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14–19 May 2017 Bella Center, Copenhagen Denmark

THE REPORT

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Netherlands Organisation for Scientific Research



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Denmark and The Netherlands both score high on the European Innovation Scoreboard. Our countries are European innovation leaders and we have R&D-cooperation in many fields. And, crossing the bridge from Copenhagen, it's just 20 minutes to Sweden, the leading EU-member state on innovation, with its European Spallation Source outside Malmö as one of the biggest European research centres. Looking at the Global Innovation Index of 2016, worldwide, all three countries are in the Top-10.

The Netherlands participates in many major research projects all over the world, as we would like to maintain our position as innovation leader. We, the Dutch, consider these projects essential for necessary innovation in science and society. New and more sustainable materials,

the energy transition, reaching the sustainable development goals, all are dependent on future innovations of big science projects.

Besides being an innovative country, The Netherlands has been a major trading nation for centuries. Our well-developed cooperation paradigm, often called the 'triple helix' or 'golden triangle', where government, private sector and research institutes work together, is often seen as an example by other countries. The Dutch feel at home working together in an international environment, often in public-private partnerships. This cooperation produces economic growth and makes the country a preferred partner for innovation and trade.

The Netherlands Embassy in Denmark looks beyond the Danish borders. Together with the 7 embassies in the Nordics and Baltics, we stimulate regional cooperation as we are convinced that we can deliver higher quality support to companies and research institutes when we work together, share our network and organize regional events on specific topics. Recently, after being away for some time, a new innovation advisor was appointed, based in Sweden. And since two years, a regional business developer is working in the Nordic-Baltic region to find business opportunities and connect these to Dutch companies.

We know that despite the minimal cultural differences in this part of the world, finding partners to do research or to gain a contract is not always as easy as it seems. Therefore, the embassy supports companies and science institutes in the technology field of big science with an excellent network, knowledge of local circumstances and other services.

Being at the IPAC in Kopenhagen, means that you are in an international, high-tech, innovationminded area where scientists from all over the world will meet. I hope this event will lead the way for more international cooperation and participation in big science projects.

Henk Swarttouw Ambassador of the Kingdom of The Netherlands in Denmark

II | Big Science

Basic science and high-tech business



The core ingredients for innovation and prosperity The scientific excellence of technical research institutes and advanced accelerator laboratories has been a source of inspiration for scientists and engineers and has paved the way for great scientific discoveries. The excellent science, the large impact on engineering and technology and the strong long-term international collaboration has led to the annual International Particle Accelerator Conference, where three former conferences in different parts of the world have joined forces. And this year for the third time in Europe: IPAC 2017. With its superb scientific basis it is a booster for innovation, knowledge and technology exchange and societal and economic impact.

High-quality technology is the key to converting scientific curiosity into economic and social innovation. This can only

happen if science and industry meet and exchange ideas. At this joint conference ILO-Net plays an important supporting and facilitating role and helps to shape the ambition of the Netherlands Organisation for Scientific Research (NWO) to strengthen public-private partnerships and to consolidate efforts related to the Dutch government's economic priority areas policy.

NWO runs eight research institutes and one advanced research center, all of which are world-wide leading centers of expertise in specific scientific fields. The four NWO domains jointly cover all fields in the science, humanities and social sciences, medical science and engineering and provide the funding to excel. All four domains promote strong collaboration between researchers with different disciplinary backgrounds and between science, society and industry.

The Advanced Instrumentation Roadmap of NWO gives an overview of advanced research facilities, which are necessary to allow Dutch researchers to operate at the frontiers of research world-wide. It is a superb example of scientific institutes and more than fifty companies jointly building instruments for scientific research. The realization of these advanced facilities requires considerable public funding. Public-private partnerships (PPP) are indispensable as they bring additional funding and expertise and also facilitate knowledge transfer from academia to industry.

Big Science is connected to the Advanced Instrumentation Roadmap via NWO and ILO-Net. The ILOs facilitate and support PPPs and the Calls for Tender from international Big Science institutes. The ultimate aim is to improve the return on investment for Dutch companies, encourage innovation by exchange of technical knowledge and to enable SMEs to operate internationally in new markets.

An open and dynamic knowledge and innovation system is an important incubator for seizing opportunities and challenges for innovation in economic growth, especially in the area of hightech. I hope IPAC 2017 brings public and private R&D, researchers and private enterprises in constant and constructive contact with each other!

Stan Gielen President Executive Board, the Netherlands Organisation for Scientific Research



NWO Netherlands Organisation for Scientific Research

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Holland has been joining many Big Science programs for over 60 years. There are many examples such as particle accelerators laboratories like CERN with the LHC, fusion experiments like ITER, neutron facilities like the ESS, optical and radio telescopes like the E-ELT and Lofar, but also light sources, free electron lasers.

