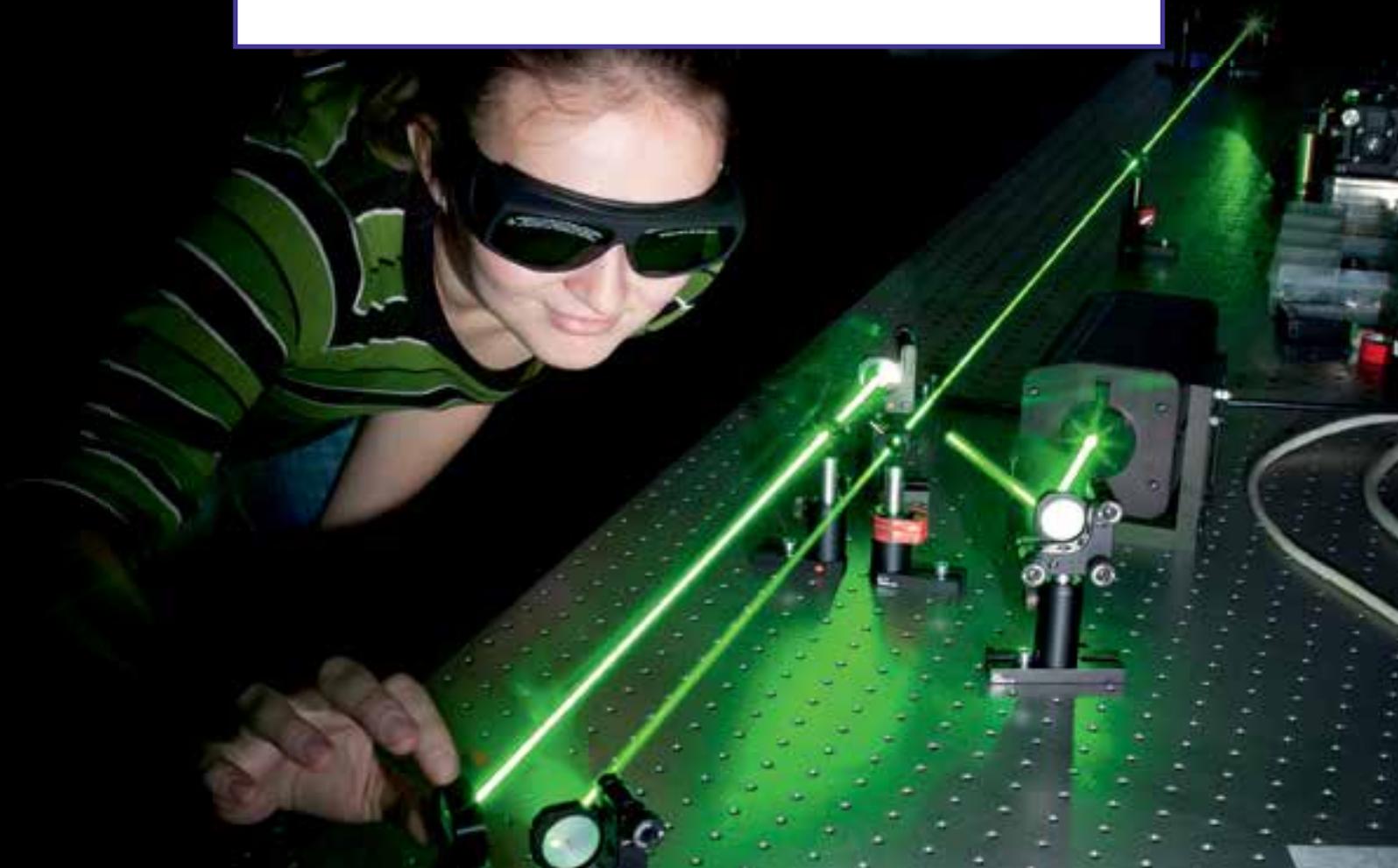


Dutch Photonics

company guide 2013



Initiative

NL Agency / IOP Photonic Devices

Mikrocentrum

Photonics Cluster Netherlands



NL Agency
Ministry of Economic Affairs


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Photonics Cluster

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Preface

Over the last decade Dutch industry has been increasingly exploiting the huge potential that photonics brings to our national innovation strength. Photonics has been recognized as a key enabling technology in Europe as well as in our national topsector policy within High Tech Systems and Materials. The industry in fact connects the tradition of generating knowledge and bringing this into innovative products. The products of these companies utilize the strength of light for optical processing, transmission and imaging. These products find their way in different market segments like communication (Fiber to the Home), medical- and healthcare (diagnostics & therapy), lighting (LEDs), test-and measuring (sensors), agriculture (spectroscopy), photovoltaics (solar cells) to name a few. Also, a merging of micro/nano-electronics and generic photonic technologies allows further miniaturization and cost reduction photonic technologies also allow substantial energy saving opportunities. Hence: Photonics is GREEN!

The Netherlands has an extensive R&D landscape in high tech systems. As integral part, photonics gives substantial impulses to high tech market segments. The potential of photonics in the Netherlands has been recognized already more than 10 years ago in excellent R&D work at our universities. This has led to national programmes like the IOP Photonic Devices, STW Perspective GTIP and Smart-Mix Memphis and others that focus on the transfer of academic knowledge into industrial and commercial activities. The Photonics Event (www.fotonica-evenement.nl) supports this transfer by bringing together all stakeholders in Photonics Netherlands; an event that is still growing and attracting international interest. The sector has initiated it's own Dutch photonics roadmap, wich has been recently updated in 2012 indicating clearly the needs and potential of our industry. A summary is provided in this guide.

