industry.

In 2010 Gibas expanded its activities with a new department Gibas Tools specialising in cutting tools and accessories and also a number of suppliers of Swiss precision machines.

Gibas is divided into 4 main disciplines:

- Gibas Numeriek: Production and precision machines
- Gibas Automation: Automated production systems
- Gibas Tools: Cutting tools and accessories
- Logistics: Transport of machines

**GIBAS NUMERIEK BV**

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r.vanbuschbach@gibas.nl  
www.gibas.nl

**GERMEFA BV**

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810 KB ALKMAAR (NL)  
Contact person:  
Mr. Rene de Vries  
T +31 (0)72-5350000  
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**GILEON TECHNICAL COMPONENTS****172**

Franke develops and produces Antifriction Bearings and Linear Systems, which are precisely adjusted to suit the needs of customers. We are experts in special bearings when it comes to Antifriction Bearings. The design with grinded race rings results in an extremely compact bearing which suits very small spaces. The choice of design and material for the

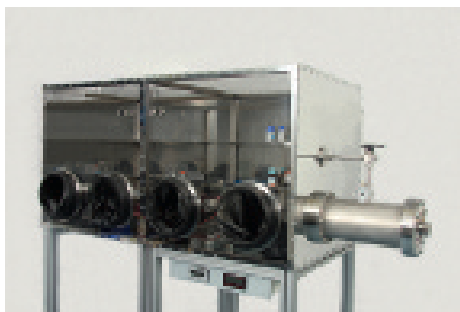
surrounding component is flexible. We produce bearing solutions. The modular design of our Aluminium Linear Systems enables us to fulfil diverse customer wishes regarding low weight, high speed and silent running for maintenance-free and clean operation. We produce linear guides and complete systems.

**GILEON TECHNICAL COMPONENTS**

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**GLOVEQB****177**

The GloveQb system is a solution to integrate controlled and gas-tight atmospheres to your application, characterized by endless possibilities for expansion and adaptability. The basis for these properties is the 3D-modular construction system. A unique technique that allows you to design a fully controlled atmosphere for your experiments or processes. Interfacing your existing instrumentation to a GloveQb system is easily realized by using a modular panel with the appropriate connectors, for example standard CF or ISO connections or specially designed connections for your application. GloveQb has extensive experience with interfacing applications.



GloveQb: Adaptive, modular, standard, customized and quickly deliverable.

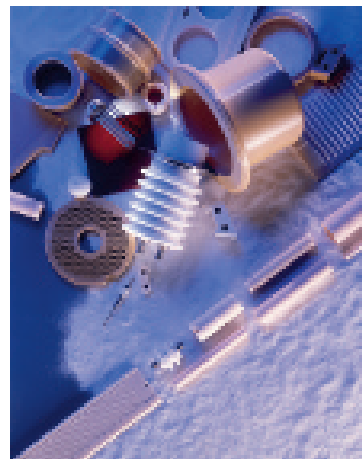
**GLOVEQB**

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T +31 (0)10-4427949  
info@gloveqb.com  
www.gloveqb.com

**FRIATEC TECHNISCH KERAMIEK / GLYNWED****140**

FRIATEC is one of the most specialized manufacturers of ceramic components out of pure oxides, their registered trade mark is FRIALIT®DEGUSSIT®. Technical ceramics can be applied in various industries, laboratories, technics of measurement and regulating, machine building (O.E.M.), electrical engineering and electronics. Besides a large scale of standard products, custom-made products can be manufactured in alumina oxides, zirconia oxides, silicium nitride and silicium carbides.

As associated firm of FRIATEC, Glynwed is responsible for consulting and sales of FRIALIT®DEGUSSIT® ceramics. A variety of ceramic components of FRIATEC is presented on booth number 140.

**FRIATEC TECHNISCH KERAMIEK / GLYNWED**

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4797 ZH WILLEMSTAD (NL)  
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## GEREEDSCHAPMAKERIJ GMI BV

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### Quality is produced by working together

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development and production of both high-grade moulds and precision mechanical components involve accuracy and reliability. This requires two parties that can implicitly trust each other’s expertise, innovative thinking, operational speed and flexibility. High quality is not just achieved by continuously probing the limits in our own business but also by collaborating with our customers to find the best solution. A 30 year “feeling for measurement” establishes bonds.

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## W.L. GORE & ASSOCIATES GMBH

84



### Improve Cable Reliability in Cleanrooms

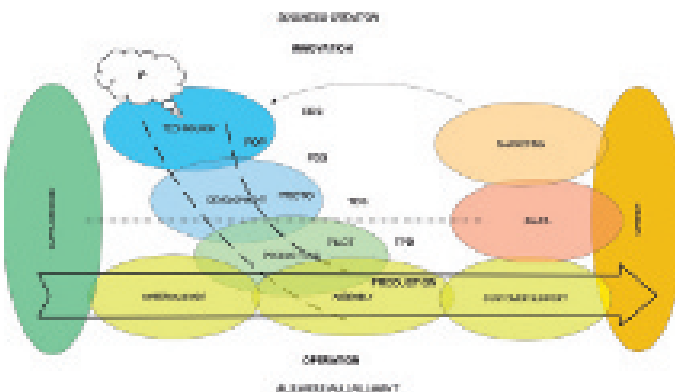
GORE® High Flex Cables provide superior flex life performance and maximum resistance to severe mechanical and environmental stresses. With nearly 50 years of experience in the wire and cable industry and extensive knowledge of unique materials, Gore provides reliable solutions to your most demanding cable and assembly needs. Particulation and outgassing of materials used in cleanrooms are complex issues. As cables move, flex, and rub against cable chains, the cable jackets can shed particles. In addition, the materials used in constructing cables and assemblies can outgas and contaminate in a cleanroom.

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Contact person: Mrs. Petra Tillmanns  
T +49 (0)9144-601-0  
electronics.europe@wlgore.com  
www.gore.com

## GREENTECH ENGINEERING BV

49



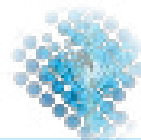
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m.grooten@greentech-engineering.nl  
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**HEIDENHAIN NEDERLAND BV****33****DR. JOHANNES**

HEIDENHAIN develops and manufactures linear and angle encoders, rotary encoders, digital readouts, and numerical controls.

HEIDENHAIN supplies its products to machine tool builders and manufacturers of automated machines and systems, in particular for semiconductor and electronics manufacturing.

**Worldwide presence**

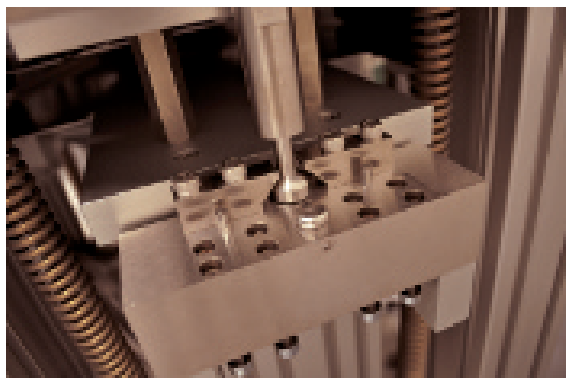
HEIDENHAIN has always sought a dialog with science and research on the one hand and with users and customers on the other. Today, HEIDENHAIN is represented in more than 50 countries – most of them with wholly owned subsidiaries. Sales engineers and service



technicians support the user on-site with technical information and service in the local language.

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Contact person: Mr. Jan Sturre  
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**HEINMADE BV****65**

Some typical provided solutions are; Ultra High Vacuum stages, Ultrasonic transducers, Positioning stages at sub nanometer accuracy, Active vibration dampers (snapshot of qualification tool), Dynamic systems with fast response times of less than 1 msec, Low-speed systems at 1 nm/sec,

HEINMADE focuses on development and supply of piezo ceramic solutions. To enhance your development process, we provide piezo components and (sub-) systems, give support or develop a customized solution. HEINMADE closely works together with Nanomotion, Noliac and Piezomechanik, which are all leading in their specific piezo technology field for known quality and performance.

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Contact person:  
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info@heinmade.com  
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**HEMBRUG MACHINE TOOLS****101**

Hembrug is the specialist with more than 40 years experience in the design, manufacturing and worldwide sale of ultra precision fully hydrostatic turning machines. The Hembrug Mikroturn® machine range is at the leading edge of what is possible with hard turning today. Hembrug offers finish hard turning solutions for workpieces up to a diameter of 1,500 mm having hardness 58-68 HRC. Shape accuracies 0.1 - 2 micron, dimensional accuracies < 2 micron and surface finish accuracies of 0.1 - 0.4 micron have been obtained. The Hembrug Mikroturn® machines are supplied to various industries such as the bearing industry, the automotive industry and the die and mold industry.

**HEMBRUG MACHINE TOOLS**

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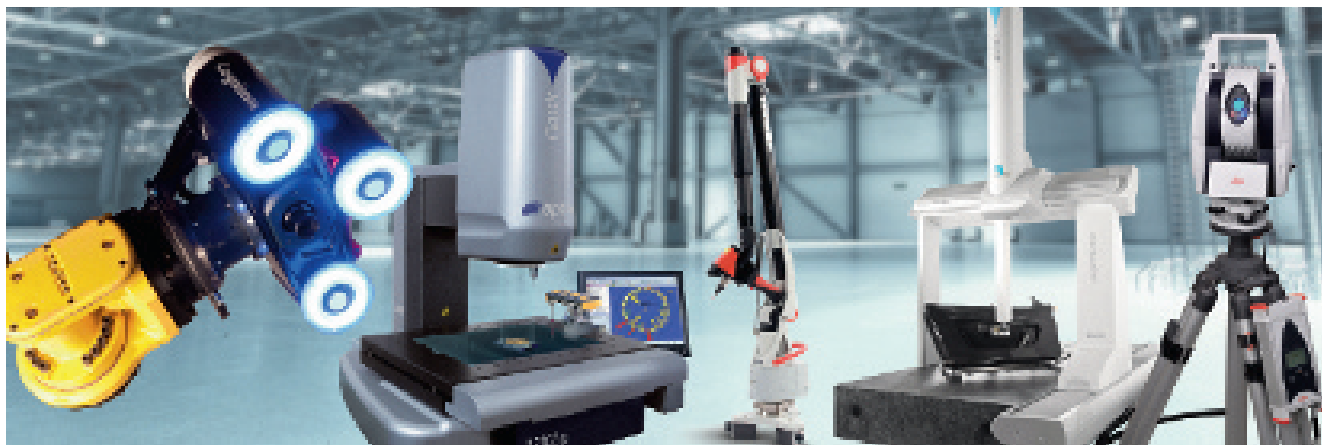
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[www.mevi.com](http://www.mevi.com)

**HEXAGON METROLOGY BV****12+13**

When the issue is metrology, Hexagon Metrology is without question the specialist. With the most comprehensive product range on the market, including leading metrology brands such as Brown & Sharpe, Cognitens, DEA, Leica Geosystems, Leitz, Optiv, PC-DMIS, QUINDOS, ROMER and TESA, we are very well equipped to optimally meet our customers' requirements.

Hexagon Metrology brands represent an unrivaled global installed base of Coordinate Measuring Machines (CMMs), portable measuring systems,

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**HEXAGON METROLOGY BV**

Van Elderenlaan 1,  
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[contact.nl@hexagonmetrology.com](mailto:contact.nl@hexagonmetrology.com)  
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**HIPRECISION****58**

HiPrecision provides all competences needed for fast and efficient development of equipment and machinery. HiPrecision clarifies specifications, provides creative input into the concept design, and applies systematic design methods. Systematic and function-oriented design leads to an efficient use of staff and resources, and a design that is functioning reliably and predictably. In the proto-typing stage HiPrecision develops test plans, and takes care for the tests and for analysis of the results. HiPrecision makes it work!

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[tom.bijnagte@hiprecision.nl](mailto:tom.bijnagte@hiprecision.nl)  
[www.hiprecision.nl](http://www.hiprecision.nl)

**HFI BV****6**

Hartman Fijnmechanische Industrie (HFI) specialises in the production of fine-mechanical parts for the industry. The turned parts are used in measuring and control equipment and in the heating, electronics and automotive industry. HFI produces precision-turned parts in series ranging from several pieces to over a million. Diameter range from Ø1 to Ø100 mm. HFI uses modern CNC machines for the production of the turned parts. HFI is able to supply part assemblies to customer specification. These assemblies are

often delivered "plug and play" in Kan-Ban fashion to customers worldwide. Since 2000 we are part of Aalberts Industries.

**HFI BV**

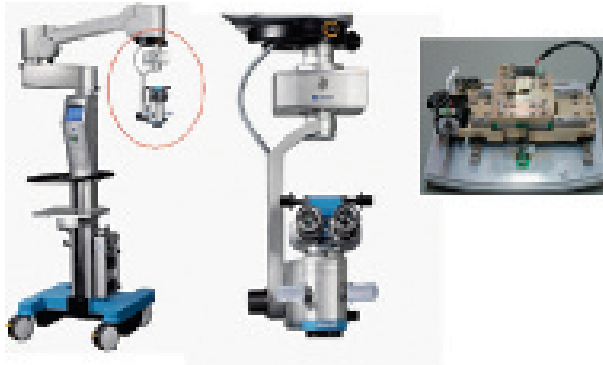
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**HITTECH GROUP BV****39**

Hittech Group is a group of centrally controlled independent companies, operating as system supplier.

Development, engineering, manufacturing and assembly join in one organization acting as a partner for high-end precision industries, analysis and medical OEM companies, supplying systems, machines, (sub) modules and components. Hittech Group has ISO 13485:2003 certified facilities.

The separate companies within Hittech Group create the flexibility of an independent enterprise, while the Group generates a powerful synergy when operating as one business.



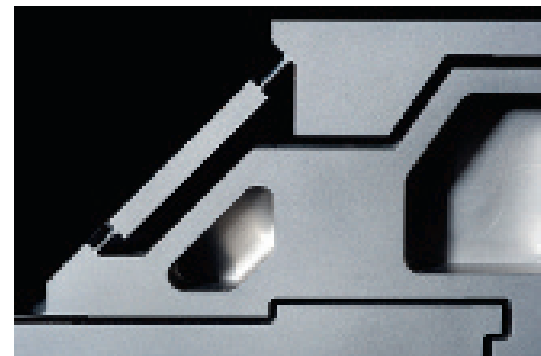
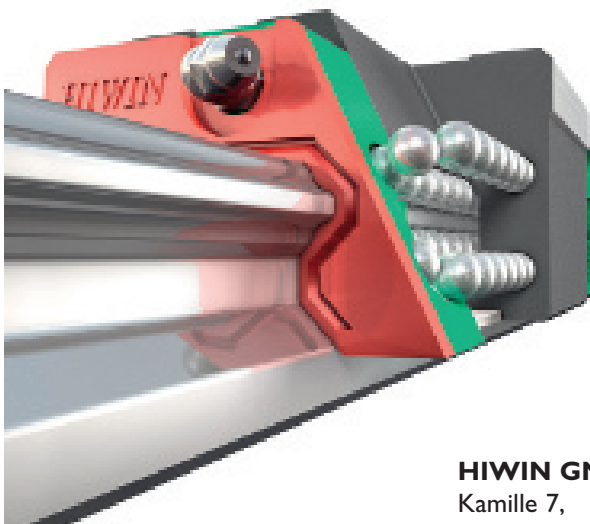
Hittech Group is geared to continuous improvement, in areas of design, product quality, cost or production processes. That's why our partners consider us "Masters in improvement".

**HITTECH GROUP BV**

P.O. Box 633, 2600 AP DELFT (NL)  
Contact person: Mr. P. Bakker  
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**TER HOEK VONKEROESIE RIJSEN BV****97****Flexible, conscientious and trustworthy – Machining without restrictions**

No direct contact between tool and work piece. That is the essence of spark erosion. By sparking from the electrode to the work piece a tiny part of it melts. The tool does not have to be harder than the editing part. All electrically conductive materials are suitable for very accurate editing. Due to the lack of mechanical techniques there will be no stress on the material and its shape will be preserved, resulting in a possible accuracy of 0.001 mm. We also process large pieces up to 3,000 kg and contours of 500mm thick and we offer Contours Sparking.

**HIWIN GMBH****73**

ballscrews, linear guideways, linear axis with ballscrews, linear motor axes, ready assembled gantry systems and cross tables, rotary tables, linear motor and torque motor components, linear actuators and ball bushes.

**HIWIN GMBH**

Kamille 7,  
3892 AJ ZEEWOLDE (NL)  
Contact person: Mr. Han Schimmel  
T +49 (0)781-932780  
info@hiwin.nl  
www.hiwin.nl

HIWIN produces and sells components and solutions for the whole field of the linear technology. The product portfolio includes

**TER HOEK VONKEROESIE RIJSEN BV**

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7463 PN RIJSEN (NL)  
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T +31 (0)548-540807  
info@terhoekvonkerosie.nl  
www.terhoekvonkerosie.nl

**HOGESCHOOL UTRECHT****194**

The Research Group MicroSystemTechnology (MST) of the University of Applied Science Utrecht (HU) focuses on product improvement and industrialization of MicroSystems.

Within the format of Submissive Product Design ten projects have been realized in which during the product development process the intended production methods were stringently taken into account.

A temperature sensor network, ~10 nodes, with data gathering via GPRS working with an energy-frugal protocol, will be shown.

HUniversal Production is proposed as the production philosophy for the future. It was developed within the framework of Agile Manufacturing. As an example will be shown the HUniplacer Delta, the third variant realized within this production platform.

Hogeschool Utrecht, Avans Hogeschool and Fontys Hogescholen will be sharing a booth.

**HOGESCHOOL UTRECHT**

P.O. Box 182,  
3500 AD UTRECHT (NL)

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erik.puik@hu.nl  
www.hu.nl

**HOLLAND INNOVATIVE BV****165**

Holland Innovative is market leader in supporting organizations in product, process and project management. In Solar we actively participate in and reinforce project teams in process development as well as running-in of solar production facilities on a global scale. A multidisciplinary team of experienced professionals develops and implements adequate and sustainable solutions. According to the "voice of the customer" and the "voice of the business", with clear targets and results.

**Always a solution**

If you are looking for yield improvement, development of production processes, reliability design or any other complex process..., Holland Innovative will offer in short time a sustainable, reliable solution. Challenge us!

The Holland Innovative Team

**HOLLAND INNOVATIVE BV**

P.O. Box 7060,  
5605 JB EINDHOVEN (NL)

Contact person:

Mrs. Ing. C. Boy  
T +31 (0)40-8514610  
claudia.boy@holland-innovative.nl  
www.holland-innovative.nl

**THE HOUSE OF TECHNOLOGY****57**

The House of Technology is a network of high-tech specialists (bureaus and freelancers) that can help innovative companies to support their projects.

The high-tech industry is very fast-moving. Speed of innovation is crucial for companies who want to stay ahead of the competition. That is why they are constantly working on technical developments. However, issues can arise for which they do not have the proper expertise in house. An extensive network of specialists with many years' experience in the high-tech industry can often provide the required solution.

At the fair you can find an overview of our experts and their specialties.

**THE HOUSE OF TECHNOLOGY**

P.O. Box 7505,  
5601 JM EINDHOVEN (NL)

Contact person:

Mr. Marty van de Ven  
T +31 (0)6-19864495  
marty.van.de.ven@  
thehouseoftechnology.nl  
www.thehouseoftechnology.nl

**IAI INDUSTRIAL SYSTEMS BV****164**

IAI industrial systems in Veldhoven designs, builds and delivers high-tech systems for a variety of industrial users. Our core market is document security, where we supply systems

for the personalisation of passports and identity cards. We also operate in the solar market, where we design, construct and deliver production systems for wafers and solar panels.

Our core competences are optics, laser applications, system design, automation, product handling, machine vision, control software and inkjet printing. We have experienced a strong growth and are looking to expand our workforce even further in the coming years. Please visit our booth to discover the possibilities.

**IAI INDUSTRIAL SYSTEMS BV**

De Run 5406,  
5504 DE VELDHOFEN (NL)  
Contact person: Mr. Jan Cobben  
T +31 (0)40-2542445  
info@iai.nl  
www.iai.nl

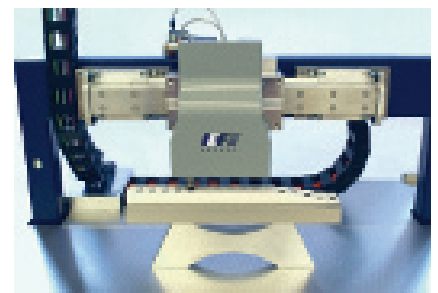
**IBS PRECISION ENGINEERING****129**

In IBS Precision Engineering you will recognize a leading innovator in high-grade precision engineering, constantly challenged to push back frontiers. From our offices in Europe and agents around the world, we serve the world market with both standard and customized metrology solutions and engineering services that excel in accuracy, efficiency and usefulness. For our customers this will ultimately result in a better product quality, an increased productivity and reduced costs.

IBS Precision Engineering is involved in special measuring machines, non-contact measuring systems, machine tool calibration & inspection systems and air bearings.

**IBS PRECISION ENGINEERING**

Esp 201,  
5633 AD EINDHOVEN (NL)  
Contact person:  
Mr. Dirk Smits  
T +31 (0)40-2901270  
smits@ibspe.com  
www.ibspe.com

**IEF WERNER GMBH****4**

IEF Werner has a large range of products of handling components, transport and positioning systems as well as palletiser for the automation technology. A modular structure concept permits individual configurations.

**IEF WERNER GMBH**

Boulevard Saint Michel 47,  
B 1040 BRUXELLES (B)  
Contact person:  
Mr. Dirk Reise  
T +32 (0)240-00056  
dirk.reise@ief-werner.de  
www.ief-werner.de



**IGS GEBOJAGEMA****111**

Your solution in precision and high precision parts and components. IGS Gebojagema has become one of

the world's leading players in the field and has left a definite mark in various sectors in recent decades. IGS Gebojagema combines know-how and experience to form an outstanding metal business.

These are the qualities that underline our broad coverage:

- Precision parts & components for machinery and equipment.
- Replacement parts and measuring devices for production processes.

- Components and subassemblies for manufacturers of tools and precision parts.

**IGS GEBOJAGEMA**

De Vest 13,  
5555 XL VALKENSWAARD (NL)

Contact person:

Mr. Hans Bakker

T +31 (0)40-2040355

[hans.bakker@igsgebojagema.nl](mailto:hans.bakker@igsgebojagema.nl)

[www.igsgebojagema.nl](http://www.igsgebojagema.nl)

**IKO NIPPON THOMPSON EUROPE BV****127**

Founded in 1950, the company has accumulated numerous proprietary technologies and a wealth of experience that it uses to develop innovative products. Nippon Thompson has become an established leader in three specialties: Needle Roller Bearings, Linear Motion and Mechatronic Products. Marketed under the IKO brand, these products have established a worldwide reputation for high quality and originality. The European affiliate, Nippon



Thompson Europe, has its head office in the Netherlands with own warehouse and facilities to modify linear motion products according

customer specification. At the Precision Fair we will show our latest development of maintenance-free linear ways and mechatronic products.