The main driver always is the curiosity of the Dutch scientists who play an important role at many of these facilities, but it is also of great importance for many highly technological companies in the Netherlands that are involved in building these large instruments. There is no doubt that innovation is driven by science and the development of scientific instruments. The innovative companies that are closely involved in these developments use this experience to expand their product portfolio and their client base.

IPAC 2017 in Copenhagen is the seventh time Holland is present and for the fifth time with a joint Dutch stand in fact a complete pavilion since this IPAC in Europe is a unique opportunity for Dutch firms to meet accelerator scientists and to get in touch with decision makers at the European facilities for future business.

The Dutch ILO-net is a network of Industrial Liaison Officers in the Netherlands supported by the Dutch government, NWO and their respective institutes that do their research at European Big Science institutes. This network supports all Dutch high-tech systems companies for doing business with Big Science facilities, both at international events and at the facilities' sites themselves.

The Netherlands Organisation for Scientific Research (NWO) funds thousands of top researchers at universities and institutes and steers the course of Dutch science by means of grants and research programs. Since companies listed in this booklet are very well equipped for translating their scientific knowledge to commercially applicable solutions, Dutch Scientific proudly presents a number of frontline high-tech companies who can support you with any project in which you want to be successful.

The organisation of the participation of the Dutch companies in Copenhagen has been made possible with the support of the MIT grant provided by RVO, Netherlands Enterprise Agency. The local embassy has been instrumental in organising the Monday evening network event. The organisation of the IPAC17 itself provided the means to get all the logistics right for our own Dutch stand.

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NWO Netherlands Organisation for Scientific Research



Big Science | V

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ILO's for Big Science

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Amsterdam Scientific Instruments

We offer you the benefits of cutting edge detector technology developed by the Medipix collaboration lead by CERN.

Our customer-focused team consists of scientists and engineers with a vast global experience covering all aspects of particle detector technology. We close the gap between innovation at the frontier of science and ready-to-use products for science and industry.

Product Information

Our Timepix hybrid pixel detectors can be used in a wide range of applications.

Besides X-ray imaging, ASI detectors are used for precise spatially resolved detection of electrons, neutrons and heavy charged particles. We also offer our detector in a vacuum compatible system. Conventional detectors use a counting method. We offer clever pixels: every pixel can operate in three different modes. These are counting mode, time-over-threshold and time-of arrival mode. For more information on our products, please visit our website: amscins.com or write us an email: info@amscins.com.

References

Nikhef, NL – AMOLF, NL – Reactor Instituut Delft, NL – Royal Adelaide Hospital, AU – Tribogenics, USA – Brookhaven National Laboratory (BNL), USA – Princeton Plasma Physics Laboratory (PPPL), USA – Stanford (SLAC/LCLS), USA



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Ceratec Technical Ceramics BV

Ceratec Technical Ceramics BV has specialized in industrial technical ceramic components since 1983. Ceratec's strength lies in the complete formula of problem analysis, development, prototyping and production. Alongside various processing techniques, special joining techniques are applied for production of composite products made of technical ceramic and metal. The requisite metalworking processes and assembly activities are carried out in-house. We produce both small and larger series. Ceratec develops and manufactures products made of technical ceramics for customer-specific applications.

Production capabilities

Green stage shaping and sintering – OD grinding, max 500mm, max length 1500mm – Honing min 0.6 mm inner diameter – Flat and profile grinding – Centreless grinding min 1mm, max 60mm (tolerance 2 microns) – Lapping with surface roughness of Ra 0.01 um – Coördinate grinding – Drilling of small holes, min 0,3 mm – 4-axis CNC grinding – CNC OD grinding – CNC turning and milling – Brazing of ceramics and corrosion resistant steel.

Assembly of metal ceramic components

We are a main supplier for various kinds of industries; mechatronics, semiconductor, space & aerospace, medical, automotive, energy, optical, (petro)chemical, R&D, pump industry etc. The ceramic precision products we supply are engineered in house, designed with solid works & cosmos, green shaped & sintered and ground with state-of-the-art (CNC) grinding machines.

Following properties make our ceramic components successful; low density, high stiffness, electrical insulator, suitable for high vacuum, wear resistant, smooth surfaces, corrosion resistant, non-magnetic.

Ceramic on the right spot!