It is with great pleasure to present the second edition of the photonics company profile guide. I am convinced that this information will give you a recent update of Dutch industrial photonics activities. This company guide provides in a nutshell the focus of each company in the field of photonics and we expect to see more companies that exploit photonics in the years ahead.



Dr. Bart H Verbeek
Chairman IOP Photonic Devices
Programme Manager Smart-Mix Memphis

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Dutch Photonics

The economic importance of photonics is not only based on photonic products and systems with their own markets but especially by the indirect impact they have on other products and systems. Photonics is a typical enabling technology and as such also seen by the European Union (SEC(2009) 1257). The European Union has indentified 5 key enabling technologies (one of them is photonics) which are seen as important for our industry in 2020.

In 2010 the turnover of photonics based components in Europe was estimated already 62,4 billion euro which is 20% of the worldmarket (estimate by EPIC). Worldwide a yearly sustained growth in turnover in this sector is over 10% (EPIC). Where the 20th century can be seen as the century of the electron by many the 21th century is already considered to be the century of the photon.

The Netherlands has a rich history in photonics. This long rich tradition started in 1690 with Christian Huygens and his *Traite de La Lumiere*. Huygens was one of the greatest Dutch physicists, a telescope (device) builder and also the founder of the theory of the propagation of light. The first optical device builder was Antonie van Leeuwenhoek, who constructed the first microscopes. The Dutch physicist Frits Zernike received the Nobel Prize for theory of the propagation of light and its application in the phase-contrast microscope. In recent years world class electron microscopes, wafer steppers and space instruments have been developed and built in the Netherlands.

At the moment many thousands of people are directly or indirectly active in the field of photonics. Characteristic of this field is that it is a rather young industry that really started off in the sixties and seventies with the invention of the laser and optical fibers. According to Photonics²¹ in the Netherlands