**IKO NIPPON THOMPSON EUROPE BV**

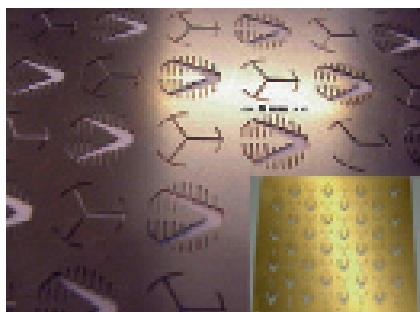
Sheffieldstraat 35-39,  
3047 AN ROTTERDAM (NL)

Contact person: Mr. A. Visser

T +31 (0)10-4626868

[nite@ikonet.co.jp](mailto:nite@ikonet.co.jp)

[www.ikont.co.jp](http://www.ikont.co.jp)

**ILT INDUSTRIELE LASER TOEPASSINGEN BV****135****Fine mechanical laser processing**

ILT specializes in producing highly accurate laser made products for customers in the field of fine mechanics, microelectronics, medical

systems, etc. Our main fields of expertise are:

- Laser (micro) cutting.
- Laser (micro) welding.
- Laser (micro) drilling
- Laser engraving.
- Production badges range from 1 (prototyping) to 5,000 pieces.
- Laser (micro) cutting
- Small and accurate parts, projection masks etc. Cutting widths down to 20 microns.
- Laser (micro) welding
- Materials: stainless steel, Titanium, Gold, etc.
- Laser (micro) drilling

- Orifices from 10 microns to 0.5 mm.
- Laser engraving.
- Moulds for compact discs, chip cards.
- Reproduction of identity codes of transponders, etc.

**ILT INDUSTRIELE LASER TOEPASSINGEN BV**

Tinsteden 30,  
7547 TG ENSCHEDE (NL)

Contact person: Mr. Ir. P. Bant

T +31 (0)63-4282874

[info@ilt.nl](mailto:info@ilt.nl)

[www.ilt.nl](http://www.ilt.nl)

**IMAGO GROUP BENELUX BV****56**

Imago Group Machine Vision and Measurement Benelux (formerly Aims Optronics since 1973) specializes in the distribution of Machine Vision and Measurement components such as industrial cameras, lighting, lenses, frame grabbers, software, fiber optic sensors etc. With locations in Waalre

(NL) and Zaventem (B) we are able to provide the whole Benelux with our experience in machine vision, image processing & analysis. Welcome on our new website. We are gradually adding more information but you can already find links to all the companies we distribute in the Products & Services part of the site. Don't hesitate to call us if you don't find what you are looking for.

**IMAGO GROUP BENELUX BV**

Van Dijklaan 15s,  
5581 WG WAALRE (NL)

Contact person:

Mr. Mart Mijnsbergen

T +31 (0)40-8200368

info@imagogroup-benelux.cm

www.imagogroup-benelux.com/vim

**IMOTEC BV****65**

of electromechanical, control, and information processing systems. This is what we call advanced intelligent mechatronics. We exhibit state-of-the-art custom piezo solutions in sensing and vibration control. We also show you an example of Multi-Agent Control Systems (MACS).

We believe software will play an increasingly important role in mechatronics. Imotec has the knowledge, the experience and the products with which we can help you achieve state-of-the-art software solutions. We help you reach your goals now and in the future by development of optimal combinations

**IMOTEC BV**

Oude Bornseweg 86,  
7556 GX HENGLO (NL)

Contact person: Mr. Jan Peters

T +31 (0)74-2505907

j.peters@imotec.nl

www.imotec.nl

**IMS BV****88**

IMS offers turn-key manufacturing solutions to customers worldwide in the high-precision, electronics and medical industry.

At the Precision Fair, the IMS stand will feature a live exhibit of the ProMicro platform for the medical industry: the ProMicro Medical. ProMicro is the semi-automatic work cell for micro systems and is commonly used in micro assembly projects for low to medium production volumes. Key aspects are its modular build up and the focus on automating the customers' value added processes, resulting in a cost effective solution for micro assembly challenges.

**IMS BV**

Einsteinstraat 14,  
7601 PR ALMELO (NL)

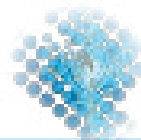
Contact person:

Mr. Martin Langkamp

T +31 (0)546-805580

ims@wwinn-group.com

www.ims-nl.com



## IMT MASKEN UND TEILINGEN AG

19

### Microstructures on Glass – Optical Components

IMT has been a supplier of complex microstructures on glass for more than 50 years.

Products: delineated optics, custom-made microstructures, thin-film coatings, lab-on-chip components, 200mm wafers with patterned optical coatings, electro-optic modulators.

All manufacturing processes for complex microlithography are in-house.

Core competences:

- Microlithography, micro-structuring of glass
- Micro-channels

- Thin-film technology, optical coatings
- Electrically conductive thin-films, electrodes
- Sub  $\mu\text{m}$  structures
- Glass machining
- Manufacture of large area photomasks (largest format: 812 mm x 609 mm)

IMT employs 70 experts in the fields of optics, physics and micro-technology. The production facility includes 1,200 m<sup>2</sup> clean rooms.

### IMT MASKEN UND TEILINGEN AG

Im Langacher,  
CH 8606 GREIFensee (CH)  
Contact person: Mrs. T. Weber  
T +41 (0)44-9431900  
tweber@imtag.ch  
www.imtag.ch

## INSCOPE BV

48



Importeur/Distributeur voor Vision Engineering en Optilia Instruments in de Benelux. (Optische) Microscopen en videomicroscopen.

### INSCOPE BV

Oeverkruid 1,  
4941 VV RAAMSDONKSVEER (NL)  
Contact person: Mr. Ruud Pels  
T +31 (0)162-677547  
info@inscopebenelux.com  
www.inscopebenelux.com

## NL INNOVATIE / INNOVATIEKREDIET 59A

NL Innovation (a division of Agency NL) provides various means of financing of innovation activities. Especially for small and medium-sized companies (SMEs) the 'Innovatiekrediet' (Innovation Credit) is an attractive way to finance technical development projects of products, processes or services which are new for the Netherlands. The Innovation Credit is a risk bearing loan which finances 35% of the project costs. When the project fails technically, the credit can be waived. Fill in the quick scan on our website ([www.innovatiekrediet.nl](http://www.innovatiekrediet.nl)) to hear from one of our advisors whether your project could qualify for the Innovation Credit.

### NL INNOVATIE / INNOVATIEKREDIET

Juliana van Stolberglaan 3,  
2595 CA DEN HAAG (NL)  
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Mr. Kees van Hoeven  
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innovatiekrediet@agentschapnl.nl  
www.innovatiekrediet.nl

## IPS TECHNOLOGY

179



Our mission is both simple and wide-ranging: we ensure that your industrial products reach the user's site in perfect condition, ready for efficient installation. We achieve that by cherishing your products. IPS is a specialized consulting and design agency in high-tech packaging, tooling and testing. Our knowledge and experience contains the dismantling, packaging, shipping and reassembling of industrial products. Meaning, we generate concepts for

shipping them from the manufacturer to customer. Sounds like a narrow area of expertise. However, within that narrow area, we are incredibly wide-ranging. This wide-range is what we call 'integral supply chain thinking'.

IPS recognizes the increasing importance of cleanliness within the high-tech supply chain. Therefore we proudly present our new sister Innovar! Cleaning Control. Cherishing industrial products!

### IPS TECHNOLOGY

Boschdijk 760,  
5624 CL EINDHOVEN (NL)  
Contact person:  
Mr. A.P.V.W. Klaassen  
T +31 (0)40-2647253  
armand.klaassen@ips-technology.com  
www.ips-technology.com



## IRIS VISION BV

8



Iris Vision offers a complete range of machine vision and image processing products from major manufacturers. Our expertise is the integration of all necessary vision components for a wide variety of image processing and machine vision applications. Ranging from the beginning of the data chain with lighting and optics, through the versatility of the acquisitions and processing to the result of the application. We offer you a range of

solutions, simple frame grabbers, extensive pipeline processors, host based processing and hardware processing.

Your vision problem is our problem. We help you in solving your image processing task for process control and quality control. Our price/performance in all the vision components and systems is unbeatable and our specialists are at your disposal to make your vision application easy.

### IRIS VISION BV

Joppelaan 82a,  
7213 AE GORSSEL (NL)

Contact person:  
Mr. Dietmar Serbée  
T +31 (0)575-495159  
info@iris-vision.nl  
www.iris-vision.nl

## IRMATO

136



Irmato offers the one-stop-shopping principle. In this concept, Irmato supports its customers in the total product life cycle, from research to development & engineering, project management, supply chain management and assembly/realization.

Irmato brings high-tech competences to its customers:

- Measurement solutions (incl. calibration) and the P-ECM technology.
- Mechatronic Development & Engineering of Tooling, modules and systems.

- Assembly and realization of tooling, modules and systems with the following characteristics: high mix, low volume and high complexity.
- Concept Development "from scratch".
- Consultancy for PLM, PDM and CAD-CAM implementation.
- Professional and flexible engineering support.

For more information please visit  
www.irmato.com

### IRMATO

Graafschap Hornelaan 143,  
6001 AC WEERT (NL)

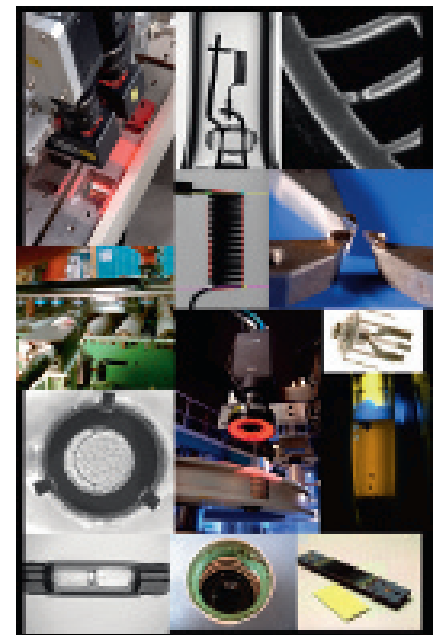
Contact person:  
Mrs. Sonja van den Berg  
T +31 (0)495-453502  
info@irmato.com  
svandenber@irmato.com  
www.irmato.com

## J.A.I.M.S.

58

J.A.I.M.S. develops and creates vision solutions for product quality inspection, measurement and positioning problems. Knowledge and experience gained within high precision machinery and equipment design, automotive, semi-conductors, special glass products, medical systems and optical systems. Expertise in:

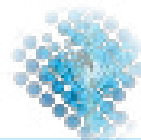
- Image Composition Development; the perfect match between optics and illumination is crucial.
- Feasibility study Vision Solution; gives on forehand information about the accuracy, reliability, risks and hidden costs.
- Integral Vision Projects; stand-alone and system integrated vision solutions on customer demand.



### J.A.I.M.S.

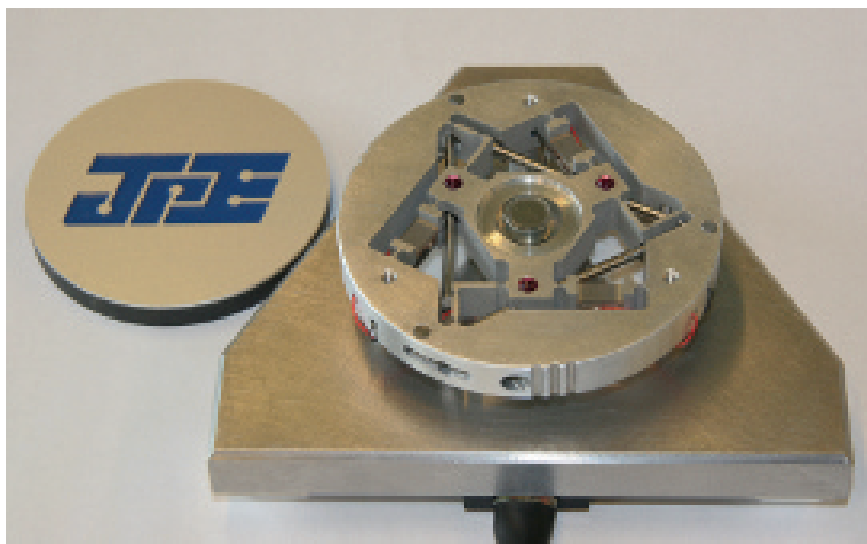
Heidestraat 64,  
6114 AE SUSTEREN (NL)

Contact person:  
Mr. J.A. Janssen  
T +31 (0)46-4490936  
janssen@jaims.nl  
www.jaims.nl



**JANSSEN PRECISION ENGINEERING**

**65**



Precision engineering in ambient, vacuum and cryogenic environment.

**JANSSEN PRECISION ENGINEERING**

Aziëlaan 12, 6199 AG  
MAASTRICHT-AIRPORT (NL)

Contact person:  
Mr. Huub Janssen  
T +31 (0)43-3585777  
huub.janssen@jpe.nl  
www.jpe.nl

**JTEKT EUROPE BEARINGS BV KOYO BENELUX OFFICE**

**93**



includes Ceramic-bearings, Hybrid-bearings and various types of steel bearings. We offer these custom-designed bearings for the various typical applications requirements such as: high precision, high and/or low temperatures, high vacuum, low/- non lubrication, non-particle emission, X-ray, contact with aggressive

Koyo is the brand name of a range of high-quality roller bearings for automotive and industrial applications produced by the Japanese JTEKT Group.

At the Precision Fair 2011 we exhibit the Koyo-Exsev series of high precision roller bearings specially designed for critical applications and extreme environments. This range

chemicals, etc.

**JTEKT EUROPE BEARINGS BV KOYO BENELUX OFFICE**

P.O. Box 1, 2965 ZG  
NIEUWPOORT (NL)  
Contact person: Mr. J. Blonk  
T +31 (0)184-606800  
info@jtekt.nl  
www.jtekt.nl

**JEVEKA BV**

**81**

Since 1937 Jevaka is a leading specialist in the field of fasteners and tools in the Netherlands. We deliver a high-quality program, well attuned to our customers needs and wishes. We support you as a customer with our large knowledge base and a customer oriented, but above all reliable and independent organization with over 55 people.

**Quality products with excellent documentation**

Our program consists of over 60,000 products from more than 50 renowned brands with a constant high quality. We are specialised in fasteners for vacuum and EUV applications. You can find our product range through our E-Commerce website: [www.jevaka.com](http://www.jevaka.com).



**JEVEKA BV**

P.O. Box 22966, 1100 DL  
AMSTERDAM ZUIDOOST (NL)  
Contact person:  
Mrs. C.M. Collewijn  
T +31 (0)20-3420342  
tinycollewijn@jevaka.com  
www.jevaka.com



**KANTNER PRÄZISIONSOPTIK****27**

Kantner Präzisionsoptik is the European representative for overseas OEM Optics suppliers. Kantner Präzisionsoptik is responsible for Rochester Precision Optics (RPO), Materion, Lattice and Hoya Candeo. RPO is a manufacturer for high-precision molded glass aspherical lenses, polished lenses, and optical systems. The new division of RPO produces high-precision compression-molded plastic components like lenses, lens-arrays, prisms. Materion is a coating company. They produce with over 100 coating

machines OEM coatings from 200 nm up to 40 µm. Dimension can go up to 1 meter.

Hoya Candeo is a Japanese manufacturer for Color Filter Glass e.g. Color Compensating Filters, Light Balancing Filter.

**KANTNER PRÄZISIONSOPTIK**

Rotbuchenweg 5,  
D 50858 KÖLN (D)

Contact person: Mr. Jürgen Kantner  
T +49 (0)221-78940267

jk@kantner-praezisionsoptik.de  
www.kantner-praezisionsoptik.de

**KMWE PRECISION SYSTEMS & PRECISION COMPONENTS BV****47**

We support our customers with product development, prototyping and series-production, SCM and transfer of proven processes to our subsidiaries. Over 55 years of experience, 300 motivated employees, an international supplier network and a continuous drive for excellence enable us to meet the highest demands of our customers. Our focus is to realize the logistical and quality requirements, and also on securing the lowest Total Cost of Ownership during the product lifecycle.

KMWE is a supplier for the high-tech equipment and aerospace industry. We are specialized in automatically machined parts and functionally tested mechatronic modules. KMWE is located in Eindhoven, Malaysia and Turkey, regions known for their High-Mix, Low-Volume, High-Complexity industry.

**KMWE PRECISION SYSTEMS & PRECISION COMPONENTS BV**

Croy II / P.O. Box 7930, 5653 LC /  
5605 SH EINDHOVEN (NL)

Contact person:

Mr. Geert van Bergen  
T +31 (0)40-2561168  
g.v.bergen@kmwe.com  
www.kmwe.com

**KISTLER BV  
NETHERLANDS****37**

Kistler is a leading manufacturer of dynamic measurement technology. Sensors, signal conditioning and data acquisition solutions for force, pressure, torque, speed and acceleration are key areas of expertise.

Application specific solutions have been developed for key markets:

- Engine Development
- Vehicle Technology
- Crash Technology
- Manufacturing Process Control
- Joining Systems
- Plastic Processing
- Biomechanics
- Road & Rail (Weigh in Motion)

The company is driven by innovation and engineering excellence and has production and R&D facilities in Switzerland, Germany and the United States. World-wide, the company employs 1,000 staff in over 25 countries.

**KISTLER BV NETHERLANDS**

Leeghwaterstraat 25,  
2811 DT REEUWIJK (NL)

Contact person:

Mr. Eric van Veen  
T +31 (0)182-304444  
sales.nl@kistler.com  
www.kistler.com



## KUGLER GMBH

10



measuring machines,  
interferometric devices, etc.

### KUGLER GMBH

Heiligenberger Str. 100, D 88682  
SALEM (D)

Contact person:

Mrs. Sandra Fechtig

T +49 (0)7553-920084

sandra.fechtig@kugler-precision.com

www.kugler-precision.com

KUGLER develops and produces highly complex and sophisticated micro machine tools, ultra-precision optical and mechanical components, and (in jobshop production) optical surfaces, mainly of non-ferrous metals.

### Products

Ultra-precision machine tools and machine components on precision-mechanical, aerostatic, and/or hydrostatic bearings:

- Fly-cutting machines
- Drum lathes
- 3- and 5-axis micromachining centers
- Special machine tools
- Linear guides
- Rotary tables

- Metal optics
- Beam delivery components for CO2 high-power lasers

Job order production:

- Diamond turning/milling of ultra-precision surfaces (diameters up to 1,500 mm).
- Plastics for illumination and imaging optics.
- Replication molds replication of mass-produced items.
- Micro machining (metal-cutting / laser machining) (2½D- and 3D-machining).

Metrology:

- Ultra precision measurements / quality inspection on coordinate

## LARSEN PREMIUM PRECISION PARTS

146



Fine mechanical parts of undeniably high quality are essential to the workings of a machine and are decisive for a company's reputation. This is our field of activity. Larsen is the specialist in premium milling and turning work. We are fully equipped with the knowledge and technology required to produce special parts made of stainless steel, aluminum, synthetic or exotic materials. We work for demanding clients who cannot and will not accept anything less than premium precision parts.

### LARSEN PREMIUM PRECISION PARTS

Ambachtsweg 36,  
3899 AR ZEEWOLDE (NL)

Contact person:

Mr. Frank te Hennepe

T +31 (0)36-5220931

ftehennepe@precisionparts.nl

www.precisionparts.nl

## KUSTERS METAALBEWERKING OSS BV

55

The activities mainly consist of the production of (fine) mechanical parts for widely divergent trades. Almost all metal machining processes, with regard to the most widely divergent types of metal and synthetic materials, can be performed by us to perfection. Because of the flexibility, the quality consciousness of the organisation and the versatile modern machinery,

hightech products and a short production cycle can be realized.

### KUSTERS METAALBEWERKING OSS BV

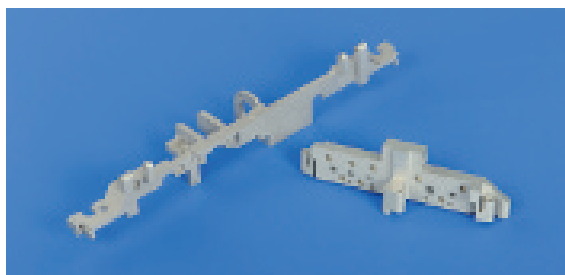
Saksenweg 31, 5349 AX OSS (NL)

Contact person: Mr. J.A. Kusters

T +31 (0)412-633328

info@kustersmetaal.nl

www.kustersmetaal.nl



**bsi Brandt** Fijnmechanische Industrie b.v.



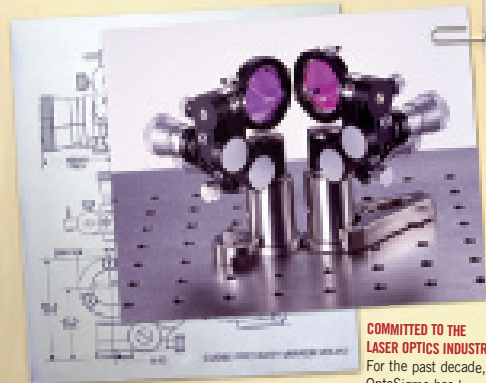
**On our operations  
you should demand the most**

Brandt Finemechanische Industrie, is specialized in single and serial production of high-quality precision products and assemblies that meet the highest demands in the market.

With its know-how in material field, advanced machinery, quality assurance system and 3D measurement facilities, **Brandt FMI** offers best principles for the supply of your precision components. Call for a free acquaintance.

**Brandt FMI BV**  
De Strubbenweg 15  
NL-1327 GB Almere  
☎ +31 (0)36 523 13 98  
☎ +31 (0)36 533 26 33  
✉ info@brandtfmi.nl  
🌐 www.brandtfmi.nl

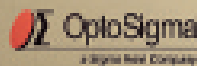
**WE DON'T ALWAYS GO BY THE BOOK**



**COMMITTED TO THE  
LASER OPTICS INDUSTRY**  
For the past decade, OptoSigma has been a recognized, stable leader in the laser optics industry. Our dedication stems from a desire to solve problems. As long as there are breakthroughs to be made, you can count on us to be at the forefront.

**CATALOG OR CUSTOM, WE PROVIDE PARTS AND KNOW-HOW**  
When it comes to laser optics, OptoSigma wrote the book on quality materials and great pricing. While we're proud of our comprehensive line of products, we are equally proud of our ability to tackle challenges that can't be solved from our catalog. When you require someone to read between the lines, OptoSigma's engineers will consult with you to develop a custom solution that fits your needs.

OptoSigma is more than a leading manufacturer and distributor, we're your partner in invention. Give us a call. If it's not in the book, we'll write a new chapter for you.

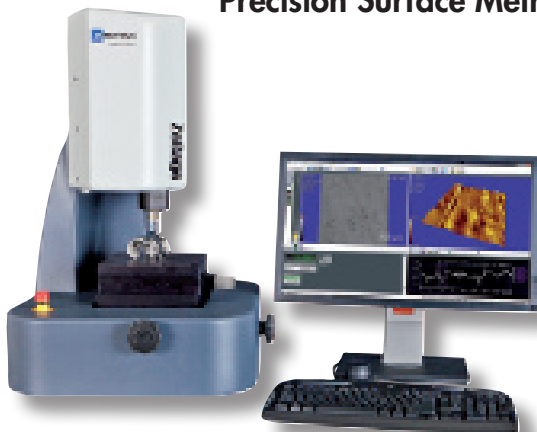


**molenaar optics**  
Industrial laser systems, measuring instruments, optical components

Postbus 2, 3700 AA Zeist  
Gerolaan 63a, 3707 SH Zeist  
Tel.: 030-69 51 038  
Fax: 030-69 61 348  
E-mail: info@molenaar-optics.nl  
Internet: www.molenaar-optics.nl

OPTICS | OPTICAL COATINGS | OPTO-MECHANICS | MOTOR STAGES | CUSTOM COMPONENTS  
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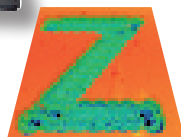
## **ZeGage™ – Robust and Affordable 3D Optical Profiler for Precision Surface Metrology**



Visit our booth 152

### **Key benefits**

- ▀ Vibration resistant design provides robust metrology on production floor
- ▀ Quantitative surface metrology with nanometer-level precision
- ▀ Integrated autofocus and focus aid simplifies part setup



**ZygoLOT GmbH**  
Im Tiefen See 58 • 64293 Darmstadt  
[www.zygo-lot.de](http://www.zygo-lot.de)

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EUROPE



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Metrology  
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**LASER 2000 BENELUX CV****133**

Laser 2000 Benelux is a design-in distributor, specialized in

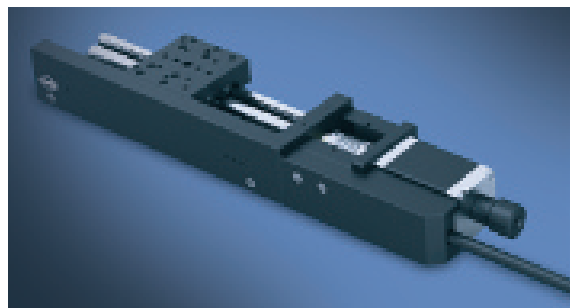
- industrial, lifescience and scientific lasers;
- laser material processing;
- LED, light and display metrology;
- motion control & positioning;
- vision and inspection.