Kees A. Visser Director

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Cryoworld BV

Advancing in Cryogenics

Cryoworld B.V. is a manufacturer of cryogenic, vacuum insulated equipment. Our company is based on extensive experience in both theoretical as well as practical field. Our core business is design, production, testing and installation of helium and other custom designed cryogenic equipment.

In our new production facility our dedicated engineers and specialists make sure every project meets the highest quality standards. Cryoworld delivers projects to renowned companies and scientific institutes worldwide.

Besides the design and fabrication of "standard" cryogenics our fields of expertise are:

- Valve boxes for liquid helium
- Liquid helium transfer lines
- Cryogenic pressure vessels
- Special cryostats
- Special cryogenic processes and equipment
- Innovative design, cryogenic prototyping
- Accurate sensing and controlling of cryogenic processes, level, pressure and temperature
- Custom built valves

Some references:

Cern – Linde Kryotechnik AG – Air Liquide ALAT – GSI Darmstadt – Helmholz Zentrum Berlin – Triumf – Radboud University (HFML lab) – Merck – MBB Fertigungstechnik – CCM



Marcel Keezer CEO

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Demaco Holland BV

If you are looking for...

- Support in Cryogenic Engineering
- Cryogenic expertise in manufacturing and installation of your Cryogenic Infrastructure like
 - Helium Transfer Lines
 - Helium Distribution Valve Boxes

- Helium Interconnections between your facility and the storage tank or liquefier
- Cryostats
- Liquid Nitrogen Systems
- Optimisation or Modification of your existing Cryogenic Infrastructure

...please don't hesitate to contact us and send us your enquiries. It will be our pleasure to provide you with a suitable proposal with your Cryogenic Solution.

Demaco is the leading knowledge driven cryogenic infrastructure partner for industrial gas companies, scientific institutes and EPC contractors world-wide. Our team of cryogenic specialists, Cryogeniuses, is committed in supporting our partners in their daily effort to transport and condition all liquefied gasses. By advising on, designing, engineering, manufacturing, testing and installing customer specific vacuum insulated solutions of superior quality we continuously provide the highest yielding infrastructure in the industry.

References

CERN

- Multiple Helium Transfer Lines for LEP, LHC, ATLAS and CMS
- UHV-chambers for LEP separators
- Helium Siphons
- Liquid Argon Valve Box

DESY

- HERA-by-pass Helium Transfer Lines
- Bunch Compressor bypass
 pipelines I and II
- Helium Valve Boxes and Transfer Lines for the X-FEL Test Facility
- Extension for the TTF Transfer Lines

ESA

- Main Valve Boxes for the LSS Satellite Test Facility
- LN2 Transfer Lines and Phase Separators

Triumf – NSRRC – ESRF – KIT – GSI – ITER – PSI – ISRO – NIKHEF – Helmholtz – Max-Planck

Ronald Dekker

Director Strategy & Large Projects

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IBS Precision Engineering BV

For over 20 years IBS Precision Engineering has been helping its customers to realise their demands for measurement, positioning and motion systems where ultra-high precision is required. With our expert foundation in metrology, we understand the true meaning of precision and how to help our customers achieve it.

IBS products and solutions can be found at leading companies world-wide serving industries from disk drive to semiconductor equipment, printing and medical systems. In the field of machine tools we serve both builders and users with measurement systems delivering significant bottom-line productivity improvements. For the research community, we provide support from standard ultra-precision components to custom made systems.

At IBS we have a long history in successfully helping our customers address unique problems. We do this through both our standard products as well as our design house. The latter provides support from feasibility through to pilot production for modules through to machines.

From advice on component application to full system design and realisation, our aim is to deliver the innovative solutions required by our clients where leading measurement or high accuracy motion capability is critical.

Hans Ott Sales & Marketing Director

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INCAA Computers

INCAA Computers is a well-established company with over 35 years experience in design and manufacture of professional high-tech electronic equipment for industry, science, and OEM. We provide solutions for technical automation projects and take system responsibility.

Product information

Applications extend from industrial and scientific scalable data acquisition systems through transient recorders, timing systems, superconducting magnet test benches and power supply control modules to alarm and safety systems.

Hardware Development: Modules can be designed from scratch or standard modules can be tailored to customers specific needs. Characteristic product properties are the high quality level and the relatively small to medium production volumes.

Software Development: Due to our in-house hardware expertise we know best to separate projects into hardware and software functions and how to interface them to build innovative fail-safe systems. Specialisations include system software, databases and graphical user interfaces.

System Integration: We not only deliver hardware modules and software packages but also integrate these with third-party components into complete functioning turn-key systems.