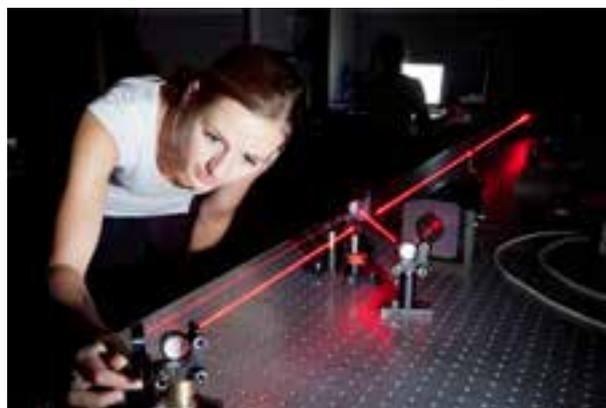
more than 85% of the Dutch companies in this field have less than 250 employees. Behind Germany, England and France the Netherlands takes the 4th position in Europe. In the Netherlands, especially the photonics application fields health and medicine as well as home automation (domotics) and lighting can be found but also other application fields like water & environment, energy and high-tech in general are growing.

The Netherlands has an excellent knowledge infrastructure and is for this reason an ideal breeding ground for the development of innovations. There are a number of excellent research groups in the field of photonics at universities, research institutes and companies.

An important research programme is the IOP Programme Photonic Devices, see:

www.agentschapnl.nl/iopphtonicdevices

that focuses especially on the application of photonic devices in health and medicine and on the development of a generic photonics manufacturing technology as well as building up the photonics community in general.





NL Agency

NL Agency is a division of the Dutch Ministry of Economic Affairs. Focussing on sustainability, innovation, international business and cooperation, NL Agency is the number one contact point for businesses, knowledge institutions and government bodies. You can contact us for information, advice, financing, networking and regulatory matters. Whether you are entrepreneur, (knowledge) institution or government body.

IOP Photonic Devices

The aim of an IOP programme is to intensify the interaction between companies in the Netherlands and the knowledge infrastructure within a specific discipline, by providing an extra impulse to research within a theme and by actively involving industry in the execution of this research. Combining the forces of companies and knowledge infrastructure leads to the formation of new networks and the reinforcement of existing ones.

In one of these programmes, the IOP Photonic Devices (second phase 2010-2015) focuses on research into photonic devices and new ways to employ light.

Highlights of this programme are:

- stimulating collaboration between researchers (on universities and institutes) and industry in this field
- investment in the coordination of the photonics community in the Netherlands
- stimulating economic activity based on developed photonics knowledge and technology
- sustaining the Dutch photonics network and linking this technology to different application fields and to the Dutch 'TOP' sectors
- stimulating education in this field

NL Agency consists of five thematic divisions.

The divisions are:

- NL Energy and Climate Change
- NL EVD International
- NL Innovation
- NL Environment
- NL Patent Office

The programme also has funded research and development projects:

- based on application of photonic devices in health and medicine
- new photonic devices based on generic technologies

IOP Photonic Devices

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Mikrocentrum

Mikrocentrum is an independent knowledge institute, founded in 1968, which is supporting technological companies and institutions in improving knowledge levels, skills and technical business networking. This is achieved by organising trade fairs, conferences, lecture days and trainings. In addition Mikrocentrum facilitates the Mikrocentrum High Tech Platform consisting of more than 500 companies which are presented in a High Tech Company Guide and for which special business networking events are being organized.

Mikrocentrum's mission is to deepen and broaden the knowledge and know-how of manufacturers and suppliers of equipment, modules and parts as well as to enhance their networking opportunities.

Mikrocentrum offers about 200 different practical and theoretical trainings on technical and managerial topics aimed at all levels of education. In 2010 Mikrocentrum has introduced the brand Engenia for its top trainings for professionals at academic levels. Trainings, both in open enrolment as well as in tailor made in-company format, are held at different locations in the Netherlands and Belgium or, if desired, at your own location.

Amongst others, Mikrocentrum and Engenia offer various trainings in the fields of (applied) optics, lasers and high power LEDs as well as in innovation and production management. These range from introductory courses to high-end specialised trainings. PCN is supporting these activities in optics and photonics thus ensuring content and quality.