Laser 2000 serves the industrial, OEM and scientific customers in the Benelux. Laser 2000 will show its latest developments in the area of

lasers, industrial laser systems and nano-/micropositioning systems. To name a few:

- fiber lasers with advanced laser parameter handling,
- integrated piezo-controller positioning configurations,
- motorized and manual positioning systems
- material processing workstations

**Laser 2000; the future of photonics.**

**LASER 2000 BENELUX CV**

P.O. Box 20,  
3645 ZJ VINKEVEEN (NL)

Contact person:  
Mr. Ir. P.H. Kramer  
T +31 (0)297-266191  
pkramer@laser2000.nl  
www.laser2000.nl

**LASERTEC BV****86**

Our expertise comes from experience.

For more than 15 years now, Lasertec has been a strong and reliable partner in the world of laser technology. Thanks to its high levels of knowledge and practical experience, Lasertec can build bridges between the conceptual stages and technical execution. During the past years, this has resulted in a number of remarkable cases in which the level of knowledge of Lasertec and its strategic partners fires the imagination.

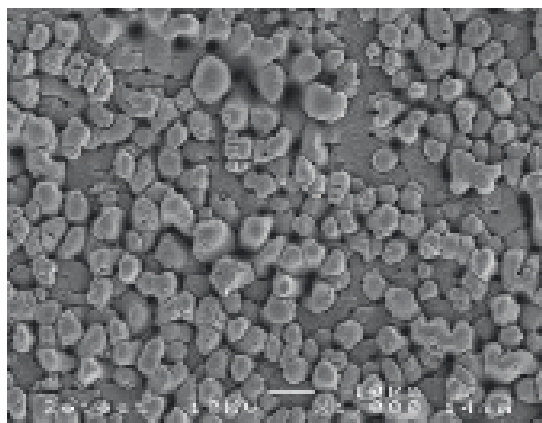
Keywords:

- 3D ultraviolet treatment in picoseconds
- Custom made applications
- Innovative power

- Non-impact measurement solutions

**LASERTEC BV**

Bijldorp Oost 4, 2992 LA BARENDRECHT (NL)  
Contact person: Mr. M. Bak  
T +31 (0)180-644744  
lasertec@lasertec.nl  
www.lasertec.nl

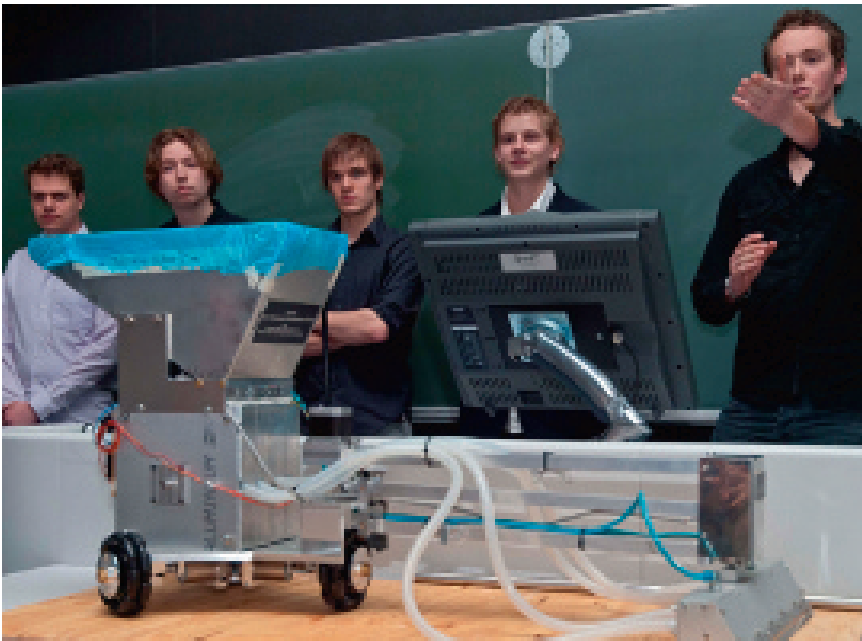
**LAYERWISE NV****188**

As a pioneer in AM (additive manufacturing), LayerWise is a technology innovator rather than a technology user. This makes we are an innovation partner for our customers in industrial and medical markets. Our core business is to develop AM solutions with customers and deliver better-than-expected service in volume manufacturing. With headquarters in Leuven, Belgium, we are active on an international level.

LayerWise technology is a 3D print technique for metal components. Starting from a 3D file, we build up micron layers of solid material. In each layer, we deposit powder alloy and melt the geometry making use of a high-intensity laser source. Unlike machining and casting techniques, AM requires no tooling, has virtually no waste and enables designers to materialize complex geometries that can't be made with "conventional" techniques.

**LAYERWISE NV**

Kapeldreef 60, B 3001 LEUVEN (B)  
Contact person:  
Mr. Tom De Bruyne  
T +32 (0)16-298420  
info@layerwise.com  
www.layerwise.com

**LEIDSE INSTRUMENTMAKERS SCHOOL****191**

The Leidse Instrumentmakers School is a Vocational Training Institute for research instrument design and precision manufacturing. The school has close contacts with companies and institutes for applied instrument design. We accept design and manufacturing orders. Officially registered by the Dutch government under Crebo nr 94360.

**LEIDSE INSTRUMENTMAKERS SCHOOL**

Einsteinweg 61,  
2333 CC LEIDEN (NL)

Contact person:  
Mr. Ing. D.W. Harms  
T +31 (0)71-5681169  
info@lis-mbo.nl  
www.lis-mbo.nl

**LEUVEN AIR BEARINGS****156**

Leuven Air Bearings develops and produces high-precision motion systems such as rotation stages and



linear stages. LAB delivers turnkey solutions for high-demanding precision applications. Our motion systems are typically used in coordinate measurement machines, test equipment, wafer steppers, CT scanners, etc.

**LEUVEN AIR BEARINGS**

Romeinse straat 18,  
B 3001 HEVERLEE (B)

Contact person:  
Mrs. Ilse Clijsters  
T +32 (0)16-401244  
ilse.clijsters@leuvenairbearings.com  
www.leuvenairbearings.com

**LEMO CONNECTORS BENELUX****43**

LEMO Connectors Benelux is een onderdeel van de internationale LEMO Group en is een partner die anticipeert op signalen uit de markt en reageert op behoefte van klanten door het leveren van professionele connector-oplossingen en kabel-assemblages, welke de hoogste



verwachtingen van de gebruiker waarmaken en overtreffen. Gebaseerd op een solide praktijkervaring van 65 jaar, associëren onze relaties LEMO met kwaliteit en betrouwbaarheid. Als leider in de connector-industrie gaat LEMO door met het verhogen van haar standards, waar anderen een poging doen deze te benaderen. Als wij het niet hebben, dan maken we het!

**LEMO CONNECTORS BENELUX**

De Trompet 2108, 1967 DC  
HEEMSKERK (NL)

Contact person:  
Mr. René Lengers  
T +31 (0)251-257820  
nl.marketing@lemo.nl  
www.lemo.nl



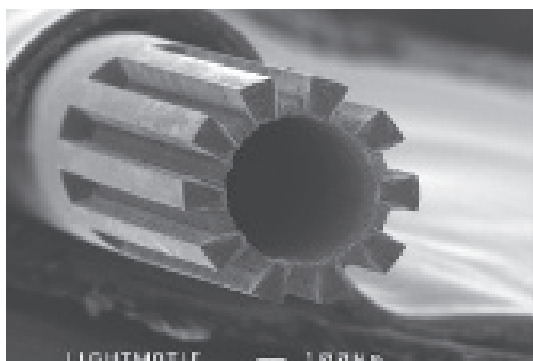
**LEVES METAAL BV****162**

Leves Metaal manufactures parts and components for clients in a wide range of industries. Our team is well

trained and has many years of experience. We use state-of-the-art machinery. Our customers can count on our exceptionally strong commitment. We are entirely focused on turning and milling and are able to reach a very high level of accuracy and specifications. Series of several 100,000 units are no exception, but at the same time our engineers cooperate already at the earliest stage with our customers to develop and design their prototypes. Obviously we provide 3D measurement reports and we are ISO 9001 certified.

**LEVES METAAL BV**

Broekstraat 5,  
5711 CT SOMEREN (NL)  
Contact person: Mr. Michel Lexmond  
T +31 (0)493-497080  
info@levesmetaal.nl  
www.levesmetaal.nl

**LIGHTMOTIF BV****112**

Lightmotif offers innovative production solutions for micromachining based on the use of ultrashort pulsed lasers. The ability to machine any material with high precision and no damage is used for micromachining as well as for surface texturing. Our expertise ranges from drilling, cutting, caving to surface structuring. Lightmotif is leading in

application development for the most demanding requests. The company supports its customers from development to industrial implementation. After successful application development, Lightmotif can perform in-house production or supplies its semi custom micromachining equipment to customers for mass production.

**LIGHTMOTIF BV**

Pantheon 12,  
7512 PR ENSCHEDE (NL)  
Contact person:  
Mr. Max Groenendijk  
T +31 (0)53-4500840  
max.groenendijk@lightmotif.nl  
www.lightmotif.nl

**TE LINTELO SYSTEMS BV****92**

Since 1985, Te Lintelo Systems (TLS) is specialized in sales and services in the field of optical, opto-electronical components, lasers and high-performance optical test & measuring systems.

TLS is the leading company in the field of applications in the automotive, scientific, medical, industrial areas as well as the light engineering sector. In this field we represent prominent suppliers for the Benelux countries with well-educated engineers with a long experience and knowledge. We design and produce custom-made systems as well.

We will demonstrate SIOS Laserinterferometric vibrometers ideal for accurate, contactless determination of position changes of objects or surfaces.

**TE LINTELO SYSTEMS BV**

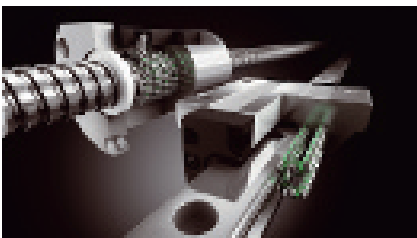
Stijn Streuvelsstraat 2,  
6901 KT ZEVENAAR (NL)  
Contact person:  
Mr. Ben J.J. te Lintelo  
T +31 (0)316-340804  
sales@tlsbv.nl  
www.tlsbv.nl

**LM SYSTEMS BV****90**

LM Systems is located in Veenendaal and is the exclusive Dutch Service Supplier for THK. THK's creative ideas and unique technology have made the company a worldwide pioneer in the development of Linear Motion (LM) products and have made THK a leading manufacturer in the industry. Today, THK's linear motion products are indispensable in mechanical and electronic equipment in a wide variety of systems used in all industries.

At the Precision Fair we will exhibit our wide program with unique mechanical products and focus on THK's miniature program of ball rails, ball splines and ball screws.

THK, Toughness High quality Know how, "the Mark of Linear Motion".



Products & Services from LM SYSTEMS:

- High precision mechanics (micron range)
- Innovation support
- Linear technology
- Motion control

**LM SYSTEMS BV**

Kruisboog 2,  
3905 TG VEENENDAAL (NL)  
Contact person:  
Mrs. K. Naninck  
T +31 (0)318-554615  
info@thk.nl  
www.thk.nl

**LOKET MBO MECHATRONICA****181****Portal site "MBO Mechatronica" organizes theme event "New technology in education"**

The portal site Vocational Training Mechatronics is a unique site for anyone who is looking for information on vocational training in mechatronics. You will find information on: qualifications, training institutes, examinations, job market, knowledge circles, actualities and agenda items. All relevant information is available within 2 or 3 mouseclicks. The portal site is an initiative of Kenteq, centre of expertise and advice on technical craftsmanship.

Come and see us at stand number 181 (Hotspot) as well at our theme event "New technology in education" that will be held on November 30th.

**LOKET MBO MECHATRONICA**

Olympia 6-8,  
1213 NP HILVERSUM (NL)  
Contact person:  
Mrs. Leonore Pop  
T +31 (0)35-7504205  
leonore.pop@kenteq.nl  
www.loketmbomechatronica.nl

**LOUWERS & HANIQUE****130**

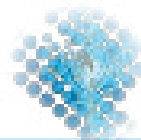
As a strategic supply chain partner, Louwers & Hanique specializes in the development and supply of technical solutions based on advanced glass and/or ceramic materials. Furthermore, L&H provides special high-end solutions based on combined technologies and/or materials. Technical consultancy, co-development & farm out, prototype production as well as regular series production (including Lean Manufacturing and SPC), L&H provides precisely the solution that makes our customers successful in their business.

Extensive material knowledge, precision machining, mechanized and automated glass processing, material bonding, complex assemblies, UHV/UCV cleaning and qualification, QLTC focus, L&H is the partner you can count on.

**LOUWERS & HANIQUE**

Energieweg 3a,  
5527 AH HAPERT (NL)  
Contact person:  
Mr. S. van den Cruijsem  
T +31 (0)497-339696  
sjoerd.van.den.cruijsem@louwers.nl  
www.louwers.nl



**MA3 SOLUTIONS****134**

MA3 Solutions is the leading manufacturer of tailor-made automation equipment for the micro-dispense and micro-systems assembly market.

Active in the areas of Life Sciences, Medical, Automotive, Inkjet, Semiconductors, ICT/Telecom and MEMS/MST, MA3 supports its customers with shorter delivery lead-times and faster ramp-up to volume. MA3 works with customers active in production and integration and who operate between manual and proprietary automated solutions.

The company's system philosophy is based on utilisation and high standardisation of the base equipment and processes, which ensures a proven and stable platform. This allows MA3's customers to focus on their business opportunities.

**MA3 SOLUTIONS BV**

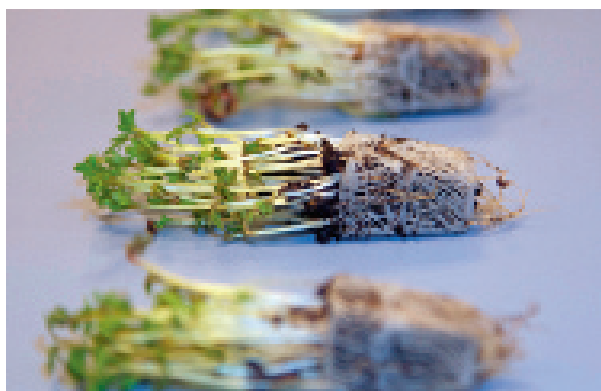
Science Park 5080,  
5692 EA SON (NL)  
Contact person: Mr. Martin van Acht  
T +31 (0)40-2969330  
m.vanacht@ma3solutions.com  
www.ma3solutions.com

**MAGNETIC INNOVATIONS BV****182****Magnetic Innovations, electro mechanic design & products**

Magnetic Innovations is an advanced knowledge centre for electromagnetic and thermal designs. We focus on rotary and linear motors, low frequent geophones, moving magnet actuators.

**Contract research**

We operate by means of contract research. Many of our designs have been successfully completed and market introduced. Our innovative designs resulted in several patents.

**MAAN GROUP****167****Maan Group - Glueing Technology**

Maan Group in Raalte has the vision to connect by means of adhesion all materialistic (precision) compounds in a sustainable way. The three divisions of Maan have their own specialty to realize the Group's objectives.

- **Maan Research & Development - Glueing Solutions**  
Maan R & D day-to-day is working on customer questions about adhesive bonds and surface (pre) treatment and is converting the answers into working solutions.
- **Maan Engineering - Glueing Machinery**  
Maan Engineering is specialized in the implementation of the

solutions which are developed by Maan R&D. Maan Engineering is designing and building adhesive applications systems.

- **Maan Special Products - Glueing Precision**  
In specially designed (cleanroom) production areas, Maan Special Products can achieve very accurate adhesives layers and surface treatments.

**MAAN GROUP**

Klipperweg 21,  
8016 CL RAALTE (NL)  
Contact person:  
Mr. Roel de Ruiter  
T +31 (0)572-302614  
info@lcmaan.nl  
www.lcmaan.nl

**Products**

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**Electromagnetic alternative for pneumatic cylinders**

We can deliver a new generation of electric cylinders, which are faster and make less noise than pneumatic cylinders.

**MAGNETIC INNOVATIONS BV**

Oude Kerkstraat 61a, 5  
507 LB VELDHOVEN (NL)  
Contact person:  
Mr. Bart van den Broek  
T +31 (0)40-2051718  
bart.van.den.broek@  
magneticinnovations.com  
www.magneticinnovations.com

**MAKE-MACHINING  
TECHNOLOGIE****60**

Leverancier van CNC-gestuurde draaiautomaten, 3- tot 12-assig gestuurd, hoogprecisie, voor seriematige productie, zowel voor klein seriewerk als ook series tot meerdere miljoenen, draaidelen in compleetbewerking, met frees en dwarsboren.

**MAKE-MACHINING  
TECHNOLOGIE**

Antonie van Leeuwenhoekweg 18,  
5151 DV DRUNEN (NL)

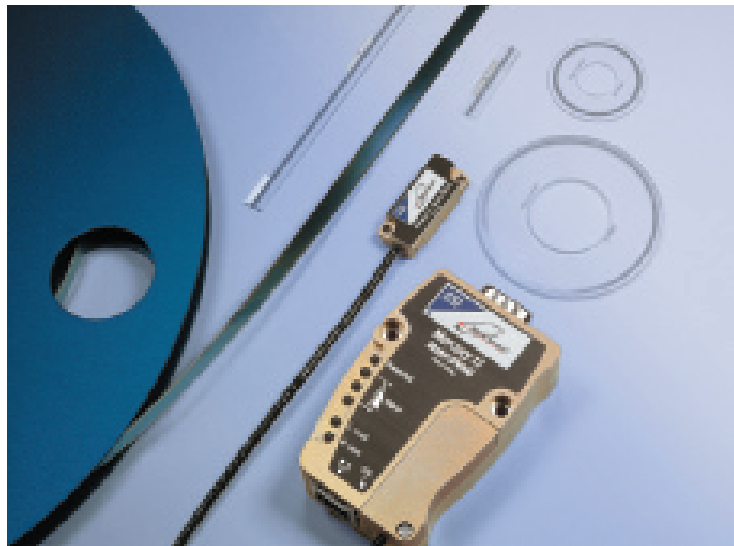
Contact person:

Mr. Edward de Jong

T +31 (0)416-320068

info@make-mt.nl

www.make-mt.nl

**MARTEK BVBA****38**

MARTEK is the BeNeLux specialist importer company for precision sensors, linear and angular encoders, inspection instrumentation, digital readouts and probing systems for machine tools.

**MARTEK BVBA**

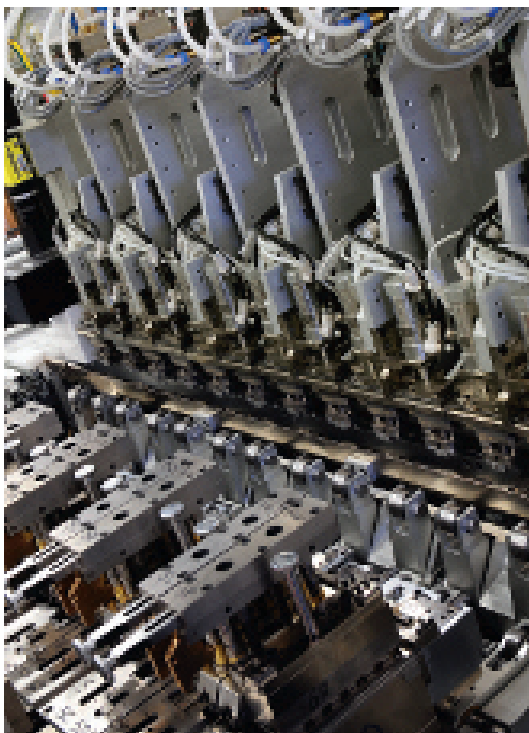
Avenue René Comhaire 82,  
B 1082 BRUSSEL (B)

Contact person: Mr. F. Geerinckx

T +32 (0)2-4670040

francis.geerinckx@martek.be

www.martek.be

**MASÉVON TECHNOLOGY BV****169**

Masévon Technology is a full service system supplier for the high tech industry. The main goal is to support the OEMs or end users of equipment for the solar, semiconductor, medical and micro-assembly industry, as well as other high demanding markets. Masévon Technology is a fully equipped system supplier, combining decades of experience with new techniques and a broad capacity in engineering, manufacturing and assembly. The focus is to support our customers in a professional way, to take care of the construction and realisation of the equipment, from the 1st step of engineering up

to the commissioning at the production site.

**Masévon Technology: Invent and Realise!****MASÉVON TECHNOLOGY BV**

P.O. Box 287, 7770 AG  
HARDENBERG (NL)

Contact person:

Mr. A.J. Altena

T +31 (0)523-238560

aja@masevon.com

www.masevon.com

**MATHWORKS****105**

MathWorks is the world's leading developer of mathematical computing software. This includes MATLAB® and Simulink® for data analysis, algorithm development, numeric simulation and design of multi-domain embedded systems. Together with a wide range of optional add-on products, these establish the most powerful environment for Model-Based Design currently available 'off-the-shelf.' It enables engineers in high-tech mechatronic industry to go from 'innovative idea' to 'actual product' in the shortest possible time and in accordance with the highest possible quality and/or certification standards. Founded in 1984, MathWorks employs more than 2,200 people in 15 countries. For additional information, visit [www.mathworks.nl](http://www.mathworks.nl).

**MATHWORKS**

Dr. Holtropaan 5b,  
5652 XR EINDHOVEN (NL)  
Contact person: Mrs. Cindy Bouwels  
T +31 (0)40-2156700  
[info@mathworks.nl](mailto:info@mathworks.nl)  
[www.mathworks.nl](http://www.mathworks.nl)

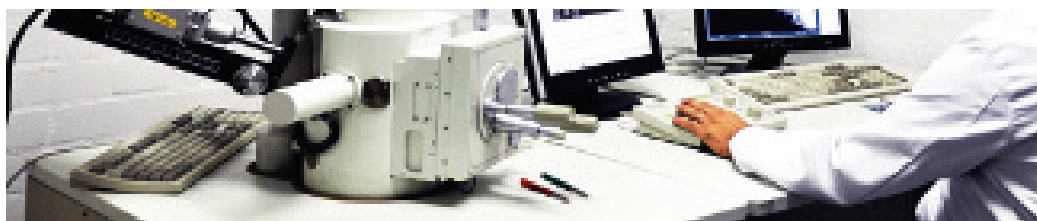
**MATINSPIRED****58**

Are you a production company with its own R&D department? Do you want to develop new products and/or improve existing products? Then you can call in the specialized knowledge and experience of MATinspired. We have access to the knowledge and equipment of various companies and universities, in order to offer you tailor-made research. Our focus is on materials science (metal) and nanophysics. We go one step further by thinking along with you, interpreting the research data for

you. We can carry out a combination of measurements for you. If necessary, we can also help with the implementation as interim manager.