References

Our client base includes a wide selection of international organisations and companies: CERN – Sincrotrone Trieste – GSI – UKAEA – MIT – FZ Juelich – Alstom – ASML



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Janssen Precision Engineering

Precision engineering and mechatronic solutions in ambient, vacuum and cryogenic environment.

Company profile

JPE is an independent engineering group for development and realization of high-tech machinery and instruments. Especially where accurate and stable performance is involved in the sub-micron area.

The company was founded by Huub Janssen in 1991 after several years of experience in the high-tech industry of companies like ASML and Philips. Nowadays, we have built up a team of professionals which are able to find and implement solutions for very challenging engineering requests. JPE has gained multidisciplinary knowledge of technical issues at every level. From system level down to component level, from definition and design, up to prototyping and qualification. By following a systematic approach with high involvement, quality and efficiency are guaranteed.

We develop high-end opto-mechanical applications to be used in deep vacuum as well as cryogenic environment.

Our developments typically find their way in an international market like:market like:

- semi-conductor industry,
- astronomy and space,
- scientific experimental instruments

Competences

- precision engineering
- mechatronic solutions
- nanometer positioning
- · positioning in cryogenic environment

Huub Janssen Founder & CEO

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20 employees

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LouwersHanique BV

LouwersHanique is a leading specialist in the development and manufacturing of high-end solutions in the field of the thermal and mechanical processing of technical glass and ceramic materials. The company activities also include the bonding and [clean room] assembly of unique material combinations based on an extensive range of bonding and integration technologies. The main company focus and strength lies with low volume – high mix niche solutions for high-end applications and leading edge industries and customers driving todays and tomorrows technological progression.

One of the main activities is the development and manufacturing of electrical and optical feedthroughs.

Our electrical and optical feedthroughs offer hermetic and electrical isolation in Ultra-High Vacuum (UHV) and High Pressure applications with a lifetime leak-free performance from Cryogenic temperatures up to 500 degrees C. We apply proprietary glass-to-metal binding technologies to directly seal pins and other components into the metal flange without laser welding or other sealing technologies. No local thermal stress will occur and virtual leaks are absent. With our technology we can make use of standard flanges as well as custom designed parts and assemblies, exceeding the limitations of existing technologies.

Based on a modular concept we can integrate low noise Coaxial, High Power/High Voltage optical and other feedthroughs in Flanges and modules without the need of laser welding with extremely high integration levels. In-house cleanroom assembly, process control and state-of-the-art surface finishing and cleaning equipment guarantee flawless surface texture and topography for the most demanding applications. To ensure that all products are leak tight LouwersHanique has the newest testing facilities available as Helium testing equipment, RGA detection equipment, ultrasonic cleaning and 3D measurement systems (CMM) including white light interferometry for nm accurate surface inspection.

The company implemented World Class Manufacturing, JIT and 5 S best practises resulting in 100% process and quality control thus leading the highest possible QLTC reliability and overall product value for the lowest integral costs. This, combined with our highly skilled and motivated workforce of over 110 technicians enables us to produce components and solutions of consistent and high quality on time, every time.

LouwersHanique is located in the High Tech Brainport Region of the Netherlands and is ISO 9001:2008 certified by TÜV

Carel van de Beek Accountmanager

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SteeRED Technology

Connecting the dots to make your system work!

steeRED Technology, founded by experienced industry professionals, is an interconnection system development and supply company. We use internal resources as well as the capabilities and resources of our partners to make new developments possible and to maximize productivity for our customers.

Our Technologies:

- Connectors and other interconnection components.
- Copper cable assemblies
- Foil & Flex based interconnect solutions.
- Fibre Optic cable assemblies and subsystems.
- High Speed copper cable assemblies
- Solutions for verification and characterisation testing.

Our team has over 80 years of experience with developing and selling interconnection systems. In 's-Hertogenbosch we do have our engineering, prototyping and testing capabilities and we also work together with carefully selected partners to have access to those technologies which can make the difference for the value we want to bring to our customers.

Theo Hooft Business Development

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VDL Enabling Technologies Group

VDL Enabling Technologies Group is a globally operating tier one contract manufacturer of parts, mechatronic modules and systems. VDL ETG focuses on long term / strategic partnerships with its customers.

Product information

VDL ETG provides solutions based on its core competences: Precision Technology, Vacuum, Material Handling, Material Positioning, and Industrialization. This throughout the entire product life cycle: basic research, proto typing, ramp-up, volume, and end-of life.

Products

Mono parts, complex high-end modules, complete (mechatronic) systems.

Markets

VDL ETG serves a number of OEM industry key segments: Semiconductor Equipment, Analytical, Medical, Solar, LED, and Science & Technology.