Among the various events organized by Mikrocentrum is the annual Photonics Event. It is a unique opportunity in the Benelux to meet people in the world of photonics ranging from research to business. The high quality conference and exhibition offer a

wide range of solutions and ideas. More information can be obtained at www.fotonica-evenement.nl

Mikrocentrum aims at further supporting the photonics community by organising lecture days, presenting the Dutch photonics companies internationally, issuing this company guide and by means of the website www.dutchphotonics.nl. At this website various photonics related issues will be presented such as news items and an event calendar of photonics related activities. Also the Dutch companies active in photonics (also presented in this company guide) will be listed.

When it comes to photonics in the Netherlands, Mikrocentrum in cooperation with PCN and the IOP Programme Photonics Devices is your partner!



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Photonics Cluster Netherlands

Photonics Cluster Netherlands' (PCN) objective is to be the Dutch platform for knowledge transfer in the field of photonics for high-tech companies and education at all levels, and to promote photonics as a key enabling technology. PCN was initiated by the Dutch Society for Photonics, and is supported by a growing number of Dutch companies, individual members and by the Dutch government (Dutch Photonic Devices Programme).

"We can make the difference!"

How?

Education in Photonics

We stimulate photonics education on all levels from primary, secondary and vocational education up to engineering level. We have a close cooperation with several Dutch universities and academies of engineering. If you are interested in our educational activities or if you want to take part in these activities, please don't hesitate to contact us.

Consultancy

We advise companies how to integrate photonics in their products or in their production activities.

"Cost Down – Reliability Up – Safety Ensured" is our standard.

Trainings and thematic seminars

PCN is closely cooperating with Mikrocentrum on trainings in optics and photonics. These range from introductory courses to high end specialised trainings. They are made available by Mikrocentrum on the market in both open enrolment as well as in-company tailor made format. PCN is supporting these activities thus ensuring content and quality.

Dutch Photonics Event

Together with Mikrocentrum we organize the annual Photonics Event, where science and industry meet, exchange knowledge, network and create new (inter) national partnerships. The international character of the event is supported by the presence of cluster organizations from different countries on the EXPO and in the conference programme. Together with Enterprise Europe Network (EEN) and the Dutch Syntens organization we also organize the Brokerage Event. This brokerage event give companies the unique possibility to meet each other in their search for new partnerships.

International Photonic Network & Clustering

The Photonics Cluster Netherlands has a growing network with other European Photonic Clusters and initiatives which play an important role in promoting photonics as an enabling technology, e.g. Photonics 21, EOS and SPIE.



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Roadmap Photonic Devices

Introduction

The Dutch government has defined 9 Top Sectors. These are sectors in which the Netherlands has a strong position worldwide. The High Tech Systems and Materials (HTSM) is one of the top sectors led by a topteam with representatives from industry, science and government. The topteam has already given advice to the minister of Economic Affairs on how to strengthen this industry and maintain competitive in the world market.



Figure 1: Cover of *Holland High Tech Advice from TopTeam to Minister of Economic Affairs with a bundle of optical fibers*

The topsector HTSM comprises a number of linked manufacturing industries: machine- and systemindustry, automotive, aeronautics and space, printing and a number of key technologies such as nanotechnology, materials, semiconductors, mechatronics and photonics. The interplay of these subareas is shown in figure 2.

In 2009 this sector generated a turnover of 73 B€, with an added value of 23 B€ and an export value of 32 B€ with the ambition to double this in 2020. This industry is capital intensive and invests all together more than 2,3 B€ per year in R&D.

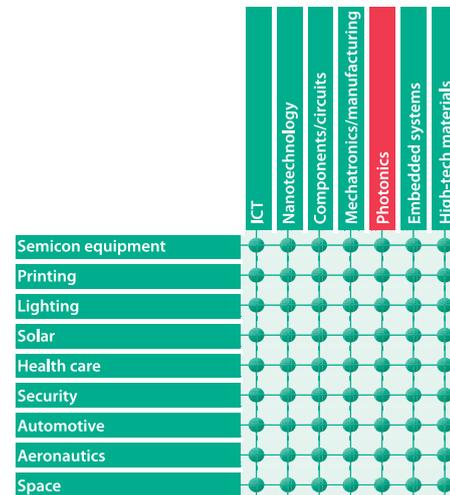


Figure 2: Overview of markets and technologies of the HTSM Topsector and their interlinkage.