**MATINSPIRED**

Horsten 1, Multi Media Paviljoen 1.41,  
5612 AX EINDHOVEN (NL)  
Contact person:  
Mr. Dr. Ir. Niels Kuijpers  
T +31 (0)615574498  
[info@matinspired.nl](mailto:info@matinspired.nl)  
[www.matinspired.nl](http://www.matinspired.nl)

**MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION****166**

Mat-tech is your specialist in the development and production of high-tech soldering and brazing solutions. We develop new products and improve existing products. Mat-tech consists of two business units: Mat-tech Development & Testing and Mat-tech Production.

Mat-tech Development & Testing has specialized in the development,

optimization and implementation of all possible soldering technologies. We offer different types of research, for example to gain insight in life cycle and reliability of products and to analyze the causes of failure of products. Mat-tech Production offers the opportunity to outsource your high-tech soldering and brazing production, for large series as well as

for single pieces. We use our technical knowledge to make better and more cost-effective products.

**MAT-TECH DEVELOPMENT & TESTING AND MAT-TECH PRODUCTION**

Ekkersrijt 4508, 5692 DR SON (NL)  
Contact person:  
Mr. Erik Brom  
T +31 (0)499-490133  
[info@mat-tech.com](mailto:info@mat-tech.com)  
[www.mat-tech.com](http://www.mat-tech.com)



**MAXON MOTOR BENELUX BV****2**

to 500 watts. Our modular program is complemented by flat motors with an iron core. The modular system with planetary, spur and special gearheads, sensors and control electronics, completes the range. High-tech CIM and MIM components are produced in a special competence center.

maxon motor stands for

requirements to create an integrate total solution. We are driven by your specific requirements.

**MAXON MOTOR BENELUX BV**

P.O. Box 716,  
7500 AS ENSCHEDE (NL)  
Contact person:  
Mrs. K. Funke  
T +31 (0)53-4864777  
kim.funke@maxonmotor.com  
www.maxonmotor.nl

The solution is always a matter of the right combination.

maxon motor develops and produces brushless and brush DC motors with a unique ironless maxon winding, up

top quality, innovation, competitiveness and a worldwide distribution network. We combine motor, gearhead and electronics according tot customers' specific

**MECHAPHYSICS BV****24****Passion for technology**

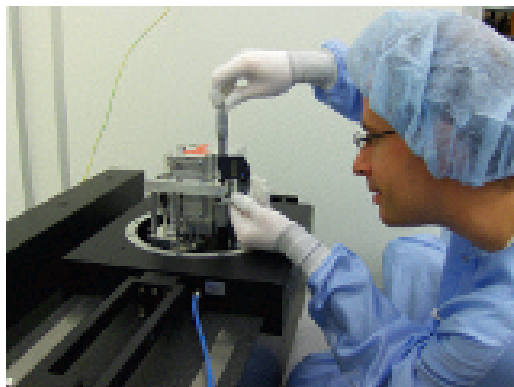
Mechaphysics is the precision engineering division of the Vision Dynamics Group. Concept research and design is our passion. We design according to physical principles with the accent on mechanical principles. To fulfil the requirements for our customers the base, the concept, must be right. We also implement integration of precision mechanics for vacuum and clean room environment.

Supporting our customers by:

- Fundamental Research
- Concept Research
- Technical Design
- Prototyping
- Turn-key Solutions

Mechanical solutions:

- Precision Mechanics
- Mechatronics
- Cryogenic Technology
- E-beam Technology

**MECHAPHYSICS BV**

Fransebaan 592a,  
5627 JM EINDHOVEN (NL)  
Contact person:  
Mr. E. Bos  
T +31 (0)40-2566745  
info@visiondynamics.nl  
www.mechaphysics.nl

**MFK BV****6**

Machinefabriek Van Kneegsel (MFK) is a mechatronical system supplier, with over 50 years of experience. With around 25 employees, an advanced machine shop, specific know-how on high-tech machine operations and assembly, MFK is your partner for development and production of high-tech components, baseframes, complex assemblies and vacuum technology.

MFK is part of Aalberts Industries. Apart from our own competences, within Aalberts Industries MFK has a wide network of specialists active in special production techniques and surface treatments. With this, MFK always has the right partners to produce your complex modules.

**MFK BV**

Hoefseweg 2,  
5512 CH VESSEM (NL)  
Contact person:  
Mr. Freek Kronenberg  
T +31 (0)497-592200  
info@vankneegsel.nl  
www.vankneegsel.nl

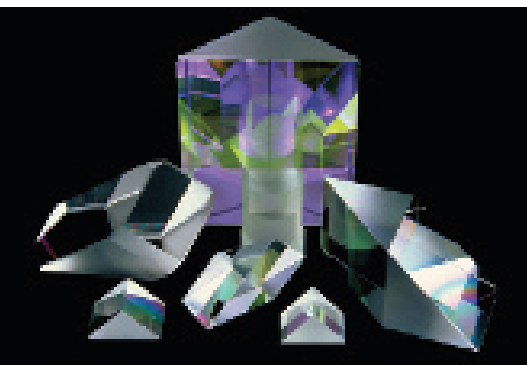


**CVI MELLES GRIOT 98**

CVI Melles Griot, a leading global manufacturer of photonics products including optical components and systems, lasers, motion-control systems, laser measurement instrumentation and opto-mechanical hardware will show a variety of these product during the Precision Fair. Please visit our stand to get a free copy of our 'Tech Guide' or catalog.

The Tech Guide covers topics such as, but not limited to:

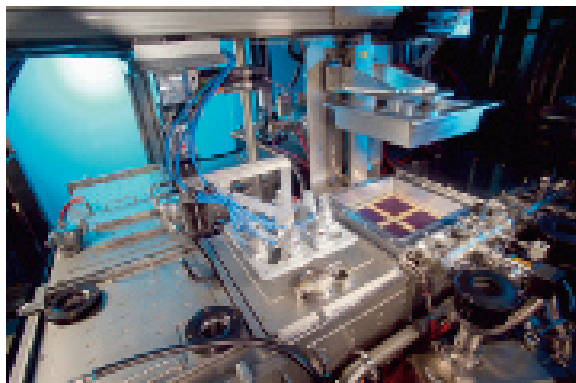
- Fundamental Optics
- Polarization
- Material Properties
- Optical Coatings
- Fundamentals of Positioning
- Laser Principals
- Power and Energy Measurement



**CVI MELLES GRIOT**

Aalsbergen 2, 6942 SE DIDAM (NL)  
Contact person:  
Mr. Klaas Hop  
T +31 (0)316-333041  
info.holland@cvmellesgriot.com  
www.cvmellesgriot.com

**MEVI BV FIJNMECHANISCHE INDUSTRIE 122**



The Mevi Group, with its principal office in Helmond (NL) and operating companies in Belgium and the Czech Republic, is a main supplier and valuable partner in the field of development, engineering and realisation of complete (prototype) machines and modules, to customer specification. Together with specialist companies of electronics and machine-control, complete projects are realised for customers active in

the fields of semiconductors, copying attachments, the CD and DVD industry, automotive and the electronics industry. The Mevi Group is furthermore specialised in the production of high-precision mechanics (micron range) and

parts, in any type of material required and in quantities ranging from single items to several hundreds.

**MEVI BV FIJNMECHANISCHE INDUSTRIE**

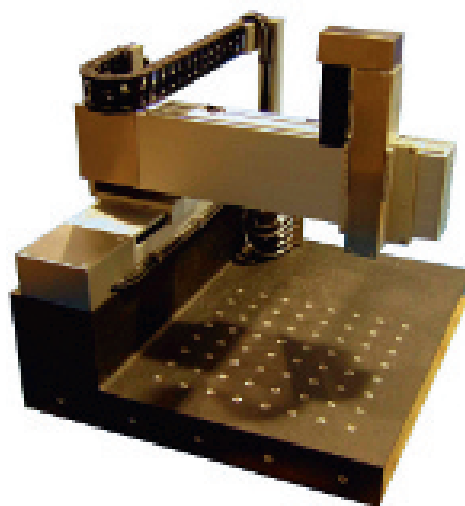
P.O. Box 238,  
5700 AE HELMOND (NL)  
Contact person: Mrs. F. Colen  
T +31 (0)492-538615  
fcolen@mevi.com  
www.mevi.com

**MIJNSBERGEN BV 91**

Mijnsbergen is specialised in dynamic precision positioning systems. Besides selection of components Mijnsbergen realizes projects from engineering up to installation. At the Precision Fair Mijnsbergen will show an extended

range of components such as AKRIBIS direct drive linear and rotary motors, circular and rectangular voice coil modules, piezo modules and ELMO servo drives. The motors and actuators are available as separate

components or as complete modules, including linear guides, encoders and cabling. Experienced engineers offer support with the selection of components and offer the most efficient solution for your application needs.



**MIJNSBERGEN BV**

P.O. Box 166,  
3640 AD MIJDRECHT (NL)  
Contact person:  
Mr. H. le Noble  
T +31 (0)297-285821  
info@mijnsbergen.nl  
www.mijnsbergen.nl

**MIFA ALUMINIUM****6**

Mifa Aluminum specialises in tight tolerance aluminum extrusions. The extrusion process offers the greatest design freedom possible to designers. Mifa is used to extrude tolerances up to  $\pm 0,02$  mm. With our innovative profile design engineering and technology, we can offer profiles with demanding shapes and sizes, a good surface finish, and press extreme thin wall thicknesses from 0,3 mm. Mifa is also capable to extrude in Magnesium alloys!

There is no minimum order quantity, and Mifa is able to supply a fully finished component as well, through

in-house CNC machining, surface treatment and assembly capabilities. Some of our primary markets are machine construction, aerospace and defense, medical equipment, automotive and measuring and control equipment. Mifa complies with many quality norms including ISO 9002.

**MIFA ALUMINIUM**

Deltakade 4-6,  
5928 PX VENLO (NL)  
Contact person: Mr. Frank Loobeek  
T +31 (0)77-3898888  
sales@mifa.nl  
www.mifa.nl

**MIKROCENTRUM****59**

MIKROCENTRUM offers a comprehensive array of short, to the point practical courses and workshops on all educational levels ranging from hands-on technical up to academic. The courses are held at various locations in the Netherlands and Belgium.

MIKROCENTRUM offers these courses open to individual registration as well as in a corporate setting. MIKROCENTRUM teachers are themselves professionals in their line of expertise, highly skilled and educated as well as enthusiastic. Currently it is possible to choose from more than 195 different course topics starting at various points in time.

For additional information please contact Mr. Frank Bruls, department manager Courses,  
f.bruls@mikrocentrum.nl

**MIKROCENTRUM**

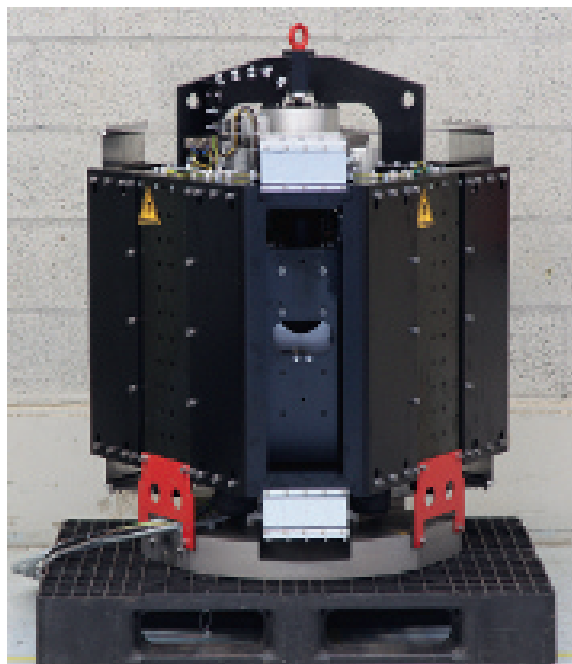
Kruisstraat 74,  
5612 CJ EINDHOVEN (NL)  
Contact person:  
Mr. Frank Bruls  
T +31 (0)40-2969933  
opleidingen@mikrocentrum.nl  
www.mikrocentrum.nl

**MI-PARTNERS****182**

MI-Partners is a centre of expertise in the field of mechatronics and is actively involved in the development of high-tech mechatronic systems. New concepts are defined based on extensive experience, creative thinking and combining knowledge from different markets. Predictive modeling in an early stage indicates final performance of the concept.

We proudly present an example of this way of working at our booth. For seismic monitoring the ground is excited with a vibrator.

Commercially available systems use hydraulics to create the required forces. For the excitation at low frequencies (2-5 Hz), the non-linear behaviour of the hydraulics is the limiting factor in the performance. Therefore, a new vibrator, based on linear motor technology was developed.

**MI-PARTNERS**

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5652 AM EINDHOVEN (NL)  
Contact person:  
Mr. Leo Sanders  
T +31 (0)40-2914920  
info@mi-partners.nl  
www.mi-partners.nl

**MINIMOTOR BENELUX 83**

As a member of the FAULHABER® Group, MINIMOTOR Benelux takes care of the sales & support of the FAULHABER® products in the Benelux. The FAULHABER® product range consists of miniature electrical drive systems: brushed & brushless DC-motors, stepper motors, linear motors, piezomotors, gearboxes, tacho's, encoders, drivers & motion controllers.

All products are characterized by the highest power-to-volume ratio, high efficiency, precision and reliability. FAULHABER® offers solutions based on standard or semi-standard products, as well as completely customized designs. Typical applications are found in instrumentation, medical equipment, optical devices, factory automation, robotics, military and space industry.

**MINIMOTOR BENELUX**

Dikberg 14/6c,  
B 2200 HERENTALS (B)  
Contact person:  
Mr. Diego Kennis  
T B: +32 (0)14-211320  
NL: +31 (0)75-6148635  
info@minimotor.be  
info@minimotor.nl  
www.faulhaber.com

**MITUTOYO NEDERLAND BV****7**

Mitutoyo Nederland is a full daughter of the Japanese Mitutoyo Manufacturing Corporation, the world's biggest manufacturer of precision measuring instruments. In the Netherlands, Mitutoyo offers besides the full product range of over more than 5,000 different precision instruments, also full service support, product and general metrology training and a RvA accredited calibration service.

Most instruments are operational in the over 400 m<sup>2</sup> showroom in Veenendaal. At the Precision Fair, Mitutoyo will display the latest generation of Form measuring instruments, vision and tactile 3D measuring machines and a selection of products out of the comprehensive product range.

Products and services of Mitutoyo Nederland:

- Calibration
- Linear technology
- Measuring machines and measuring equipment
- Motion control
- Optics
- Sensor technology
- Trainings
- Vision systems

**MITUTOYO NEDERLAND BV**

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VEENENDAAL (NL)  
Contact person:  
Mr. H. Slotboom  
T +31 (0)318-534911  
h.slotboom@mitutoyo.nl  
www.mitutoyo.nl

**MOGEMA****6**

Mogema is a mechatronical system supplier, with over 50 years of experience. With around 135 employees, an advanced machine shop, specific know-how on high-tech machine operations and assembly, Mogema is your partner for development and production of high tech components, baseframes, complex assemblies and vacuum technology.

Mogema is part of Aalberts Industries. Apart from our own competences, within Aalberts Industries Mogema has a wide network of specialists

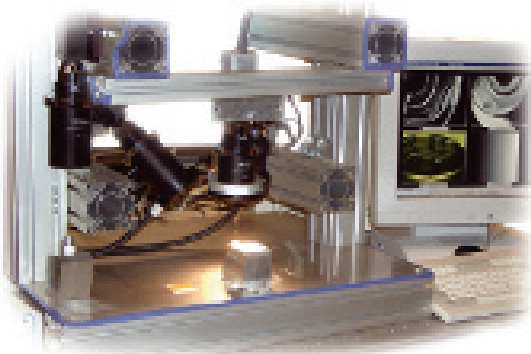
active in special production techniques and surface treatments. With this Mogema always has the right partners to produce your complex modules.

**MOGEMA BV**

Industrieweg 9,  
8084 GS 'T HARDE (NL)  
Contact persons:  
Mr. Elgar van der Bij,  
Mr. Michel Kurstjens  
T +31 (0)525-651533  
info@mogema.nl  
www.mogema.nl

**MOLENAAR  
OPTICS VOF****104**

Molenaar Optics offers innovation support for applications using optical and opto-mechanical components. Designs may contain both standard as well as custom-made parts. Optical components comprise simple lenses, mirrors, prisms and complex multi-element laser objectives for materials processing or telecentric camera lenses for vision systems. Opto-mechanical part series cover holders for optics as well as manual- and motorized positioning systems. Molenaar Optics also advises and offers optical measuring instruments, from basic microscopes and modular microscope components to digitally controlled profile projectors.

**MOLENAAR OPTICS VOF**

Gerolaan 63a, 3707 SH ZEIST (NL)

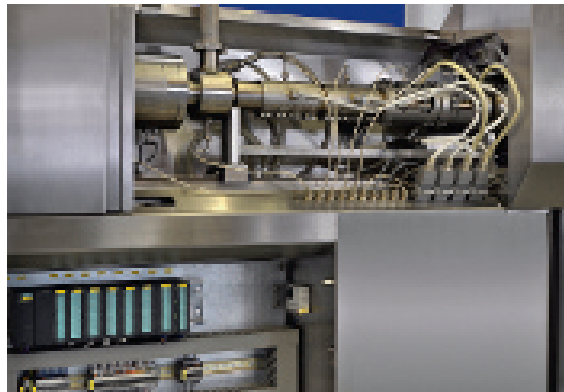
Contact person:

Mr. Drs. Robert Molenaar

T +31 (0)30-6951038

info@molenaar-optics.nl

www.molenaar-optics.com

**MTSA TECHNOPOWER****163**

MTSA Technopower is a renowned technology company for the design and production of high-quality mechatronic modules and systems according to customer specification. We excel in designing, engineering and manufacturing complex high-tech products and parts as one-off pieces or series for OEM in semiconductor, analytical, medical, pharmaceutical, food & beverage, energy and process

technical industries, as well as for technical institutes, research centres and service companies.

MTSA Technopower: your partner in design and supply of complex process and mechatronic parts, modules and systems.

**MTSA TECHNOPOWER**Westervoortsedijk 67,  
6827 AT ARNHEM (NL)

Contact persons:

Mr. Rob van der Sluis,

Mr. Ko van de Ven

T +31 (0)26-3636310

mail@mtsa.nl

www.mtsa.nl

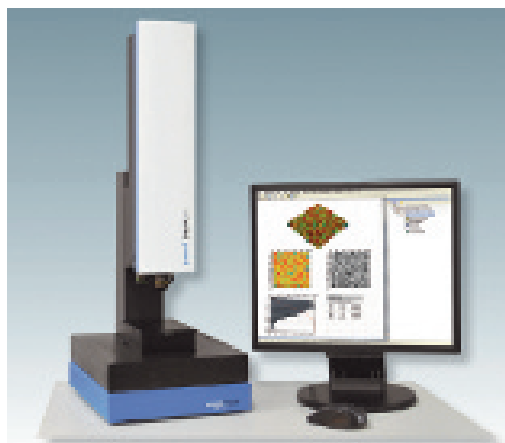
**NANOFOCUS AG****174**

NanoFocus is a developer, manufacturer, and distributor of measurement technology and software packages for the characterization of technical surfaces. The company has been active in this field for 16 years.

The optical measurement systems allow high-precision micro and nano

scale 3D surface measurements. The systems work at high measurement and analysis speeds for laboratory applications as well as for inline quality assurance and use near production lines.

NanoFocus solutions are applied by leading innovative companies in the automotive, semiconductor, solar, and medical technology industries worldwide where they efficiently contribute to sustainability.

**NANOFOCUS AG**Lindnerstr. 98,  
D 46149 OBERHAUSEN (D)

Contact person:

Mr. David Matthews

T +49 (0)208-620000

info@nanofocus.de

www.nanofocus.de





## MYTRI BV

119

Your personal partner in precision granite.

MYTRI has been an established name in the precision measuring industry for over 70 years. MYTRI produces precision granite surface plates, measuring beams, squares, straight edges, portals, base plates, machine components and more within any measurable accuracy. MYTRI has the possibilities for many applications and processing according to your design drawings. MYTRI gained an international reputation and our products find their way into high-tech companies all over the world. Besides precision granite MYTRI also has a program for cast-iron surface plates and components.



### MYTRI BV

Laan van Westenken 60,  
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Mr. G. van den Brink  
T +31 (0)55-5429174  
info@mytri.nl  
www.mytri.nl

## NANOMOTION LTD

65



As the leading manufacturer of piezoelectric motors for precision motion control applications, Nanomotion's product line ranges from single-element motors for actuation, to larger motors for driving typical stages. Nanomotion motors operate with no intrinsic magnetic fields and no moving parts. The motors provide unlimited travel in a compact package,

with the ability to achieve unmatched precision for linear or rotary motion. Nanomotion's motors have been successfully applied in diverse applications, from using our standard housed motors for motion control positioning to simply applying a piezoelectric element embedded in consumer products.

Standard and vacuum compatible rotary stages will be shown.

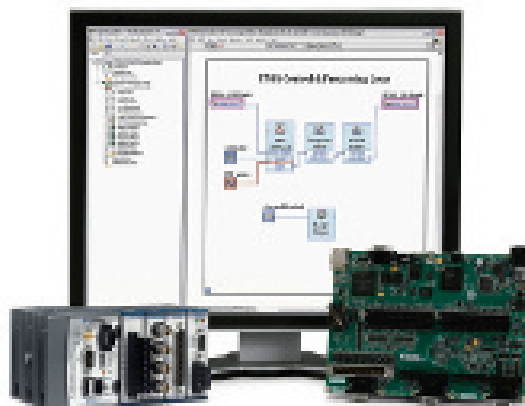
### NANOMOTION LTD

High Tech Campus 9,  
5656 AE EINDHOVEN (NL)  
Contact person: Mr. Hein Schellens  
T +31 (0)40-8512180  
info@heinmade.com  
www.heinmade.com

## NATIONAL INSTRUMENTS NEDERLAND

15

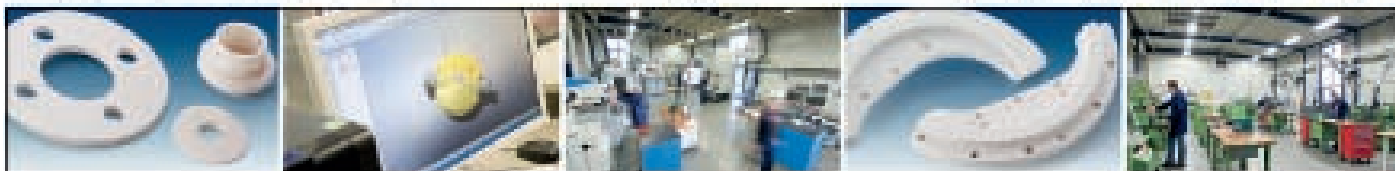
National Instruments offers an embedded design and prototyping platform that combines the LabVIEW graphical development environment with off-the-shelf, microprocessor and FPGA-based measurement and control hardware for design, simulation, rapid prototyping, implementation, validation and verification of embedded systems. Using the intuitive LabVIEW graphical dataflow programming environment, engineers and scientists can rapidly develop and iterate on designs, reducing the time from concept to prototype. After prototyping and validating the design, domain experts can then deploy these custom designs to an extensive range of off-the-shelf NI hardware or deploy to custom



hardware. Come to our booth 15 for more information.