Science & Technology

VDL ETG is specialized in the (co)development and manufacturing of high precision parts, subassy's, complex modules. All products require high / ultra precision turning & milling, high-end metrology, bonding, RF testing, and heat & surface treatments. The defined production strategy determines yield, cycle time, and cost of ownership. Our strength is to rapidly translate highly innovative, complex product designs into tangible products ready to enter small series production. Typical key markets within Science & Technology: accelerator, FEL, aerospace, and instruments.

References

Semiconductor Equipment: ASML, AMAT, KLA Tencor, CymerAnalytical: KLA Tencor, FEI – Medical: Philips, Elekta, Waters – Solar & LED: AMAT, Veeco – Mechanization Projects: P&G, Kellogg's, Bosch – Science & Technology: ESO, ESA, ESRF, TNO, PSI, CERN

Cees Coolen Business Manager Science & Technology

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ILO's for Big Science

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Toon Verhoeven (FOM-DIFFER/ITER NL)	A.G.A.Verhoeven@differ.nl	ITER (F4E) – FR ESS/RID – SE JET (EFDA) – UK Asdex-U* – DE Wendelstein-7X* – DE IFMIF* (IEA)	Fusion facilities.
Rob Klöpping (FOM-Nikhef)	klopping@nikhef.nl	CERN – CH ESRF – FR ILL* – FR EMBL – DE DESY* – DE Neutrino Telescopen	Accelerator, neutron and X-ray facilities.
Jan Visser (FOM-Nikhef)	janvs@nikhef.nl	CERN – CH ESRF – FR	
Wilfried Boland (NOVA + ESO)	boland@strw.leidenuniv.nl	E-ELT ALMA	Optical telescopes.
Emiel van der Graaf (KVI)	vandergraaf@kvi.nl	ZFEL – NL, Groningen XFEL* – DE	Free electron laser facilities.
Ronald Halfwerk (ASTRON) Michiel van Haarlem	Halfwerk@astron.nl Haarlem@astron.nl	LOFAR – NL SKA SKA	Radio Telescopes.
Paul Hieltjes (SRON)	P.J.Hieltjes@sron.nl	ESA/SRON	Space Science.
Daniel van Beekhuizen (NSO)	d.vanbeekhuizen@ spaceoffice.nl	NSO	Space
Hermen van der Lugt (Pallas)	hermen.vanderlugt@ pallasreactor.com)	Pallas	Pallas reactor, medical isotope production and energy.
Martin van Breukelen (HFML)	M.vanBreukelen@science. ru.nl	HFML – NL, Nijmegen EMFL – NL, FR, DE	Magnets with ultrahigh fields.
Rob van der Mei (CWI)	R.D.van.der.Mei@cwi.nl		National research institute for mathematics and computer science in the Netherlands

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Settels Savenije

About Us

Settels Savenije is a group of companies where high level technology is combined with a passion for people. We invent, design, manufacture, assemble and test high tech equipment, products and tools. We also train technology professionals in both technical and leadership skills. What we are looking for is creativity, tenacity and downright enthusiasm for technology!

Development

Our research, development and engineering activities are covered by different expertise groups. Our groups closely cooperate and there are regular interchanges between projects. In our Research and Feasibility Group, we focus on creating new technology, new manufacturing processes and creating concepts. We out role proof-of-principle programs and feasibility studies and perform concept studies for high tech products and systems. Our Engineering of Tools & Equipment expertise group focuses on design and industrialisation. Projects link to test-tools, manufacturing tools and manufacturing equipment. Key focus in this group is on writing performance specifications, risk management, implementing design principles, design for manufacturing and design to cost. We have great experience in generating full TPD, integration in SAP and using several CAD environments (Unigraphics, ProE, Inventor etc..).

Manufacturing

Our development activities are closely integrated with manufacturing, testing and assembly. This guarantees success in delivering complex and technologically advanced systems. It also provides a challenging and dynamic working environment where theory and practice are combined.

In 2010 we invested in our precision factory Bakker Fijnmetaal BV. Our company is specialised in the manufacturing of small dimension, high precision metal parts and assemblies. In 2009, during our assessment of this factory, we recognised a level of craftsmanship and experience comparable to the high tech tool shop at Philips research in the 80s. The Bakker factory is an important source of knowledge and experience for our group. In our projects, understanding manufacturing technology and the risks involved is often more relevant than managing cost. In our supply chain design team, design experts and manufacturing experts always are involved as key members of our team.

We welcome you to visit us!

Are you looking for support with innovative solutions for complex mechanical, mechatronic and physical challenges? For a broad range of leading international customers in the (high tech) industry? Consider us!

Do visit us at www.sttls.nl.

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