The Netherlands is worldleader in the design, development and manufacturing of hightech equipment and micro/nano components with the following characteristics: intelligent (embedded systemen, software, sensors); high precision (nanoelectronics, high precision manufacturing); and efficiënt (mechatronica). Knowledge in the fields of materials and photonics/optics plays an increasingly important role.

The topsector high tech is an important “enabler” for many other application sectors like energy, chemistry, life sciences and food and provides solutions for our societal challenges in health, mobility, sustainability.

Every sub area provides a roadmap with topics that are relevant for the industry and steers R&D and collaboration between universities and companies. After a general introduction of photonic devices, a summary of the photonics roadmap 2012 is provided based on input from industry and academia. The full roadmap can be found on www.htsm.nl or www.dutchphotonics.nl

What are photonic devices?

Photonics is an emerging technology, comparable to semiconductor technology. Many functions in technical applications are currently realised by semiconductor products. The expectation is that photonic devices will partially replace existing semiconductor devices, but on top of that will also complement these in a qualitative way. The unique characteristics of photonic devices create an additional dimension like enlarged bandwidth, energy saving and larger communication distances. In addition, photonic devices are less sensitive to interference and have unique physical characteristics.

The drives for the application of photonic devices usually are:

1. Bandwidth and fast data processing and transfer.
2. Physical measuring characteristics and measuring principles.
3. Contactless measuring characteristics.
4. Processing possibilities of materials.
5. Energy saving.
6. Cost and dimension reduction.

Figure 1 indicates the wavelength areas of photonic devices. This ranges from applications in infrared radiation for measuring thermal processes to the use of gamma radiation for measurements with gamma cameras in the medical sector. The operational area

stretches from about 200 nm to about 1200 nm, hence larger than the range of visible light (380 - 800 nm).

Imaging using THz frequencies and the transportation of light via optical fibres with e.g. infrared signals are some other examples which illustrate the diversity of applications.

Photonic devices are often used in combination with mechanics, electronics, embedded software and physical processes in liquids and chemistry. Detection, emission and transmission are important functions of photonic devices in applications.

The detection of light is used in many different applications. ICT & communications is an important sector, as well as spectrometry and the sensor market.

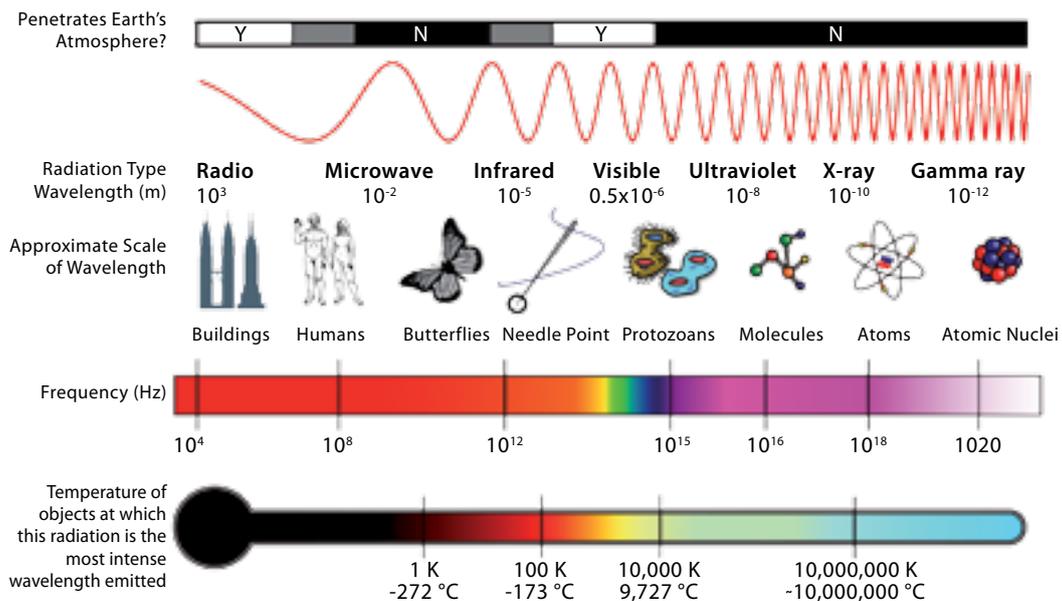
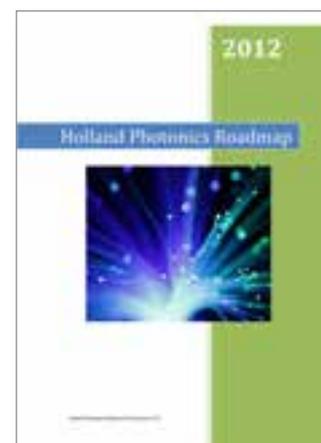