### NATIONAL INSTRUMENTS NEDERLAND

Pompmolenlaan 10,  
3447 GK WOERDEN (NL)  
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T +31 (0)438-433466  
info.netherlands@ni.com  
www.netherlands.ni.com



Booth: 120

## ceramic on the right spot

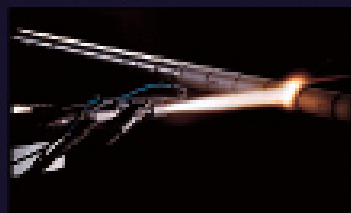
Poppenbouwing 35  
4191 NZ Geldermalsen  
T: +31(0)345 - 58 01 01  
F: +31(0)345 - 57 72 15

**ceratec®**  
Technical Ceramics BV

**WWW.CERATEC.NL**

E: [ceratec@ceratec.nl](mailto:ceratec@ceratec.nl)  
T: [www.webshop.ceratec.nl](http://www.webshop.ceratec.nl)

**CZL TILBURG BV**  
Oppervlaktetechnieken



Hard chrome plating & HVO®  
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Black Oxidizing  
HP-4100 Thermal Spraying  
Dionex® Dry Lubrication  
Diam® Diamond Coating  
Cylindrical & flat grinding  
Repair of high tech components

**Innovative in surface treatments and  
repair of high-value technical components**

The coatings of CZL Tilburg are superior in wear resistance,  
corrosion protection, hardness and have low friction resistance

CZL Tilburg BV - Boesweg 13 - 5447 HT Tilburg (NL) - TEL: +31 (0)16 540049

[www.czltilburg.nl](http://www.czltilburg.nl)

Booth: 132



# Eye for Precision

**Laser 2000, specialist in:**

**lasers**

**laser marking and cutting systems**

**motorized and piezo-positioning stages**

**fast and accurate light metrology**

**Precisiebeurs, booth 133**

tel.: +31 (0)297-266 191 - [info@laser2000.nl](mailto:info@laser2000.nl)  
[www.laser2000.nl](http://www.laser2000.nl)



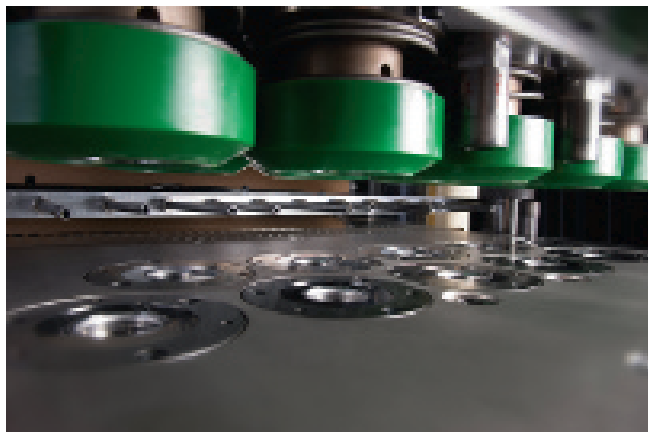
**LASER 2000**

**NDI EUROPE GMBH****171**

human movement tracking. In 1983, this new product became the company's first generation of 3D, real-time optical measurement products. In 2001 NDI Europe opened there doors .We are providing Optical and electromagnetic measurement solutions for Medical, Industrial and Life Science.

NDI was started in 1981 by University of Waterloo graduates who were designing custom, scientific instruments for industrial measurement applications. NDI set out to design an optical motion measurement system for

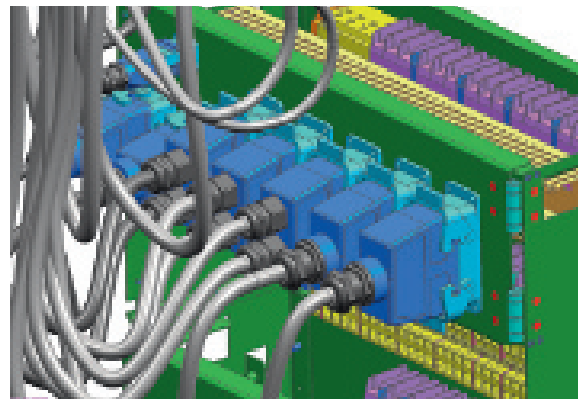
**NDI EUROPE GMBH**  
Fritz-Reichle-Ring 2,  
D 78315 RADOLFZELL (D)  
Contact person: Mr. J. Geys  
T +49 (0)7732-9391900  
jgeys@ndieurope.com  
www.ndieurope.com

**NEITRACO GROUP****71**

The Neitraco Group is a collaboration of engineering companies in the Benelux. Our core competences are Projects, Detachment and Realization in the fields of, mechatronics, (precision-) engineering and tooling in the areas of aviation, civil, geodesy, transport, heavy- and light rail, nano-technology, food and healthcare. A selection of our customers: ASML,

Fokker, Philips, Nedtrain, SBM GustoMSC, Vanderlande, VDL Group. Our mission is technical support to collaborate with our customers to achieve mutual success. We achieve this with approximately 300 highly motivated and educated employees. Our slogan is "Engineering in 4D".

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sjef.van.de.laak@brabeng.nl  
www.brabeng.nl

**NEWAYS TECHNOLOGIES BV 175**

Neways Technologies, a member of the Neways Electronics International Group, offers a combination of services covering the entire product life cycle of high quality industrial electronics applications. These services range from co-development (hard/software and mechanical) up to sustaining services. Based on good component management and DFM-scans we assure that your product is developed at cost conscious with high quality in a short time to market. For design and development to sustaining services of complete machinery or parts of it, one can also call on Neways Technologies. The experts of Neways have knowledge and experience in various disciplines, such as improvement of serviceability, cost price reduction and CE marking.

**NEWAYS TECHNOLOGIES BV**  
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T +31 (0)40-2593744  
frans.gevers@neways.nl  
www.neways.nl

**NEWPORT SPECTRA-PHYSICS GMBH** 128

Newport Corporation is a globally recognized leader in advanced technology products and solutions for fields such as Research, Life & Health Science, Aerospace & Defense, Industrial Manufacturing, Semiconductors, and Microelectronics. With almost 50 years of experience in motion



control, Newport has both the capability and the capacity to provide the optimum solution for your individual needs, whether it be a standard product, an OEM solution or a fully customized engineered system. At the Precision Fair, Newport main displays will include nanopositioning linear stages, controllers, hexapods, the new Conex™ family of compact and simple photonic control devices and the New Focus™ family of picomotor actuators and components.

**NEWPORT SPECTRA-PHYSICS GMBH**

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T +49 (0)6151-7080  
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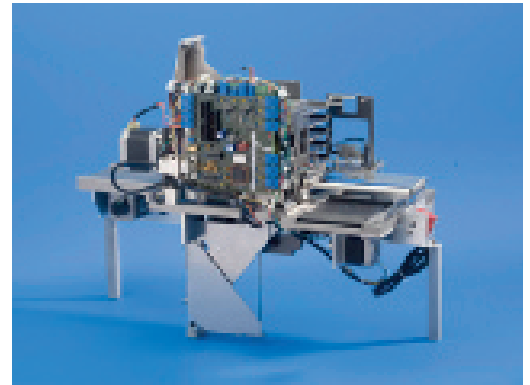
**NIJDRA GROEP (FMI)**

30

The Nijdra Groep is a full-service, family-owned organisation and is specialised in high precision components and mechatronic modules:

1. Fine Mechanical Industry (turning & milling);
2. High-tech Mechanical Industry (grinding);
3. Nijdra Special Products (engineering & assembling);
4. Medical Product Technology (orthopaedic & orthodontic implants).

The Nijdra Groep is ISO 9001, ISO 13485 and ISO 14001 certified. Cost-efficient production on robotized 5-axis milling machines and Flexible Manufacturing System (FMS) are especially for low volumes, high mixtures and short delivery times. With our experiences in several high-tech branches we create a surplus



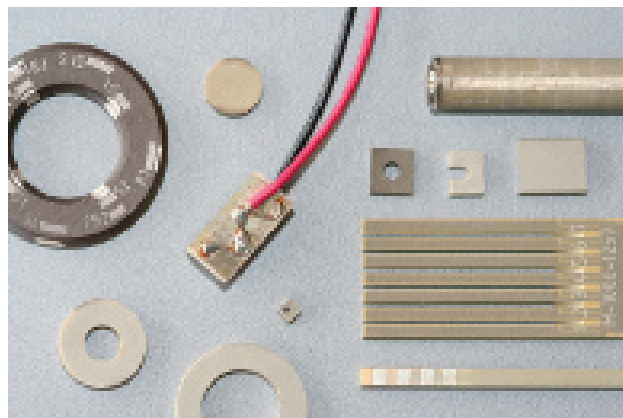
value for our customers by supporting them at the design of new projects and existing products.

**NIJDRA GROEP (FMI)**

Insulindeweg 35,  
1462 MJ MIDDENBEEK (NL)  
Contact person: Mr. M. Schulz  
T +31 (0)299-689900  
schulz.m@nijdra.nl  
www.nijdra.com

**NOLIAC A/S**

65



The Noliac Group presents a unique proficiency in the field of piezoelectric technology. Noliac designs, develops and manufactures the total range of piezoelectric products – from powders to mono- and multilayer components and all the way to finished plug-and-play applications. The picture shows a wide variety of piezo electric components.

**NOLIAC A/S**

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Mr. Hein Schellens  
T +31 (0)40-8512180  
info@heinmade.com  
www.heinmade.com

**EFD INTERNATIONAL****153**

Nordson EFD is the world's leading manufacturer of precision dispensing systems for applying controlled amounts of the adhesives, sealants, lubricants and other assembly fluids used in almost every industrial

manufacturing process. The EFD product range includes:

- Advanced fluid dispensing systems to apply accurate, consistent amounts of fluids.
- Benchtop dispensers for precise fluid deposits ranging from uniform dots as small as 0.004 inches in diameter to neat, controlled beads.
- Pneumatically operated dispense valves that combine accuracy, low maintenance and outstanding reliability.
- Tabletop robots to deliver precise placement and accurate fluid deposits.
- Non-contact jetting system using piezo-electric technology, to apply fluids on uneven surfaces or hard-to-access areas.

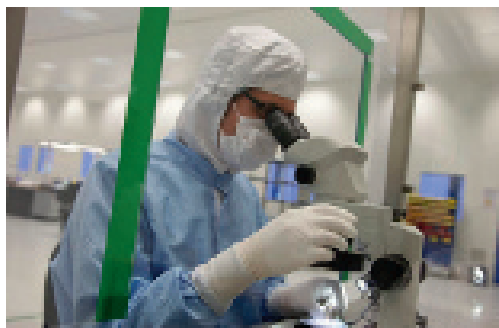
**EFD INTERNATIONAL**

Bergerstraat 10,  
6226 BD MAASTRICHT (NL)

Contact person:  
Mr. Freek Bressers  
T +31 (0)43-4077213  
europe@nordsonefd.com

**NIKON METROLOGY 110**

Nikon Metrology manufactures non-contact measuring systems covering laser scanners, vision systems and microscopes as well as X-ray and computer tomography (CT) systems. Precision Fair visitors should check out the NEXIV VMR system for ultra-precise automated video measurement. And try out the ShuttlePix, the first handheld microscope in Nikon Metrology's line-up of industrial microscopes. Furthermore, the company markets its own mechanical and optical CMMs, supporting 3D laser scanning and tactile inspection. Also watch the Handheld Scanning Demo that shows a portable metrology system that measures anything anywhere. It combines an MCA II articulated measuring arm with a digital ModelMaker laser scanner.

**NORMA****16**

- Dipbrazing and vacuum brazing
- Module assembly in cleanroom (10,000 class)
- Ultra clean vacuum production
- Design and manufacture of composite products and assemblies
- Complex cabling & electrification

**Norma: Your System Integrator**

Norma employs more than 400 motivated people divided over 3 locations in Europe and 1 location in Asia. Norma has secured a strong position as a "low volume-high mix" 1st tier system supplier over the entire life cycle of complex modules. We offer our OEM-clients service throughout the complete value chain. Key competences:

- Development and construction – Build to specification
- Ultra precision machining (Micron level) – sizes up to 0.5 m<sup>3</sup>
- Precision machining (10 Micron level) – sizes up to 5 m<sup>3</sup>

Active market places:

- Semiconductor industry
- Scientific industry
- Medical industry
- Defense industry
- Aerospace industry
- Consumer Lifestyle industry

**NORMA**

P.O. Box 531,  
7550 AM HENGELLO (NL)

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Mr. Rob Roozeboom  
T +31 (0)74-2916579  
rob.roozeboom@norma-groep.nl  
www.norma-groep.nl



**NPOINT INC.****65**

nPoint manufactures ultra-precision motion and control devices for nano-scale research and manufacturing. Our products include a series of nanopositioning systems that consist of piezo stages and control electronics. The positioning products enable rapid, precise, and repeatable motion and are used in a wide range of applications including aerospace, semiconductor industries and life sciences. The nPBio stages (see picture) from nPoint are closed-loop



XYZ nanopositioners with up to 30µm range of motion. Their large aperture allows for easy integration with optical microscopes or any application that requires easy sample access. Slide and petri dish sample holders are available for this product.

**NPOINT INC.**

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D 76275 ETTLINGEN (D)  
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Mr. Ralf Stamm  
T +49 (0)7243-527704  
ralf.stamm@npoint.com  
www.npoint.com

**NTS-GROUP BV****26**

The NTS-Group is a system supplier in the high tech industry.

The company assumes responsibility for the development, creation and optimization of optomechatronic systems and modules for leading original equipment manufacturers (OEMs). The NTS-Group is a chain of specialized companies in the Netherlands, the Czech Republic,

Israel and China. This unique concentration of strength on an international level means that customers can deliver high quality machines to their market in a shorter turnaround time and at competitive prices.

NTS-Group:  
accelerating your  
business

**NTS-GROUP BV**

P.O. Box 7093,  
5605 JB EINDHOVEN (NL)  
Contact person:  
Mrs. Dorothy Baijens  
T +31 (0)40-2597281  
dorothy.baijens@nts-group.nl  
www.nts-group.nl

**OLYMPUS NEDERLAND BV****106****Olympus Microscopy for any application**

Olympus, the leading system-solution provider in microscopy, puts all of its expertise and passion into developing forward-looking products that will advance their users. Every application is turned into an exciting voyage of discovery. Olympus offers a complete product range which covers applications from education and routine studies up to state-of-the-art research imaging systems, both in life- and material science.

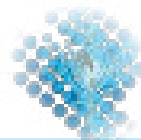
In many (research) microscopes, various peripheral devices are integrated to make up a complete, software-controlled imaging solution so that e.g. processes in living cells or in production of coatings can be accurately visualised and analysed.



Olympus therefore develops customizable soft- and hardware for microscopical imaging, in which all components can be optimally integrated.

**OLYMPUS NEDERLAND BV**

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2382 NW ZOETERWOUDE (NL)  
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T +31 (0)71-5450821  
microscopie@olympus.nl  
www.olympus.nl

**OPTIKRON GMBH****21**

OPTIKRON has specialized in manufacturing micro-optical components, complex optical assemblies, modules for micro-systems and thin-film optics. For endoscopes, laser and sensor systems we are producing micro prisms and other miniaturized plano-optics. Furthermore, OPTIKRON manufactures complex customized assemblies made of micro-optical, mechanical and fiber-optical components. There is also a production department at OPTIKRON which develops and manufactures optical coatings and thin-film optics like mirrors, beam splitter, optical windows and filters. The optical components made by OPTIKRON for use in medical applications are optimized for the special requirements in this field and for the need of being autoclaveable.

**OPTIKRON GMBH**

Loebstedster Str. 70,  
D 07749 JENA (D)  
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Mr. Thoralf Waßmann  
T +49 (0)3641-384970  
info@optikron.de  
www.optikron.de

**OPTIWA BV****99****More possibilities in complex precision parts**

Optiwa is a supplier of complex accurate machined parts and mechanical assemblies. Optiwa is able to offer you efficient production for parts with tolerances down to 0.5 µm accuracy. (Dimensional, form and location tolerances within the Sub-micron range.)

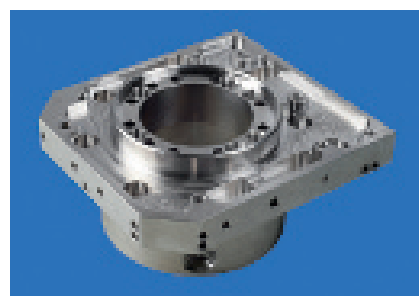
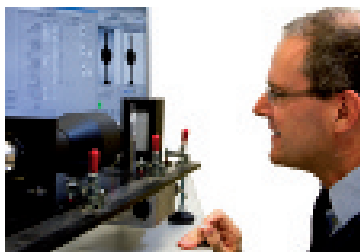
In addition to turning and milling processes, Optiwa offers: grinding, hard turning, polishing, lapping and all possible surface and heat treatments. Various parts of the production area are climate controlled. Several CNC machines are automated by robot installations.

Parts are used in electron microscopes, air bearings, optical

modules and specific medical and analytical equipment.

**OPTIWA BV**

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5953 ZK REUVER (NL)  
Contact person: Mr. Ing. A. Wullms  
T +31 (0)77-4769900  
twullms@optiwa.nl  
www.optiwa.nl

**PHILIPS INNOVATIVE APPLICATIONS NV****110****Philips GTDM**

Uw brug tussen  
product ontwikkeling  
en massafabricage

Specialist in:  
Laserprocessing  
Microlenzen  
Machine vision  
Manipuleren van kleine onderdelen  
Lekdetectie

Philips GTDM, a group of over 100 manufacturing technology experts provide professional services in order to develop and improve the reliability and efficiency of production processes. These services comprise

process and feasibility studies, mechanical and electrical engineering work and machine realization, including vision and measurement tools for process control. Over the past 50 years, the GTDM group has gathered particular expertise in some major technology areas such as laser processing and micro-welding, manipulation and dosing of small quantities of materials, integration of machine-vision systems, light measurements and handling and processing of glass components.

**PHILIPS INNOVATIVE APPLICATIONS NV**

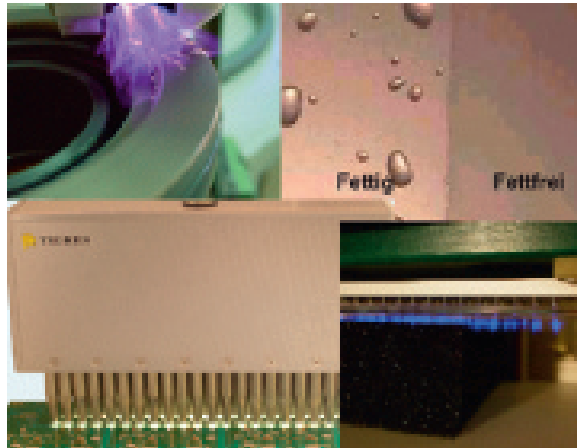
Steenweg op Gierle 417,  
B 2300 TURNHOUT (B)  
Contact person: Mr. Gert Van der Haegen, Mrs. Karin Van Hoeck  
T +32 (0)14-921383,  
+32 (0)14-401281  
gert.van.der.haegen@philips.com,  
karin.van.hoeck@philips.com  
www.lighting.philips.com/main/  
application\_areas/mechanization/  
index.wpd

**PIEZOMECHANIK  
GMBH****65**

Piezo actuation is a top innovative technology in the field of linear drivers on motors, featuring a unique combination of drive parameters with respect to positioning accuracy, force generation, load capabilities and dynamics. Most applications in mechatronics / adaptronics would not be feasible without piezo actuation. PIEZOMECHANIK accompanies you to investigate these new fields and to provide the right measures and products for a successful innovation step. PIEZOMECHANIK offers you its assistance from the very first visions of your new business up to a final real working and profitable product.

**PIEZOMECHANIK GMBH**

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5656 AE EINDHOVEN (NL)  
Contact person: Mr. Hein Schellens  
T +31 (0)40-8512180  
info@heinmade.com  
www.heinmade.com

**PLATOS CONSULTING****58**

PlaToS Consulting offers a wide range of services in the field of modern surface treatment technologies, mainly plasma technology. Available services are e.g. trainings, technology workshops, proces optimisation, troubleshootings, case studies, sample treatments, subcontracting, surface analytics, rentable equipment. Experience in all major industrial sectors, where all types of materials

like polymers, metals, ceramics, textiles are converted and surface-processed – e.g. printing, glueing, painting, functional coatings, cleaning, laminating, welding, .... PlaToS Consulting supports, completes and strengthens your R&D, Engineering and Production teams by providing additional expertise and an

independant viewpoint on your surface related problems, questions and needs.

**PLATOS CONSULTING**

Galgestraat 12,  
B 9700 OUDENAARDE (B)  
Contact person: Mr. Dr. Ralf Greger  
T +32 (0)55-305032  
ralf.greger@platos-consulting.be  
www.platos-consulting.eu

**PM-BEARINGS BV****85**

Development, integration and manufacturing of linear guides, guiding systems, nanopositioning stages and mechatronical [vacuum] modules for the Semiconductor, Medical, Analytical and Optical markets.

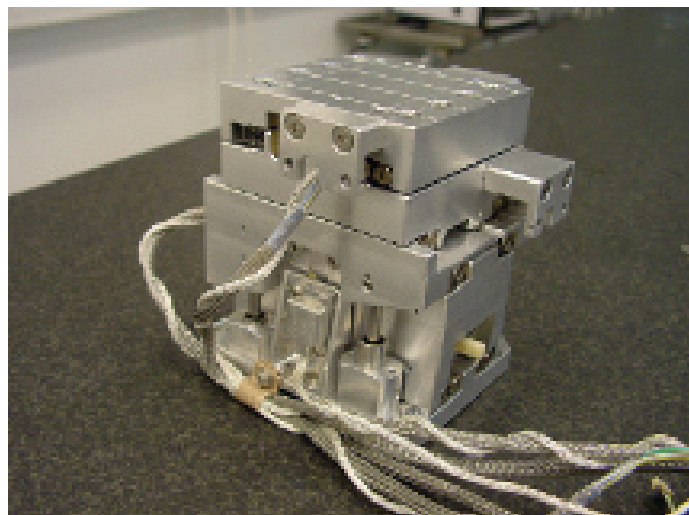
**PM-BEARINGS competences:**

1. Systems realisation from R&D to Serial production
2. High precision machinery
3. Linear technology
4. Wafer inspection equipment
5. Nanopositioning mechatronical modules
6. Motion control
7. Piezo technology
8. Module assembly, also in clean room conditions
9. UHV and UCV production

**PM-BEARINGS BV**

Galileistraat 2,  
7701 SK DEDEMSVAART (NL)  
Contact person: Mr. J. Oldereuver

T +31 (0)523-612258  
info@pmbearings.nl  
www.pmbearings.nl



**PRECISION MICRO****9**

Precision Micro is one of the largest specialist metal component manufacturers in Europe, innovating, developing and utilizing a unique combination of manufacturing processes to meet the needs of customers worldwide.

The company has pioneered developments in photo etching (also known as chemical etching, photo chemical etching, acid etching and chemical milling), electroforming and mechanical forming, achieving standards admired by the industry and appreciated by customers in automotive, communications, aerospace, electronics,

medical, military and other 'high-tech' engineering industries.

**PRECISION MICRO**

De Waal 42, 5684 PH BEST (NL)

Contact person: Mrs. Bonny van Geel

T +31 (0)499-377954

[bonny.van.geel@precisionmicro.com](mailto:bonny.van.geel@precisionmicro.com)

[www.precisionmicro.com](http://www.precisionmicro.com)

**PROMIS ELECTRO-OPTICS BV****139**

Promis Electro Optics (PEO) is a modern trading company with over 30 years of experience in the field of non-contact electro-optics and radiation technology QA and radiation safety. We offer specialized measurement and detection solutions to optimize your processes using light, position (PSD), absolute color and radiation.

PEO knowledge comes together with field experience and an established network of professionals. PEO offers high standard in Quality, Innovation and Support through selection of the best suppliers that are up-to-date with the latest technology and optimal communication.

We deliver professional support in a personal way. Your satisfaction is our focus.

**PROMIS ELECTRO-OPTICS BV**

P.O. Box 194,  
6600 AD WIJCHEN (NL)

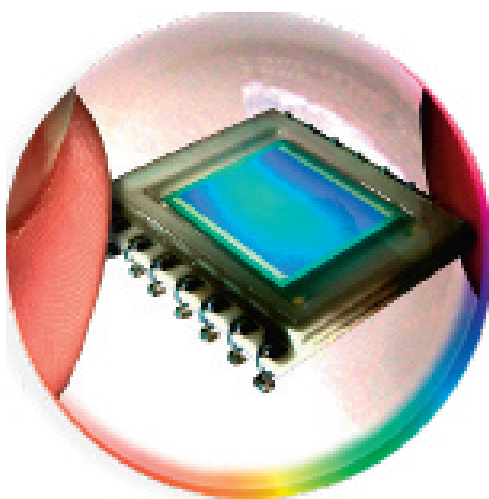
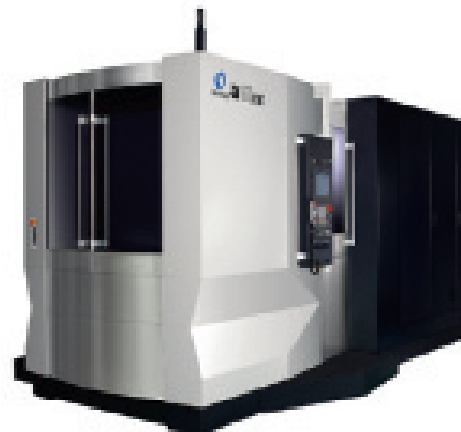
Contact person:

Mr. Vincent Kroeze

T +31 (0)24-6488688

[info@gotopeo.com](mailto:info@gotopeo.com)

[www.gotopeo.com](http://www.gotopeo.com)

**PRODUTEC BV****180**

PRODUTEC BV is importeur van metaalbewerkingsmachines op het gebied van Frezen, Eroderen en Slijpen. Daarnaast leveren wij de daar bij behorende services zoals onderdelen, opleidingen, toebehoren, software en automatiseringsoplossingen voor het beladen van de machines. Ons programma bestaat uit de volgende topmerken: MAKINO, KELLENBERGER, JONES & SHIPMAN, MST, GMTK en ROSA. Vanzelfsprekend leveren we voor deze machines de service die bij TOPniveau hoort. Uw behoefte is onze uitdaging.

**PRODUTEC BV**

Energieweg 3v,  
4231 DJ MEERKERK (NL)

Contact person:

Mr. André Verburg

T +31 (0)183-600560

[info@produtec.nl](mailto:info@produtec.nl)

[www.produtec.nl](http://www.produtec.nl)

**QIOPTIQ PHOTONICS GMBH & CO KG****78**

Qioptiq designs and manufactures photonic products and solutions that serve a wide range of markets and applications in the areas of medical and life sciences, industrial manufacturing, defense and aerospace, and research and

development. The company is known for its high-quality standard components, products and instruments, its custom modules and assemblies, its leading-edge innovation, its precision manufacturing and its responsive global resourcing. Through a series of acquisitions, Qioptiq has an impressive

history and pedigree, and benefits from having integrated the knowledge and experience of Avimo, Gsänger, LINOS, Optem, Pilkington, Point Source, Rodenstock, Spindler & Hoyer and others. For more information, visit [www.qioptiq.com](http://www.qioptiq.com)

**QIOPTIQ PHOTONICS GMBH & CO KG**

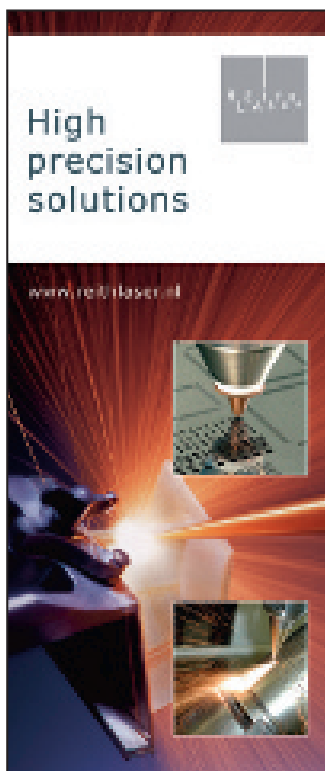
Königsallee 23,  
D 37081 GÖTTINGEN (D)  
Contact person:  
Mr. Karsten Fischer  
T +49 (0)551-6935156  
[karsten.fischer@qioptiq.de](mailto:karsten.fischer@qioptiq.de)  
[www.qioptiq.de](http://www.qioptiq.de)

**Q-SYS BV****103**

Q-Sys offers a complete service, from initial application assessment, through feasibility and costing studies, system design, manufacture, calibration and commissioning. Bespoke system design is a speciality and we also offer a complete turnkey capability for multi supplier configurations. Additionally we provide comprehensive technical support to maintain system availability at a maximum. Q-Sys offers cost-effective solutions for all motion control and positioning requirements. Some examples are: large format digital printing, laser welding and cutting, flat panel display mastering, X-ray and optical inspection and holographic master creation.

**Q-SYS BV**

Korte Dijk 2,  
5705 CV HELMOND (NL)  
Contact person:  
Mr. Henry Over  
T +31 (0)492-714434  
[h.over@q-sys.eu](mailto:h.over@q-sys.eu)  
[www.q-sys.eu](http://www.q-sys.eu)

**REITH LASER BV****109**

For more than 20 years Reith Laser has been the leading supplier of laser-processed products in Europe. By using completely automatic

production processes, we are capable to produce just one piece, but also larger series. You can find our products all over the world and even beyond....

With our very expanded and modern laser equipment (20 laser installations), we can offer you a great diversity of laser material processing activities:

- Laser (micro-) cutting
- Laser drilling
- Laser welding
- Laser micromachining

Reith Laser is active in precision industry, medical industry, aerospace, semiconductor and automotive industry.

**REITH LASER BV**

Bijsterhuizen 24-29,  
6604 LK WIJCHEN (NL)  
Contact person: Mr. Ir. J. Reith  
T +31 (0)24-3787564  
[info@reithlaser.nl](mailto:info@reithlaser.nl)  
[www.reithlaser.nl](http://www.reithlaser.nl)





## RELIANCE PRECISION MECHATRONICS

142



- couplings,
- gears,
- rack,
- leadscrews,
- gearboxes,
- motors, and
- slides

to build your precise assemblies. We can assist with your design, test your assembly and manufacture for

Reliance Precision Mechatronics, a division of Reliance Precision manufactures, designs, assembles and tests high-precision mechanical components and mechatronic assemblies. We offer a wide range of standard high-precision motion-control components such as

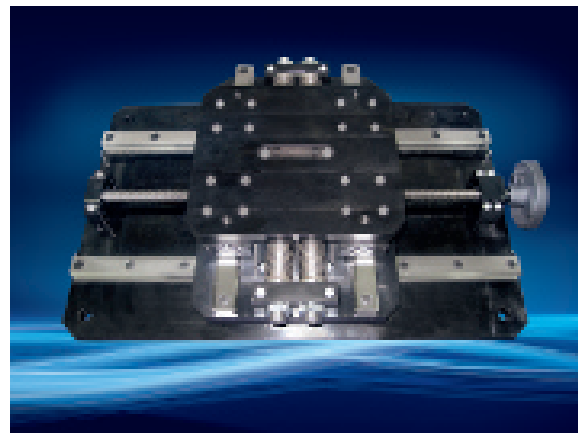
prototypes or production. We can also help you further with high demand specialist components and assemblies at Reliance, where we have two cleanrooms and a team of qualified engineers for vacuum-compliant components and assemblies.

### RELIANCE PRECISION MECHATRONICS

Florijnstraat 20,  
4879 AH ETTEN-LEUR (NL)  
Contact person: Mr. John Bazuin  
T +31 (0)76-5040790  
jb@rpmechatronics.co.uk  
www.rpmechatronics.co.uk  
www.reliance.co.uk

## RODRIGUEZ GMBH

186



Rodriguez is one of the leading suppliers of thin-section bearings, linear technology, precision roller bearings, special bearings and components for various industrial applications. In our modern time, which is characterised by technical innovations, the demand for superb construction solutions is higher than ever, including the competent consulting for the best fitting and customer-specific roller bearing technology, which is gaining more and more importance. Rodriguez delivers to the most important industrial sections.

### RODRIGUEZ GMBH

Ernst-Abbe-Strasse 20,  
D 52249 ESCHWEILER (D)  
Contact person:  
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T +49 (0)2403-7800  
info@rodriguez.de  
www.rodriguez.de

## RENISHAW BENELUX BV

160



measurement, additive manufacturing, gauging, Raman spectroscopy, machine calibration, position feedback, CAD/CAM dentistry, shape memory alloys, large scale surveying, stereotactic neurosurgery, and medical diagnostics. Our aim is to be a longterm partner,

offering superior products that meet our customers' needs, backed up by expert technical and commercial support.

Renishaw is a global company with core skills in measurement, motion control, spectroscopy and precision machining. We develop innovative products that significantly advance our customers' operational performance – from improving manufacturing efficiencies and raising product quality, to maximising research capabilities and improving the efficacy of medical procedures. Typical applications: machine tool automation, co-ordinate

### RENISHAW BENELUX BV

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benelux@renishaw.com  
www.renishaw.com

**W.J. ROELOFS MEETINSTRUMENTEN BV****121**

In more than 50 years, Roelofs Meetinstrumenten has built a reputation as importer of measuring instruments from manufacturers in England, Germany, the Netherlands and Switzerland, such as Marcel Aubert, ARA, Diatest, Feinmess Suhl, Isatool, Kordt, L&W, Mytri, Opus, Sylvac, Tesa, Trimos, Wyler, YPG, Zeiss TSK. With the support of our suppliers, we are capable to offer a wide range of solutions for measuring problems, in order to advise the right measuring instrument. On a regular basis we have in-house presentations in our show room and seminar room where we inform our customers about the latest new product developments.

**W.J. ROELOFS MEETINSTRUMENTEN BV**

Kernreactorstraat 42-44,  
3903 LG VEENENDAAL (NL)  
Contact person: Mrs. I. Roelofs  
T +31 (0)318-521580  
info@roelofsmeetinstrumenten.nl  
www.roelofsmeetinstrumenten.nl

**ROFIN-BAASEL BENELUX BV****44**

Rofin-Baasel Benelux is the Benelux subsidiary of Rofin Laser GmbH, the world leading manufacturer of laser sources and laser workstations. From Alblasterdam we supply Service and Maintenance, Consultancy and Sales of CO<sub>2</sub>, YAG, Fibre and Diode laser solutions for all kinds of industrial segments: a.o. Medical, Automotive, Metal Sheet working, Tool manufacturing, Consumer Electronics and Photo-Voltaic Industries. Welding, Cutting, Engraving, Marking, Ablation and Drilling are the main applications for our lasers and workstations.

**ROFIN-BAASEL BENELUX BV**

Edisonweg 52,  
2952 AD ALBLASSERDAM (NL)  
Contact person: Mr. Paul Wielinga  
T +31 (0)78-6931037  
info@rofin-baasel.nl  
www.rofin-baasel.nl

**ROMÉDES ENGINEERING BV****155**

machines for electronics components, handling equipment for the medical and related industries. We show several fast moving machines which function with approx. 600 strokes per minute with a positioning accuracy within 10 µm. Real engineers should not let the opportunity pass by to get acquainted.

Romédés Engineering is an energetic company, which characterises itself by enthusiasm, drive and precision. The group of engineers is an energetic team of highly qualified and well attuned specialists. Based on the question c.q. problem definition, with a clearly defined process, Romédés will generate a resourceful solution.

The realised projects consist of fast moving machines for precision engineering industries, assembly

**ROMÉDES ENGINEERING BV**

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7131 MN LICHTENVOORDE (NL)  
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Mr. R.J.M. Wessels  
T +31 (0)544-356180  
info@romedes.nl  
www.romedes.nl

**DE ROOY SLIJPCENTRUM BV****149**

De Rooy Slijpcentrum (Grinding Centre), founded in 1939, has been a reliable supplier to a number of well-known industrial companies for many years. The company has developed the last decade into a centre of allround grinding and milling excellence.

Capabilities:

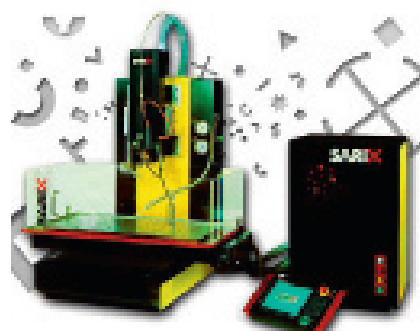
- Flat and profile grinding 7,000 x 1,750 x 1,500 mm
- Surface grinding 6,000 x 1,400 x 500 mm
- Cylindrical grinding Ø 1,000 x 4,000 mm

- Internal grinding Ø 2,000 x 1,300 mm
- Milling 16,000 x 4,000 x 1,300 mm

Furthermore, De Rooy is specialized in delivery of complete precision components. De Rooy's extensive, modern machine park offers a high level of both flexibility and precision. De Rooy Slijpcentrum's quality control system conforms with – and is qualified by – TÜV-Nederland for ISO 9001:2008.

**DE ROOY SLIJPCENTRUM BV**

P.O. Box 781,  
5600 AT EINDHOVEN (NL)  
Contact person: Mr. M.H.M. de Rooy  
T +31 (0)40-2813459  
m.derooy@rooy.nl  
www.rooy.nl

**SARIX SA****158**

Always at leading edge of the highest Micro-machining performance, SARIX offers a new machining concept, the 3D Micro EDM Milling. Complexes cavities can be achieved down to real micro scale of 10 micron with accurate tolerance down to 1 micron within high surface finishing of  $R_a < 0.1$ . SARIX designs, manufactures and markets highly efficient Micro-EDM equipment typically used in many industries such as: medical, die-making, microelectronics, automotive, aerospace as well as universities. With its reliable machine concept using in once the Micro-Drilling, Sinking and EDM Milling, SARIX contribute on the development of new high-tech products from R&D to Mass Production reliability.

**SAFFIR, DESIGNERS FOR MANUFACTURING****65**

Specialized in the supply of know-how about engineering materials, in combination with a broad view on all imaginable forming, joining and surface technologies.

Our focus is concentrated in giving support at early stages of product development. This is the most suitable moment for attention to this subject at an efficient and most profitable way.

It is the supply of this specialized know-how in which Saffir, Designers for Manufacturing has developed its

specialism. We can assist by temporary support of your development department, initiate and support of innovation processes or full time stationing of specialists and making links to specialized suppliers.

**SAFFIR, DESIGNERS FOR MANUFACTURING**

Salderes 175, 5682 EZ BEST (NL)  
Contact person: Mr. Jan Gerrits  
T +31 (0)6-53656683  
jan.gerrits@saffir.nl  
www.saffir.nl

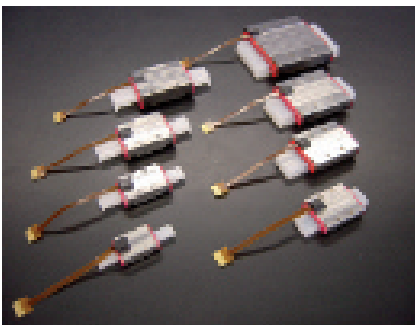
**SARIX SA**

Via ai Molini 22,  
CH 6616 LOSONE (CH)  
Contact person: Mr. Reto Gallera  
T +41 (0)91-7858171  
info@sarix.com  
www.sarix.com

**SCHNEEBERGER  
GMBH****40**

SCHNEEBERGER has been developing and producing already for more than 80 years linear guides, guiding systems and complete turn-key positioning systems for the high-tech market. For regular environments as well as for clean-room and vacuum applications where the  $\mu\text{m}$  or  $\text{nm}$  accuracy is needed. More and more we cast base frames for our systems out of mineral cast with high benefits regarding damping.

One of our strengths is the flexibility to produce customised product based on our standard products. SCHNEEBERGER is globally oriented and has worldwide companies and representatives.

**SCHNEEBERGER GMBH**

p/a Beekerweg 65,  
6235 CB ULESTRATEN (NL)

Contact person:

Mr. Maurice Bastings

T +31 (0)43-3654532

maurice.bastings@schneeberger.com

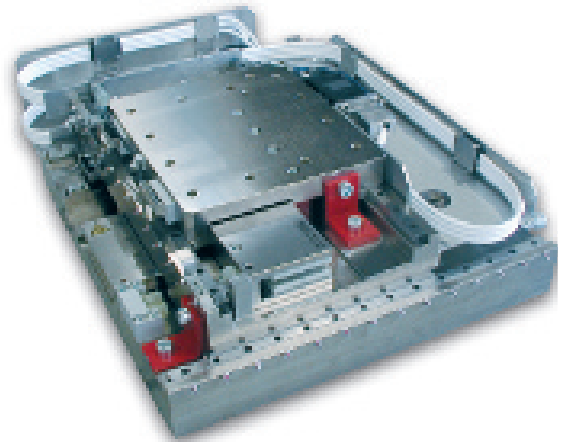
www.schneeberger.com

**SCHAEFFLER NEDERLAND BV****75**

Schaeffler Nederland is part of the world-wide operating Schaeffler Group. With her brands LuK, INA and FAG the Schaeffler Group belongs in the world of drives to the leading suppliers of rolling bearings, linear systems, maintenance products and services for all existing fields of application in the sectors Automotive, Industry and Aerospace.

In our booth 75 we will show you our latest developments of:

- IDAM (INA Drives & Mechatronics) – direct drives and mechatronics.
- INA Linear – overview of linear products and solutions.
- Barden (part of FAG) precision bearings.
- Blis – ballscrews.

**SCHAEFFLER NEDERLAND BV**

P.O. Box 50,  
3770 AB BARNEVELD (NL)

Contact person:

Mr. F.W.J. Kroes

T +31 (0)342-403000

f.kroes@schaeffler.com

www.schaeffler.nl

**SCHUT GEOMETRISCHE MEETTECHNIEK BV****I**

Schut Geometrical Metrology is an international organization, specialized in the development, production and sales of measuring instruments and systems. Products produced by Schut are the 3D CNC coordinate measuring machines "DeMeet"

(video, touch probe and multi-sensor

models), "DF-System" measurement fixtures, "Approve" SPC software. Besides products as Magnescale (electronic scales, gauges etc.), TESA and Mitutoyo (measuring instruments), Fisso (stands), Käfer (dial indicators), Witte ("Alufix" fixture systems) Peak (magnifiers), LMW (gauges), Schwenk and Kroeplin (internal / external measuring tools) and Renishaw (probe systems), Schut offers an extensive range of measuring equipment in various price ranges.

**SCHUT GEOMETRISCHE  
MEETTECHNIEK BV**

P.O. Box 5225, 9700 GE  
GRONINGEN (NL)

Contact person:

Mr. Drs. B. Schut

T +31 (0)50-5877877

schutnl@schut.com

www.schut.com

**SCHUT PRECISIONPARTS BV****42**

Schut PrecisionParts is a state-of-the-art subcontractor for mechanical parts and assemblies. We are specialised in precision machining, assembly and grinding. Our company offers a fully conditioned production

facility, high-tech machinery, a certified quality system, 3D measurement facilities. A combination of these high standards and services enables us to function as a reliable partner.

**SCHUT PRECISIONPARTS BV**

Amperestraat 16, 2952 AA  
ALBLASSERDAM (NL)

Contact person:

Mr. J.M. Schut

T +31 (0)78-6915666

info@schutprecisionparts.nl

www.schutprecisionparts.nl

**SICK BV****5**

SICK B.V. is a subsidiary from SICK AG, which has a worldwide presence with numerous subsidiaries and affiliated companies, agencies and sales offices, and is one of the leading producers of sensors and sensor solutions.

SICK supplies optical sensors, inductive sensors, positioning encoders, distance measurement systems, vision sensors and cameras, barcode-reading scanners, safety systems and level measurement equipment for process automation.

**SICK BV**

P.O. Box 186 / Leijenseweg 111, 3720  
AD / 3721 BC BILTHOVEN (NL)

Contact person:

Mr. T. Bernardus

T +31 (0)30-2292544

info@sick.nl

www.sick.nl

**SENTECH SENSOR TECHNOLOGY****137**

fitted with casing, plug, cable or connector. The total sensor product will often embody ingenious solutions to specific problems that came to light during the customer's everyday operations.

At Sentech, we don't merely supply products, we advise, integrate and assemble.

Sentech Sensor Technology thinks and acts with a view to meeting the customer's needs. Our specialized trading company supplies integrated sensor solutions tailored to fit the specific purpose for which the customer will use them. Sentech regularly delivers assembled sensors ready for immediate service, pre-

**SENTECH SENSOR TECHNOLOGY**

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5253 CB NIEUWKUIJK (NL)

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Mrs. Tessa Danz

T +31 (0)73-5183121

info@sentech.nl

www.sentech.nl



**SIGMACONTROL BV****187**

SigmaControl, you have a partner understanding your business. We allow you to get your machines to respond to the demands and needs of a changing market.

Industrial companies evolve constantly. There's always a need of improvement, efficiency and cost reduction. Not rarely the machine park functions as an accelerator of that evolution. Machine builders of industrial applications have to follow these developments. With

We already did it for twenty years with a variety of clients, and with one clear vision: to provide machine builders all the tools they need to optimize their own products constantly. SigmaControl is exclusive Benelux distributor of SIGMATEK products.

**SIGMACONTROL BV**

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2994 LB BARENDRECHT (NL)  
Contact person:  
Mr. Lucien Kouwenhoven  
T +31 (0)180-695777  
office@sigmacontrol.eu  
www.sigmacontrol.eu

**SMARACT GMBH****74**

SmarAct develops, produces and distributes piezo-based micro- and nanopositioners, advanced control systems and micro-tools. In addition, SmarAct offers complete micro- and nanomanipulation systems, ranging from XY tables over 6D manipulators to multi- manipulator systems. All positioning systems can be applied in normal pressure as well as in vacuum conditions.

**SMARACT GMBH**

Floetenstrasse 70,  
D 26125 OLDENBURG (D)  
Contact person:  
Mrs. Evelyn Thiel  
T +49 (0)441-80087970  
info@smaract.de  
www.smaract.de

**SKF NEDERLAND****123**

offers for each customer segment, helping customers improve performance, reduce energy use and lower total costs, while bringing increased added value. Technical development and quality have been in focus at SKF since the very start. The Group's efforts in research and development have resulted in numerous innovations, forming bases for new standards, products and solutions.

SKF Group is the leading global supplier of products, solutions and services out of five technology platforms: Bearings and units, Seals, Mechatronics, Lubrication Systems and Services. Services include technical support, maintenance services, condition monitoring and training.

By utilizing capabilities from these platforms, SKF develops tailor-made

**SKF NEDERLAND**

Kelvinbaan 16, 3439 MT  
NIEUWEGEIN (NL)  
Contact person:  
Mr. Ringo van Voorst  
T +31 (0)30-6075957  
marketingnl@skf.com  
www.nederland.skf.com

**STAMHUIS LINEAIRTECHNIEK BV****170****Linear Motion Components and High Tech Assemblies**

Stamhuis supplies precision linear motion components and systems for machine, instrument, medical and semiconductor applications, of world leading manufacturers. These components include linear guides, ball screws, speciality gears and related components. For projects, which push beyond the limits of standard products (load, temperature, speed,...) they assist you to find a perfect solution. Sometimes by modification of standard products or by new developments in cooperation with our manufacturing partners. For many products, like linear guides and ballscrews, we offer our QUICKCENTER service.

During the Precision Exhibition we show on stand nr. 170:

- high-speed and accurate handling system;
- high-tech assembly;
- new line of ballscrews;
- ATEX and cleanroom solutions;

**STAMHUIS LINEAIRTECHNIEK BV**

Weteringstraat 9,  
7391 TX TWELLO (NL)  
Contact person:  
Mr. A. Stamhuis  
T +31 (0)571-272010  
info@stamhuislineair.nl  
www.stamhuislineair.nl

**STICHTING APPLIED PIËZO****65**

We make piezo work for you!