Figure 1: Survey of the wavelength spectrum with corresponding frequencies

Holland Photonics Roadmap 2012



1 Societal and Economic Relevance

1.1 Connection to the key societal themes

The science of Photonics includes the study of the generation, emission, propagation, modulation, signal processing, switching, amplification, detection and sensing of light. Photonics has been recognized by the EU as key enabling technology, allowing major breakthroughs in many application areas because of the unique properties of light. Photonics contributes centrally to the key societal themes that our society has to deal with in the near future:

- In healthcare by radical new approaches moving from current, cost-intensive treatment after onset of a disease, to the detection and prevention at the earliest possible stage by new (handheld based) diagnostic instruments, which allows to bring these new tools closer to the patient as well as perform remote diagnostics.
- In energy saving (“green photonics”) by the introduction of very efficient light sources, (O)LED’s, and energy generation by highly efficient solar cells.
- In security/safety by the emerging photonic sensing and imaging technologies for higher levels of security and safety through the use of sophisticated surveillance and encryption technologies both in the field as well as in logistics (e.g. nanodust detection and THz imaging technology).
- In monitoring climate change by earth’s atmosphere observation using advanced optical pollution (gas-) detection.
- In mobility by the development of the future multi-terabit internet fed by full Fiber to the Home (FttH) deployment at ever increasing capacity at lower energy allowing new economic initiatives and reducing traffic congestions (less CO₂) by providing the future proof infrastructure for more homeworking.
- In new manufacturing processes with extraordinary quality allowing mass customization, rapid manufacturing, non-destructive testing and zero-fault production (waste reduction).

1.2 Global market size addressed (2012-2020)

The world market for civil photonics products in 2010 was B€ 300 which, when the defense market is added, results in an overall total of B€ 350, which is significant when compared to other technology sectors and growing fast. From 2005-2010, the global market showed a real annual growth rate of 10% (euro basis), higher than in many other sectors (Food: 2%, Automotive: 3-5%). The photonics supply and demand is global with B€ 63 (2010) within the euro zone. Following the Optech study, the Dutch contribution is B€ 4.4 dominated by production equipment (ASML), lighting (Philips) and printing (OCE/Canon). Medical systems and optical components/systems is estimated to be B€ 0.5. The Netherlands is market leading in the following sectors: production technology in particular lithography, lighting: solid state lighting, OLED, medical technology with Imaging and diagnostics, optical measurement: machine vision, CCD/CMOS-detectors, ICT: printing and FttH equipment, solar, optical systems and components. Dutch SMEs target profitable niche segments in all photonic market sectors.