Applied Piezo:

- creates new business in piezo actuators and sensors;
- promotes piezo technology;
- stimulates knowledge development and innovation;
- provides a network where knowledge, expertise and products can be exchanged.

One stop shop for piezo solutions.

The aim of AppliedPiezo.com is to facilitate the access of industry to utilisation of piezo technology. We will help you evaluate and benefit from the advantages of piezo technology and support you from idea to production. Applied Piezo is a group of cooperating industrial companies and universities with supplemental expertise in the field of piezo technology.

STICHTING APPLIED PIËZO  
P.O. Box 4176,  
7320 AD APELDOORN (NL)  
Contact person:  
Mr. Jan Peters  
T +31 (0)6-53981738  
info@applied-piezo.com  
www.applied-piezo.com

**STEEN METROLOGY SYSTEMS NV****36**

From the outset in 1982, SMS has offered a full range of high quality geometrical measuring equipment with consultancy, support, training and service back-up. To achieve this, SMS (located on the motorway E25 at 35 minutes from Maastricht) uses in its own laboratory a variety of high-precision measuring equipment

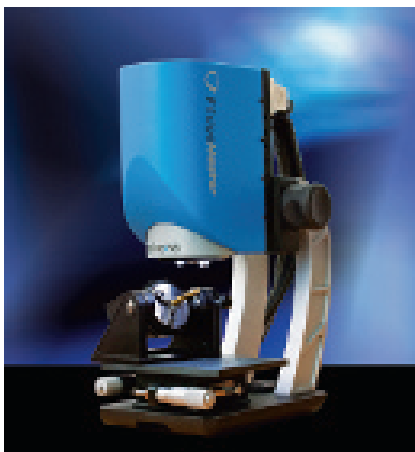
from its general sales range. Including manual or CNC measuring machines, 3D multisensor with image analysis software, all supplied by world renowned manufacturers.

**STEEN METROLOGY SYSTEMS NV**

Rue T. Gerkens 74,  
B 4052 CHAUDFONTAINE (B)  
Contact person:  
Mr. Roger Steenacker  
T +32 (0)43-687080  
roger.steenacker@smsbenelux.be  
www.smsbenelux.be

**ST INSTRUMENTS BV 118****Optical cutting edge measurement in production**

EdgeMaster is an optical 3D surface measurement device to automatically measure cutting edges in research and production. It provides high measurement accuracy and a high level of user friendliness and intuitive software. The cutting tool system is mainly used for the 3D measurement of inserts and hobs. Users measure form and chipping of the cutting edges. Even very small radii and angles are measured regardless of size, shape or surface finish. In addition, EdgeMaster offers repeatable roughness measurement on the chipping surface. The cutting edge measurement system is further used for wear analysis, automatic tolerance measurement and comparative measurements to CAD-data or reference geometry. The EdgeMaster system is very resistant to vibrations and ambient light which increases measurement accuracy.

**ST INSTRUMENTS BV**

P.o. Box 12,  
3360 AA SLIEDRECHT (NL)  
Contact person:  
Mr. J. de Bruin  
T +31 (0)184-640000  
info@stinstruments.com  
www.stinstruments.com

**STT PRODUCTS BV****159**

house concept of STT. The company is well equipped with CNC multi-axis milling machines, lathes and anodize equipment. An in-house development of a rapid prototyping system, System I25®, is since 2008 available for the market. The system equips technicians to build quickly and flexible constructions for test and measurement purposes, etc.

STT will be your innovative partner in streamlining and automating (medical device) production processes. As well they will be your designers of specific test and quality control equipment. The complete range of mechanical, electrical and software design till the production, assembly and installation skills is the fundament of the all-in-

**STT PRODUCTS BV**

Leuringslaan 48,  
9356 VM TOLBERT (NL)  
Contact person:  
Mr. Ing. M.A. Kooistra  
T +31 (0)594-514445  
info@sttproducts.nl  
www.sttproducts.nl

**TECHNOBIS GROUP****82**

Technobis Group is a developer and supplier of high-tech instruments and modules for OEM companies around the world.

The combination of technologies found within the Technobis Group and the Technology Platform formed with partners is absolutely unique. Working within this platform ensures fast response, high flexibility and optimal solutions for complex multidisciplinary and interdisciplinary challenges.

The unique combination of technologies makes it possible to

develop instruments in diverse high-tech industries. Using the experience and expertise of Technobis Group, customers were and are able to realize high-tech solutions which proved to be a key contribution to the realization of their business cases.

**TECHNOBIS GROUP**

Geesterweg 4b,  
1911 NB UITGEEST (NL)  
Contact person: Mr. P.L. Kat  
T +31 (0)251-248432  
info@technobis.nl  
www.technobis.com  
www.tft-fos.com



## TECNOTION BV

145



Tecnotion is the global authority on linear motor technology. We are the world's only unbundled manufacturer of linear motors and specialize solely in the development and production of linear motors. Because of this, our expertise, customer service and product quality are unmatched. We have a global presence, which ensures short delivery times and high quality support, wherever you are located. Our highly skilled sales and application engineers are at your disposal. They will help you from your initial prototype all the way to the application of our products and beyond. Whatever your needs are, you can count on Tecnotion as a solid, reliable partner.

### TECNOTION BV

Twentepoort West 15,  
7609 RD ALMELO (NL)

Contact person:  
Mr. Arnoud Bekkenutte  
T +31 (0)546-536300  
sales@tecnotion.com  
www.tecnotion.com

## TECHNOLOGY TWENTE BV

6



As a member of the Aalberts Industries Group, Technology Twente has been in the metalworking business since 1990. Our company specialises in the manufacture of high-value components and assemblies. Our products are used in a large number of sectors, including defence, aerospace, medical, mechatronics and general mechanical and apparatus engineering. Where necessary, Technology Twente seeks out suitable innovative solutions to meet its customers' specific requirements.

Our organisation is characterised by a combination of quality, customer focus, craftsmanship and technology. By continuing to invest in expertise and the latest technologies, Technology Twente has developed

into a reliable and innovative partner for the high-tech industry.

### TECHNOLOGY TWENTE BV

P.O. Box 738,  
7550 AS HENGELLO (NL)  
Contact person: Mr. A. Cloo  
T +31 (0)74-2438866  
acloo@technologytwente.nl  
www.technologytwente.nl

## TEESING SUBMICRON TECHNOLOGY

52



Teesing Submicron Technologies supplies components for applications in a wide variety of products, assemblies and systems associated with gases and liquids used for

semiconductor processing. Ranging from cooling systems, bulk storage gas cabinets, gas monitoring applications, bulk filtration and purification to point-of-use gas supply. For the HP and UHP applications, Teesing offers a high quality components and sub assemblies such as: piping, valves, regulators, tubing, manifolds, assemblies, and systems are supplied to semiconductor toolmakers and meet the stringent demands of the semiconductor industry. Double packed and produced under cleanroom conditions.

### TEESING SUBMICRON TECHNOLOGY

Verrijn Stuartlaan 40, 2288 EL  
RIJSWIJK (NL)  
Contact person: Mr. H. Heymans  
T +31 (0)70-4130750  
h.heyman@teeing.nl  
www.teeing.com

**TEGEMA GROUP****134**

The Tegema Group develops, innovates and realizes products, processes, systems, modules, and apparatus from the idea or specification phase up to a functional model, prototype or pre-production series. In doing so, we take care of the means of production and assembly, tooling and test equipment from the problem definition up to and including realization and commissioning. We realize total solutions using a project-oriented approach. For

specific knowledge and skill, we work closely with specialist companies and institutes. We also strive to work as much as possible and jointly develop together with our customers.

**TEGEMA GROUP**

P.O. Box 1189,  
5602 BD EINDHOVEN (NL)  
Contact person:  
Mr. Ing. M.H.J. van Acht  
T +31 (0)40-2677677  
mvacht@tegema.nl  
www.tegema.nl

**TSG GROUP****32**

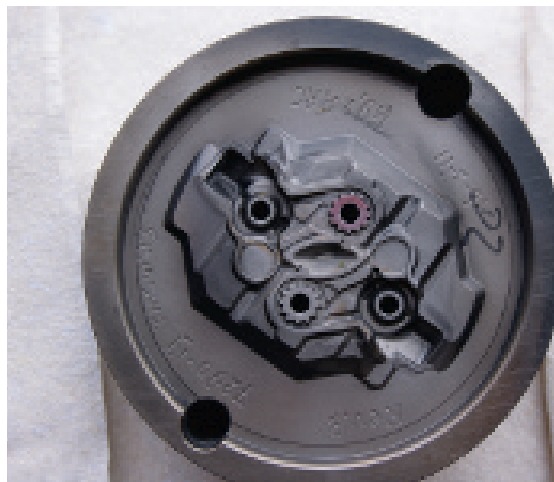
TSG Group is a mechanical engineering agency that combines knowledge, design and technology. Over a hundred employees work for companies that range from small businesses to large multinationals in Industry, Automotive and Consumer.

TSG Group consists of:

- Engineering by Total Support  
Our Analysts, Mecha(tro)nic Specialists and Product Designers provide knowledge and expertise within your organisation.
- Design by Modesi  
From Design Strategy to Concept Design to Analysis: a professional and powerful partner in the field of design.
- Projects by InnoteQ  
As a provider of total solutions we not only focus on Product Development and Industrialisation but also on Proto / Pilot Production in our own workshop.

**TELMASTAAL BV****76**

Telmastaal is a reliable partner since 1980 who provides you with high quality materials, craftsmanship and matching advice. Our global network of suppliers, large inventory and expertise provides a wide choice of materials and best support in providing customized materials for almost every industry imaginable. Telmastainless is a specialist in providing custom products of high quality stainless steel and nickel based alloys. Nimadi focuses on the processing of stainless steel and non-ferrous materials to partially or fully processed products. The strength of these companies is that they complement each other and thus can offer a suitable solution to each question.

**TELMASTAAL BV**

P.O. Box 11, 7040 AA  
'S-HEERENBERG (NL)  
Contact person: Mrs. Wendy van Ree  
T +31 (0)314-664900  
verkoop@telmastaal.nl  
www.telmastaal.com

**TESA BENELUX****12+13**

Tesa is a Swiss company that produces precision measuring equipment since 1941.

**TESA BENELUX**

Van Elderenlaan 1,  
5581 WJ WAALRE (NL)  
Contact person:  
Mr. Pascal Siebens  
T +31 (0)40-5550608  
pascal.siebens@  
hexagonmetrology.com  
www.tesabs.ch

**TSG GROUP**

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5624 MD EINDHOVEN (NL)  
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Mr. Johan van Lieshout  
T +31 (0)40-2548222  
info@tsggroup.nl  
www.tsggroup.nl



**TRIOS PRECISION ENGINEERING****107**

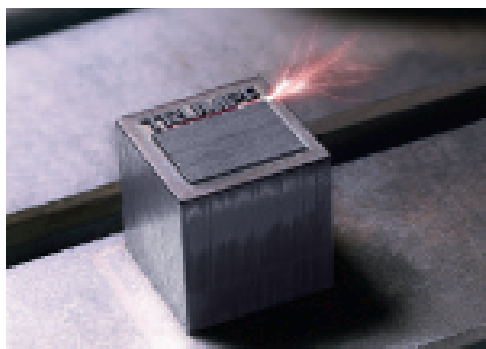
TRIOS Precision Engineering is a mechanical engineering firm offering high-grade, durable solutions in product development, product innovation and machine building. TRIOS specializes in developing precision-engineered solutions that perform under extreme conditions such as high vacuum and cryogenic temperatures. Constructing these solutions with high-performance

metals and fabrics has become one of TRIOS' core competences, as well as transport and handling under cleanroom conditions and with extreme specifications. Over many years, TRIOS has acquired experience in various industrial sectors, with applications for equipment in the semiconductor industry, medical equipment, the food industry and space travel.

TRIOS maintains a well-equipped production facility.

**TRIOS PRECISION ENGINEERING**

Nijverheidsweg 19,  
7161 AA NEEDE (NL)  
Contact person: Mr. H. Dijkstra  
T +31 (0)545-280130  
h.dijkstra@trios.nl  
www.trios.nl

**V.A.C. MACHINES****108**

Het lasermarkeren wordt steeds meer toegepast. Vooral in de kunststofwereld is er een opmerkelijk stijgende vraag om producten te voorzien van een kentekening. Dit kan gaan van een louter functioneel opschrift, tekst, codering, traceability tot echte logo's. Met de laser maken we een heel snelle, flexibele en onuitwisbare markering. Voorbehandeling van het oppervlak is niet noodzakelijk. Door verschillende lasertypes in te zetten slagen we er vandaag in de

kunststof of te carboniseren ofwel fotochemisch af te bleken. Kleuromslag door omvorming van het kleurpigment in het basismateriaal geeft een heel mooie, onvoelbare markering met meestal goed contrastbeeld. De TRUMPF TruMark is een industriële markeerlaser. Geleverd als OEM-laser of geïntegreerd in een werkstation is hij geschikt voor seriegroottes van

1 tot enkele miljoenen stuks, waarbij de lage verbruikskosten en de grote toepasbaarheid zijn grootste troeven zijn.

**V.A.C. MACHINES**

Kleine Pathoekeweg 13-15,  
B 8000 BRUGGE (B)  
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Mr. Nico Velghe  
T +32 (0)50-315083  
sales@vac-machines.be  
www.vac-machines.be

**TRUMPF NEDERLAND BV****108**

The TRUMPF Group is one of the world's leading manufacturers of laser technology and production engineering. We set the standard with our innovations – in lasers and laser systems, machine tools, power tools and medical technology. Today, we are the global market and technology leader in industrial lasers and laser systems. You will find that we have the most comprehensive product portfolio in the world, with the right laser to suit every need. Through systematic research and development, we are extending the advantages we provide our customers well into the future.

**TRUMPF NEDERLAND BV**

Oude Boekeloseweg 31,  
7553 DS HENGELLO (NL)  
Contact person:  
Mr. Michel van Valburg  
T +31 (0)74-2498498  
info@nl.trumpf.com  
www.nl.trumpf.nl

**VACUTECH BV****45**

Vacutec has been creating high-quality technical solutions for a wide range of industries since 1982. We are a trusted and critical partner for the manufacture of precision mechanical and vacuum products for industrial applications.

Vacutec employees are highly skilled and have flexible, state-of-the-art equipment at their disposal. In addition to our production department we have a specially equipped assembly department. We produce, assemble, and test products, always in close consultation with our customers. We focus on



professional and intensive collaboration, a process that is central in our philosophy. It makes us a partner you can talk to at your own level. Together we'll make it work!

**VACUTECH BV**

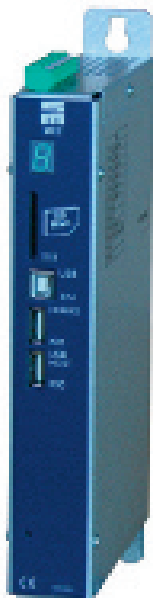
Polakweg 4a,  
2288 GE RIJSWIJK (NL)  
Contact person: Mr. J. van Westing  
T +31 (0)70-3990390  
jeroen.van.westing@vacutec.nl  
www.vacutec.nl

**VARIODRIVE AANDRIJF-  
EN BESTURINGS-  
TECHNIEK BV****115**

Variodrive is specialist op het gebied van high-end Motion Control, waarbij zij toeleverancier zijn voor de machinebouwers met besturingssystemen, servoregelaars, servomotoren zowel lineair als roterend tot complete actuators in het submicrometer bereik. Alle berekeningen voor uiteindelijke bepaling van de juist in te zetten componenten behoren tot onze standaard werkzaamheden.

**VARIODRIVE AANDRIJF- EN  
BESTURINGSTECHNIEK BV**

P.O. Box 1525,  
3260 BA OUD-BEIJERLAND (NL)  
Contact person:  
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T +31 (0)186-636285  
ehogervorst@variogdrive.nl  
www.variogdrive.nl

**VHE INDUSTRIAL  
AUTOMATION BV****17**

VHE Industrial automation is an acknowledged specialist in the field of machine controls. We design and build complete systems and modules and represent also a number of renowned producers of components for driving and controlling machines (motion control). Our employee's technical knowledge and expertise guarantee inventive, innovative and cost-efficient solutions. Our key drive is boosting the success of our customers, because that is the best imaginable safeguard for continuity.

**VHE INDUSTRIAL  
AUTOMATION BV**

P.O. Box 1309,  
5602 BH EINDHOVEN (NL)  
Contact person:  
Mr. A.P. van der Krieken  
T +31 (0)40-2508500  
info@vhe.nl,  
paul.vanderkrieken@vhe.nl  
www.vhe.nl

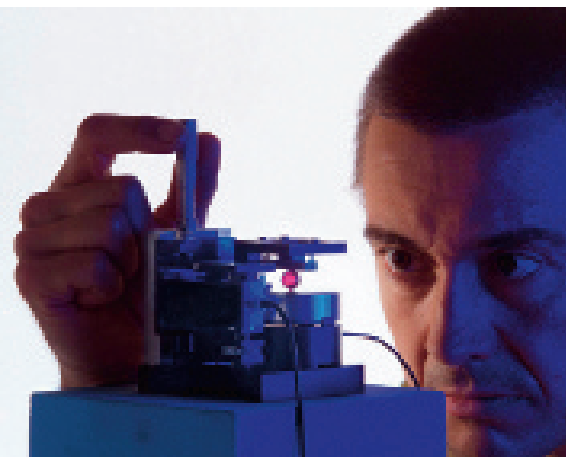
**VIBA NV****51**

Van schuifmaat tot het compleet ontwikkelen en installeren van complexe meetopstellingen in meetkamers of geïntegreerd in de productielijn. VIBA is ook leverancier van 3D meetarmen.

VIBA is leverancier van kwalitatief hoogwaardige technische producten voor de metaal- en kunststofverwerkende industrie. De Business Unit Gereedschappen is verantwoordelijk voor het pakket Geometrische meettechniek, bestaande uit handmeetgereedschap en meetsystemen voor lengte, ruwheid, contour en vorm.

**VIBA NV**

Bleiswijkseweg 41,  
2712 PB ZOETERMEER (NL)  
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Business Unit Gereedschappen  
T +31 (0)79-3306780  
gereedschappen@viba.nl  
www.viba.nl

**VSL****138**

VSL is the national metrology institute of the Netherlands. VSL is part of Holland Metrology Group. VSL makes measurement results of companies, laboratories and organizations directly traceable to

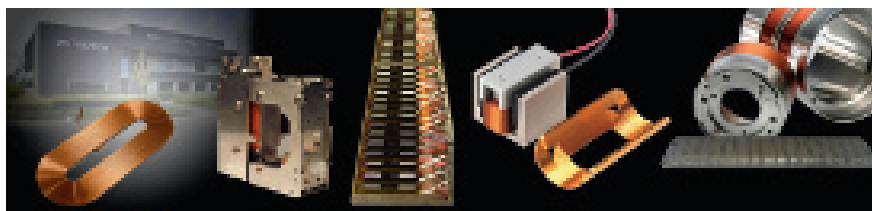
international standards. VSL makes an important contribution towards the reliability, quality and innovation of products and processes, both in business and society at large.

VSL is active in the field of:

- Calibration and Reference materials
- Contract research and consultancy
- Interlaboratory comparisons
- Courses and training

**VSL**

P.O. Box 654, 2600 AR DELFT (NL)  
Contact person: Mrs. Marja Koster  
T +31 (0)15-2691531  
mkoster@vsl.nl  
www.vsl.nl

**WIJDEVEN POWER SUPPLIES & INDUCTIVE TECHNOLOGY BV****72**

Wijdeven is a modern, dynamic and technology-driven company with an experience of more than 70 years. Wijdeven is competent in areas of engineering, production and sales of transformers, coils, magnet assies and electro mechanics.

Wijdeven has more than 100 well-motivated employees divided over two ISO-9001 certified facilities in Oirschot and Ter Apel. Besides own facilities in the Netherlands Wijdeven has co-activities in Eastern Europe and the Far East.

We are known as: proactive, short time to market, innovative and cost efficient. Focus markets are medical, machine equipment, semicon and energy.

Wijdeven will present items of the business unit Motion, e.g. coils, linear motors, voice coil actuators, direct-drive motors, magnet assies and gravity compensators.

**WIJDEVEN POWER SUPPLIES & INDUCTIVE TECHNOLOGY BV**

P.O. Box 77,  
5688 ZH OIRSCHOT (NL)  
Contact person:  
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T +31 (0)499-320130  
rene.van.den.heuvel@wijdeven.nl  
www.wijdeven.nl

**WENZEL BENELUX****102**

Wenzel Benelux is together with EMS sa, one of the biggest suppliers in the Benelux for:

- 3D measuring machines (wide range of types)
- Optical 2D + 3D machines
- Mobile 3D (scan) measuring arms
- Profile projectors
- Hardness, Roughness, Form and Roundness equipment
- 3D laser measuring and scan systems
- 1D + 2D Height gauges
- Wide range of hand measuring equipment from big brands
- Software
- Calibration (RvA)
- Product measuring
- Maintenance & Service
- Measuring and training courses

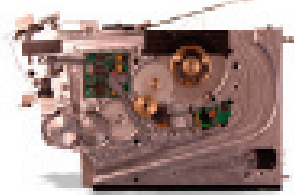
**Wenzel Benelux; your Quality Keeper!****WENZEL BENELUX**

Amerikalaan 4, 6199 AE  
MAASTRICHT AIRPORT (NL)  
Contact person:  
Mr. Maurice Vinclair  
T +31 (0)43-7630510  
info@wenzel-benelux.com  
www.wenzel-benelux.com



**WILTING****18**

Wilting manufactures mechanical components and mechatronic modules in small and medium-sized series. Wilting is the specialist in Manufacturability. So no matter if cost, lead time, reproducibility, quality or logistics is the main challenge for your components / assemblies, Wilting will implement the optimal production process and value chain. Wilting builds on extensive experience in a wide variety of



markets like Semicon, Aerospace, Medical, Food, etc. We look forward to meet you at the Precision Fair 2011 to understand your requirements and to explore

how Wilting can support your business.

**WILTING**

P.O. Box 2004,  
5513 ZG WINTELRE (NL)  
Contact person:  
Mr. Adwin Kannekens  
T +31 (0)40-2052747  
adwin.kannekens@  
wiltingcomponents.com  
www.wiltingcomponents.com

**WTS BENELUX BV****79**

Weiss Technology Systems has a long proven experience for the realization of your Clean Room facility with the following disciplines:

- Construction and building of Clean Room partitioning.
- HVAC systems with air-handling units, specialized for Clean Room use.
- Electric installation.
- Process and Control technology.

WTS Benelux designs Clean Rooms for a wide range of industries, including:

- Healthcare
- Pharmaceutical industry
- Fine-mechanical Industry

- ICT
- Aerospace
- Food

Our creative approach, the solutions and know-how are an added value for the realization of your Clean Room facility!

**WTS BENELUX BV**

Industriestraat 6a,  
3371 XD HARDINXVELD-  
GIESSENDAM (NL)  
Contact person: Mr. P.A. Tenge  
T +31 (0)184-615003,  
+31 (0)6-12088331  
paul.tenge@wtsbenelux.nl  
www.wtsbenelux.nl

**ZME VOF****154**

ZME offers precision machining using modern machinery like turning lathes with driven tools and machining centers of the brands Benzinger, Spinner and Chiron. Maximum accepted diameter is 40 mm for the lathes. ZME has, despite the small size, a quality assurance system operational and is used to just-in-time deliveries and stockholding of parts, ZME is specifically good at producing parts in series but realizes that the market demands smaller series in shorter lead times and is working to follow this trend, ZME is probably the only precision machining company proudly operated by female personnel only.

**ZME VOF**

Rijksstraatweg 28,  
3545 NA UTRECHT (NL)  
Contact person:  
Mrs. Nikki van der Zouw  
T +31 (0)30-6665443  
zme@zme.nl  
www.zme.nl



## ZYGO LOT

152



ZygoLOT is the European Headquarter of ZYGO Corp., US. ZYGO designs, manufactures, and distributes high-end optical systems

and components for metrology and end-user applications. ZYGO has two divisions: Metrology Solutions Division and Optical Systems Division. The Metrology Solutions Division is comprised of two business units: Metrology Instruments and Precision Positioning Systems. This division's products employ various optical phase analysis techniques for

surface shape, texture, roughness, and film thickness.

The Optical Systems Division is comprised of two business units: Electro-Optics and Optical Components. These groups leverage ZYGO's expertise in optical design and assembly, and high-volume manufacturing of precision optical components and systems, for the medical/life sciences, and industrial markets.

**ZYGO LOT**

Im Tiefen See 58,  
D 64293 DARMSTADT (D)

Contact persons:

Mr. Peter Kuschnir,  
Mr. Torsten Glaschke  
T +49 (0)6151-880627

info@zygolot.de,  
kuschnir@zygolot.de  
www.zygolot.de



ACT ON INSIGHTS IN REAL TIME

## ACCESS TO EXPERIENCE CAN ACCELERATE YOUR BUSINESS!

Great innovation! Great opportunity! Question? How to act and bring this business to reality? Greentech Engineering knows the difference between 1st time right and never a failure again. Driving new technologies into -turn key- operation. Delivering tailor made production solutions including project management and capacity. At your site, with competence and experience every step of the way. Industrialize your process. **Act now!**

## DRIVING INNOVATION INTO OPERATION





## Aerotech, Dedicated to the Science of Motion

Booth: 87

*Aerotech delivers the essential micro and nano positioning performance for demanding precision engineering applications across all areas of manufacture and research.*

### Component-To-System Solutions

The comprehensive range includes technically superior linear and rotary air- and/or mechanical-bearing positioning stages with advanced motion and machine controls that are individually supplied or interconnected to form high performance positioning sub assemblies or completely custom engineered motion systems.



### Our Commitment

Aerotech's commitment to advancing its product and value-added service capabilities is summed up in our motto, **Dedicated to the Science of Motion.**

From concept to final certification, Aerotech applies its engineering expertise and skills, along with unrivalled motion control and positioning technologies to provide:

- The lowest cost of ownership
- Highest throughput
- Highest accuracy
- Best return on investment

With over 100,000 positioning axes installed world-wide, Aerotech provides innovative solutions for challenging motion control applications in semiconductor, flat panel, medical device, life sciences, laser processing, electronics manufacture & test, photonics, solar panel, automotive, military/aerospace, and many other markets requiring high precision, high performance motion control solutions.



### Aerotech Limited

Jupiter House, Calvea Park, Aldermaston  
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E [sales@aerotech.co.uk](mailto:sales@aerotech.co.uk)

I [www.aerotech.co.uk](http://www.aerotech.co.uk)



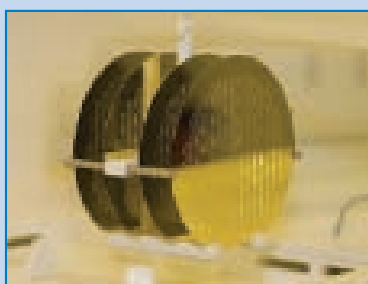
## Precision in Performance

Booth: 132

*Etchform is a manufacturing and service organization for etched and electroformed metal precision parts*

### Etchform provides customised solutions for metal precision parts.

- Production of thin metal precision parts by means of precision etching & electro-forming.
- Standard copper and stainless steel alloys, but also specialties such as beryllium copper, Elgiloy/Phynox, gold, Invar/Kovar, molybdenum, silver and titanium.



- One-off and mass production.
- Additional surface and heat treatments as well as precision mechanical, assembly and logistic services can be offered

### We also supply MicroNano metal parts and tools such as:

- MicroNano Moulding Tools, Stamps, Shims.
- Micro Stencils.
- MicroNano Parts: micro precision parts, filter sieves, vaporizer nozzles, ink-jet nozzles, apertures, probes, gears.



### Etchform B.V.

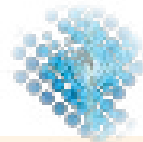
Arendstraat 51, 1223 RE Hilversum  
Postbus 4025, NL-1200 LA Hilversum

T +31 (0)35 685 51 94

E [info@etchform.com](mailto:info@etchform.com)

I [www.etchform.com](http://www.etchform.com)



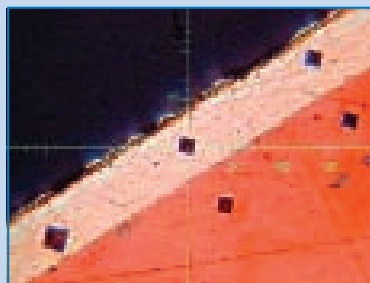


## Helmut Fischer, New experiences in micro hardness testing.

Booth: 150

*Fischer is an innovative specialist in the field of coating thickness measurement, material analyses and instrumented micro hardness testing.*

With the Picodentor HM500, Helmut Fischer has launched a high performance measuring system for determining micro-hardness according to ISO 14577 and ASTM E 2546. This instrument is ideally suited for the determination of the Martens hardness (HM), elastic characteristics and other material parameters of hard coatings, thin DLC coatings and coatings on glass, CDs, hard disks and sensors, as well as of thin paint



layers and ion-implanted surfaces. Measurements can generally be undertaken without complex sample preparation. Thus the Picodentor HM500 is suitable not only for use in laboratory conditions, but also for quick deployment in production monitoring. With high-precision distance measurements in the picometer range and force control at a level of just a few micronewtons, hardness measurements are possible even for ultra-thin coatings. Featuring a repeatability of  $\leq 0.5 \mu\text{m}$ , the high-precision, programmable xy-table allows measurements on even very small structures. Its compact design and granite base make the Picodentor HM500 stable and isolated against vibration. To avoid environmental influences, the system operates within a closed chamber and uses an active vibration-damping table. The Picodentor HM500 also has an enhanced optical system for higher resolution of extremely small structures and a motorized z-axis with autofocus. Easy and intuitive operation is possible by the customizable, multi-language WIN-HCU software. An atomic force microscope can be integrated as an option.



**Helmut Fischer Meettechniek B.V.**

**Tarasconweg 10**

**NL-5627 GB Eindhoven**

**T + 31 (0)40 248 22 55, F +31 (0)40 242 88 85**

**E [info@helmutfischer.nl](mailto:info@helmutfischer.nl)**

**I [www.helmutfischer.nl](http://www.helmutfischer.nl)**



## LEMO The Original Push-Pull Connector

Booth: 43

*LEMO is the acknowledged leader in the design and manufacture of precision custom connection solutions.*

LEMO's high quality push-pull connectors are found in a variety of challenging application environments including medical, industrial control, test and measurement, audio-video, and telecommunications.

LEMO has been designing precision connectors for six decades. Offering more than 50,000 combinations of product that continues to grow through custom specific designs LEMO, and it's affiliated sister companies REDEL and

COELVER, currently serve more than 100,000 customers in over 80 countries around the world.

LEMO is the standard connector supplier in several markets. This is due to the many benefits that LEMO Connectors can offer you.

To name a few advantages:

- UL Recognized
- Mating cycles >20,000
- Up to IP 68 protection
- Resistant to -55 °C to 250 °C
- Many contact configurations



**LEMO Connectors Benelux**

**De Trompet 2108, NL-1967 DC Heemskerk**

**T +31 (0)251 257 820**

**F +31 (0)251 257 821**

**E [info@lemo.nl](mailto:info@lemo.nl)**

**I [www.lemo.nl](http://www.lemo.nl)**



## maxon motor benelux at Precisiebeurs 2011

Booth: 02

*We are pleased to inform you about our newest high-precision drive systems.*

### EPOS2 24/2 - Miniaturized Positioning Controller – No Ifs, No Buts.

The EPOS2 24/2 quasi represents the synonym for the currently possible degree of miniaturization in positioning controller design. More power, more functionality, and more comfort in such a small space are today almost impossible.



### Sterilizable motors EC 13 and EC Size 5 - 50 Watt Drives for Medical Technology.

For the use in high speed medical applications of up to 90'000 rpm, maxon motor extends the product range by two sterilizable 50 Watt drives "EC Size 5" and "EC 13". Stand-alone, or as motor/gear combination, the drives stand out by high power, extremely low-noise and low-vibration operation, marginal heat generation and minimal size – welcome characteristics particularly in medical handheld power tools.

### The solution is always a matter of the right combination.

maxon motor develops and produces brushless and brush DC motors with an unique ironless maxon winding, up to 500 watts. Our modular program is complemented by flat motors with an iron core. The modular system with planetary, spur and special gearheads, sensors and control electronics, completes the range. High-tech CIM and MIM components are produced in a special competence center. We combine motor, gearhead and electronics according to customers' specific requirements to create an integrate total solution. We are driven by your specific requirements.



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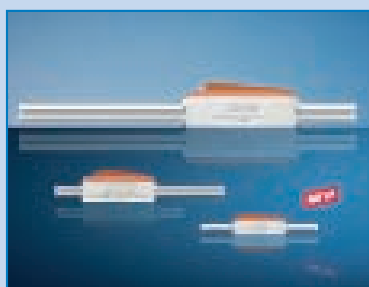
## A little addition with BIG performance...

Booth: 83

*New miniature linear DC servomotor, series LM 0830*

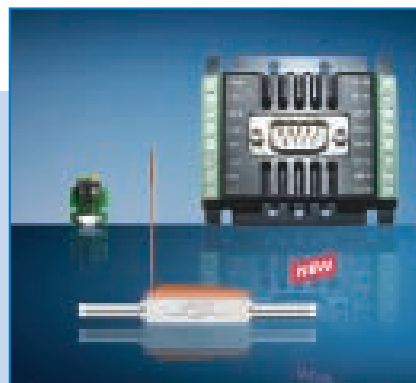
*FAULHABER extends its portfolio of linear DC servomotors with the addition of a new, smaller, highperformance linear DC servomotor based on its innovative QUICKSHAFT® technology.*

The LM 0830 ... 01 series linear DC servomotor, measuring just 8x12x30 mm and a weighing only 17 grams, provides a peak force of up to 2,74 N. The forcer rod, with a diameter of 4 mm, is available in different rod lengths ranging from 15 to 40 mm.



The new linear DC servomotor includes 3 analogue hall sensors for position and speed controlfeedback eliminating the need for an additional encoder in most applications. The 3 output signals, are 120° phase shifted, and are used by an external motion controller for commutation and speed and position control. The FAULHABER MCLM series motion controllers are available with RS232 and with CAN interfaces. The easy to use "Motion Manager" software makes parameter adjustment and motion control simple and fast.

This micro sized powerhouse is suitable for application in all fields where high precision linear movement in the most compact dimensions is necessary. The motors are highly efficient and maintenance free. Based on their simple frictionless design the motors provide extremely long operational lifetimes.



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Miniature Drive Systems  
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## The World's Smallest Brushless DC Servomotor with Integrated Motion Controller

Booth: 83

*A new Ø22mm innovation extends the portfolio of four pole brushless DC servomotors.*

FAULHABER has extended its BX4 range of four pole Brushless DC Servomotors with the introduction of the series 2232 / 2250...BX4 CSD/CCD, the world's most compact drive with integrated motion controller. This new series combines all the advantages of the BX4 four pole brushless technology with a single axis motion controller. High reliability, high torque, compact slotless design with no cogging torque, and robust construction without the use of adhesives make this new series ideal for complex areas of application like robotics, automation, medical and



laboratory technology, specialty machinery and aerospace.

The drives are based on the flexible and easy to use FAULHABER motion control platform. The compact motion controller, which fits within the diameter of the motor, combined with the motor and a full range of gearhead combinations provides a versatile modular platform for a variety of applications. The drives are available with a RS-232 serial or CAN interface. Configuring the drives is simple using the free FAULHABER Motion Manager 4.4 software. The drives have a wide operational temperature range from -25°C to 85°C and provide a continuous current up to 0,69 A with a peak of up to 3A. The speed can be precisely controlled from down to 5 rpm and up to 8000 rpm. Custom firmware and software are available on request.

The new series are available in two different motor lengths of 32 mm and 50 mm with a supply voltage of 24VDC. The very flat slope of the linear torque to speed curve and the extremely high torque to volume ratio of the motors with up to 18 mNm respectively 35 mNm continuous duty torque make these drives unique in combination with a motion controller.



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## Nijdra Groep - Precision is our Profession

Booth: 30

*The Nijdra Groep is a full-service, family-owned organisation and is specialised in high precision components and mechatronic modules.*

The Nijdra Groep consists of the following business units:

1. Fine Mechanical Industry (turning & milling);
2. High-tech Mechanical Industry (grinding);
3. Nijdra Special Products (engineering & assembling);
4. Medical Product Technology (orthopaedic & orthodontic implants).



The Business Unit Nijdra Special Products (NSP) engineers, assembles and delivers strategic modules like the Goniometer (module for the X-ray diffraction machine) with an assembled tolerance of 3 micron!

The Nijdra Groep is ISO 9001 and ISO 14001 certified. The final implementation and certification of the ISO 13485 at this Business Unit will take place at the end of 2010.

Due to our high skill of automated and robotizing machines we can produce 24/7 unmanned. Cost efficient production on our robotized 5-axis milling machine and our Flexible Manufacturing System (FMS) are especially for low volumes, high mixtures and short delivery times.

With our experiences in several high-tech branches we can create a surplus value for our customers by supporting them at the design of new projects, but also with value engineering of already introduced products.

**PRECISION IS OUR PROFESSION!**



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## EFD®'s PicoDot™ Jet dispensing system

Booth: 153

**High production speed and exceptional accuracy in product miniaturization trend.**

- Dispenses a wide range of low to high viscosity fluids
- Can apply consistent shots as small as 2 nanoliters at speeds up to 150 dots per second
- Combine high production speed with exceptional accuracy and process control
- Ideal for high-speed, high volume applications that require many small, precise fluid deposits.
- Ideal for use on uneven substrates or hard-to-access areas
- Huge range of possible applications: electronics (bonding cell phone speakers with UV-cure adhesives), life sciences (attaching needles to medical syringes), and precision mechanical applications (jetting small amounts of grease on micro gears).



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## Compact 6D Manipulator for Microassembly

Booth: 74

*SmarAct develops, produces and distributes piezo-based micro- and nanopositioners, advanced control systems and tools for the micro- and nanoworld. In addition, SmarAct offers complete micro- and nanomanipulation systems, ranging from XY tables over 6D manipulators to multi-manipulator systems.*

The compact positioning systems combine sub-nm resolution with a high straightness and cm-sized travels. They can be applied in normal pressure as well as in vacuum conditions.

An example for a compact nanomanipulator is the SmarPod 70.42. It provides six degrees of



freedom that can be used to position samples in microscopes and synchrotron facilities, or to assemble microoptical components.

Despite the compact design (70mm diameter, 42mm height) the SmarPod 70.42 provides relatively large travel ranges e.g. 11mm for planar translation, 6mm for vertical translation, 20° for tilting and 30° for rotation. Due to the integrated nano encoders and piezo-based SmarAct actuators the SmarPod 70.42 can move with high resolution and repeatability - completely free of backlash.

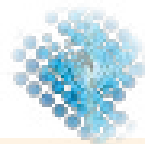
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## ZeGage™ - Robust and Affordable 3D Optical Profiler for Precision Surface Metrology on the Production Floor

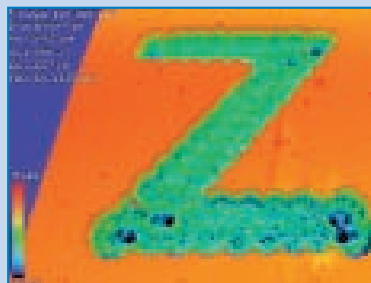
Booth: 152

*ZeGage™ is the ideal non-contact optical profiler for quantitative measurements of 3D form and roughness on precision machined surfaces.*

The industrial design provides fast, accurate metrology in a compact, cost-effective package that can be located directly on the factory floor without the need for vibration isolation or specialized enclosures. And the interactive control software, ZeMaps™, provides easy and detailed visualization to help you control your process.

### Powerful Performance

- Proprietary non-contact optical technology is insensitive to vibration effects; no vibration



isolation platforms or enclosures necessary.

- Quantitative surface metrology with nanometer-level precision provides superior gage capability.
- Selectable magnification and field-of-view with numerous imaging and system options.
- Measures a wide variety of surface materials and parameters, including 2D and 3D profiling of surface texture, form, step-height and more.
- High resolution 1 million pixel image sensor provides fast areal measurements in seconds, for excellent surface detail and visualization.
- Integrated autofocus and focus aid simplifies part setup and minimizes operator variability.
- Cost-effective price-to-performance ratio compared to alternative systems, including mechanical contact stylus profilers.

Zygo Corporation is a worldwide supplier of optical metrology instruments, high precision optical components, and complex electro-optical systems design and manufacturing services. ZygoLOT is the European head quarter for Zygo Corporation.



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## Bearing and Linear Technology



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Schaeffler Group - LuK, INA and FAG - is a world wide leading company in developing, manufacturing and supplying of rolling bearings, linear systems, direct drives and maintenance products. Applications: automotive, industrial and aerospace.

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ACE has developed into a leading engineering and consultancy firm with a strong focus on precision mechanics and mechatronics. Services include conceptualization, development, engineering and prototyping.



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The LiS is founded in 1901 by the famous scientist prof. Kamerlingh Onnes. Nowadays the LiS is a modern school for vocational training on level 4 MBO-BOL. The school encourages establishing projects in close cooperation with contractors and scientific institutes, allowing for high level "real life" work.



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Carl Zeiss Industrial Metrology is the world's leader in CNC coordinate measuring machines and complete solutions for multidimensional metrology in the metrology lab and production environment. We also provide contract programming and contract measuring in our newly founded Measuring House near Eindhoven (NL).

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centre for concepts in mechatronics

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Manufacturer of among others: gears, rack, couplings and linear systems

# Mikroniek *guide*

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sense and simplicity

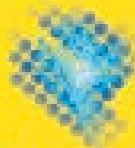
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# DSPE



Precision Fair 2011

Booth: 61



# Mikroniek

Mikroniek is the professional journal on precision engineering and the official organ of the DSPE, The Dutch Society for Precision Engineering.

Mikroniek provides current information about technical developments in the fields of mechanics, optics and electronics and appears six times a year.

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## Publication dates 2012:

nr:	deadline reservation	publication date:
1	20-01-2012	24-02-2012 - Software
2	23-03-2012	27-04-2012
3	25-05-2012	29-06-2012 - High Tech
4	27-07-2012	31-08-2012
5	07-09-2012	12-10-2012
6	12-10-2012	29-11-2012 - Precision Fair

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Optiwa B.V. is a member of the Frencken Group

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## ADVERTISERS INDEX

	Page	Booth		Page	Booth
■ ACE Stossdämpfer GmbH <a href="http://www.ace-ace.com">www.ace-ace.com</a>	74	80	■ Maxon Motor Benelux BV <a href="http://www.maxonmotor.nl">www.maxonmotor.nl</a>	33, 126	2
■ Aerotech Ltd <a href="http://www.aerotech.com">www.aerotech.com</a>	9, 124	87	■ Mevi Fijnmechanische Industrie BV <a href="http://www.mevi.com">www.mevi.com</a>	74	122
■ Applied Laser Technology <a href="http://www.alt.nl">www.alt.nl</a>	135, Fair ground plan	131	■ Mijnsbergen <a href="http://www.mijnsbergen.nl">www.mijnsbergen.nl</a>	62	91
■ Argon Measuring Solutions <a href="http://www.argon-ms.be">www.argon-ms.be</a>	22	41	■ Mikrocentrum <a href="http://www.mikrocentrum.nl">www.mikrocentrum.nl</a>	37, Leaflet	59
■ Befort Wetzlar <a href="http://www.befort-optic.com">www.befort-optic.com</a>	31	20	■ Mikroniek Guide	130	61
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■ Bruker <a href="http://www.bruker-axs.com">www.bruker-axs.com</a>	38	22	■ Mitutoyo Nederland BV <a href="http://www.mitutoyo.nl">www.mitutoyo.nl</a>	23	7
■ Ceratec Technical Ceramics BV <a href="http://www.ceratec.nl">www.ceratec.nl</a>	100	120	■ Molenaar Optics <a href="http://www.molenaar-optics.eu">www.molenaar-optics.eu</a>	86	104
■ CZL Tilburg BV <a href="http://www.cztilburg.nl">www.cztilburg.nl</a>	100	23	■ Newport Spectra-Physics BV <a href="http://www.newport.com">www.newport.com</a>	67	128
■ DSPE <a href="http://www.dspe.nl">www.dspe.nl</a>	27	61	■ Nijdra Groep <a href="http://www.nijdra.com">www.nijdra.com</a>	62, 127	30
■ Engenia <a href="http://www.engenia.nl">www.engenia.nl</a>	11	59	■ Nordson EFD International <a href="http://www.nordsonefd.com">www.nordsonefd.com</a>	34, 128	153
■ Etchform BV <a href="http://www.etchform.com">www.etchform.com</a>	24, 100, 124	132	■ Optiwa BV <a href="http://www.optiwa.nl">www.optiwa.nl</a>	133	99
■ Glynwed <a href="http://www.glynwed.nl">www.glynwed.nl</a>	46	140	■ Reliance Precision Mechatronics LLP <a href="http://www.rpmechanics.co.uk">www.rpmechanics.co.uk</a>	62	142
■ Greentech Engineering BV <a href="http://www.greentech-engineering.nl">www.greentech-engineering.nl</a>	123	49	■ Renishaw Benelux BV <a href="http://www.renishaw.com">www.renishaw.com</a>	129	160
■ Heidenhain Nederland BV <a href="http://www.heidenhain.nl">www.heidenhain.nl</a>	136	33	■ Sarix SA <a href="http://www.sarix.com">www.sarix.com</a>	46	158
■ Helmut Fischer Meettechniek BV <a href="http://www.helmutfischer.nl">www.helmutfischer.nl</a>	125	150	■ Schaeffler Nederland BV <a href="http://www.schaeffler.nl">www.schaeffler.nl</a>	36	75
■ Hexagon Metrology <a href="http://www.hexagonmetrology.nl">www.hexagonmetrology.nl</a>	22	12, 13	■ SKF BV <a href="http://www.nederland.skf.com">www.nederland.skf.com</a>	62	123
■ IBS Precision Engineering <a href="http://www.ibspe.com">www.ibspe.com</a>	62	129	■ SmarAct GmbH <a href="http://www.smaract.de">www.smaract.de</a>	128	74
■ Iko Nippon Thompson Europe BV <a href="http://www.ikont.eu">www.ikont.eu</a>	10	127	■ Technobis Group <a href="http://www.technobis.com">www.technobis.com</a>	46	82
■ Laser 2000 Benelux <a href="http://www.laser2000.nl">www.laser2000.nl</a>	100	133	■ Tegema Group <a href="http://www.tegema.nl">www.tegema.nl</a>	17	134
■ LEMO Connectors Benelux <a href="http://www.lemo.nl">www.lemo.nl</a>	125	43	■ TNO <a href="http://www.tno.nl">www.tno.nl</a>	2	
■ MA3 Solutions BV (Tegema Group) <a href="http://www.ma3solutions.com">www.ma3solutions.com</a>	17	134	■ VSL Dutch Metrology Institute <a href="http://www.vsl.nl">www.vsl.nl</a>	86	138
■ Martek Bvba <a href="http://www.martek.be">www.martek.be</a>	50	38	■ ZygoLOT GmbH <a href="http://www.zygot.de">www.zygot.de</a>	86, 129	152

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