1.3 Competitive position of Dutch Industry, total R&D investments

The Netherlands has an excellent position to bring photonics into numerous markets. We have a strong scientific position in important photonic segments (Dutch universities and NWO initiatives) and a highly qualified high-tech industry with specific Nano-electronics and mechatronics expertise. Dutch internationals like ASML, Philips and OCE/Canon are big players in the photonics area but the Netherlands has also more than 150 SME's which are already embracing photonics for innovation. A smart photonics ecosystem has been realized in the Netherlands covering the whole value chain.

The photonics industry is still in an early phase but has unique positions in medical diagnostics/therapy, data processing, telecommunication (FttH, interconnect), modern lighting systems, consumer infotainment, sensor/safety, automotive and water. Our strength is in application knowledge and design in high tech systems such as lithography, solid state lighting, generic waferfab processes and platform technologies and the presence of the proper industries to leverage the value chain into a commercial success.

More than M€ 400 (since 1995) has been invested in photonics related infrastructure by industry and government. Knowledge that has been generated by academic groups and R&D institutes is ready for commercialization. The results of the current SmartMix-Memphis project, IOP-Photonic Devices projects, the Perspective programmes of STW, the NWO research programmes and the Industrial Partnership Programmes of FOM and STW sustain and strengthen this position. In addition, the excellent position of Dutch universities is exemplified by covering almost 35% of the 60 M€ European photonic projects on photonic integration technologies. A Dutch photonic network has been established that meets once a year at the Fotonica Event (650 participants-2012).

2 Application and technology challenges

2.1 State of the art for industry and science

The strong academic tradition in the Netherlands with several Nobel laureates in optics is the basis for the flourishing applied research in the Dutch high tech industry. Optics has since many years been one of the core disciplines of leading industries such as Philips and ASML. Besides these multinationals, there are many very innovative Dutch SME's active in the field.

During the past decades there is a trend towards miniaturization and integration. The development of optical communication, optical data processing and the growth of the electronics- and ICT industries has led to "integrated optics" and "photonic integration". In this discipline the methodology in IC-manufacturing is applied to realize many optical functions on a single chip.

Photonics spans the entire field from coatings, free forms in imaging and non-imaging systems, fiber optics for communication, integrated optics, (near-field) microscopy, (bio)- medical optics, laser technology, nonlinear optics, (remote) sensing, metrology, spectroscopy, nanophotonics, plasmonics, metamaterials, to quantum optics and quantum communication. Current Dutch academic research is at the fore-front of all these subjects and the Dutch photonics industry is applying their results more and more.

The opportunities of photonics in general and the benefits of generic foundry-based technologies are addressed in three major national R&D-programmes: IOP Photonic Devices, Smart-Mix "Memphis"

and STW's "Generic Technology for Integrated Photonics" and "Smart Optical Systems" which initiated successful collaborative consortia between industry and universities and have put the Netherlands at the forefront of Photonics technology development. In particular the Memphis project - in which 23 national and international partners join forces in addressing the hybrid and heterogeneous photonic and micro-electronics integration: key to achieve robust, reliable, complex microsystems.

2.2 Future outlook, in present and emerging markets

The Dutch high tech industry is increasingly embracing photonics in its innovation. Photonic technology is maturing rapidly. Unique for the Netherlands is that all photonics expertise is available and when matched to our high tech strength, the industry will become a major player in this field. The enabling character of the photonics industry matches very well with the Top Sectors and is one of the technology "backbones" of the HTSM sector. Although not all devices and functions can be realized on a chip with sufficient performance, we nevertheless expect in the coming years a rapid growth in the development and the application of photonic integration technologies, similar to electronics, where micro and nano-electronic integration technologies have enabled electronics to change our world. Major sectors of activity in the Netherlands where photonics is used are:

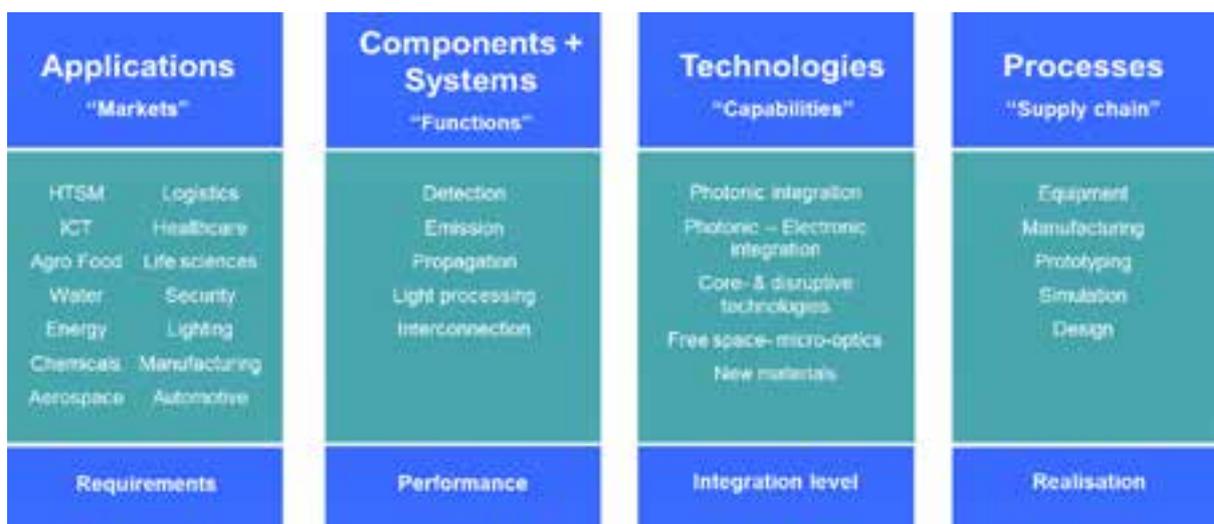
- Production technology for semiconductor industry e.g. optical lithography
- Lighting; In the next 3 to 4 decades the demand for artificial light is expected to triple by much more efficient solid state light sources, such as LEDs and OLEDs.
- Information and communication technology: digital photo copiers and printers based on laser and LED technology. Fiber-to-the-Home networks and high speed interconnections.
- Medical technology and life science: advanced microscopy and other emerging tools used in medical and life science research and applications in the clinic.
- Optical components and systems – e.g. fiber based and adaptive optics - will contribute to the development of new photonic based systems..

Apart from these areas, we envisage that the Netherlands will be strong in the following fields as well: image technologies, communication, data processing, manufacturing and packaging technologies, security, novel or emerging materials, sensors and bio-sensors which all meet societal challenges.

3. Priorities and programmes

3.1 Selected themes from roadmap

In this section an overview is presented of the broad field that is spanned by photonics, with emphasis on activities on running and planned activities in the Netherlands. To provide a guideline, these activities are grouped in four themes: i) Applications generating the requirements for the components from the market, ii) Components and Systems describe the component performance needed for the applications, iii) Technologies provide present and future processing technologies for the components and iv) Processes providing the necessary equipment and design for the technologies.



3.1.1 Applications for Top Sectors

Photonics in ICT

Novel components, materials and advanced integration technologies for the optical wide-area, access and home networks will enable efficient exploitation of available bandwidth, low-cost network operation, and data security. Optical interconnects will play a key role for future short-haul data communications and all-optical switching fabrics in e.g. data centers.

Photonics for Horticulture and Agro-Food

Growth stimulated lighting in greenhouses, photonic sensors for monitoring of climate and growth conditions in greenhouses, photonic trace gas detection for monitoring of crop conditions in the field and in stores. Monitoring of soil conditions (fertilization) and salt-fresh water ratios. Quality monitoring of packed nutrition and fruit.

Photonics for Water

Photonic sensors for water quality control in distribution networks and reuse facilities and for structural integrity monitoring in large constructions like dikes, bridges and flood control dams. Photonics technology will be used for real time monitoring of water movement, sediment transport and offshore structures e.g. windmills.

Photonics for Energy

Solar cells, solar fuel, energy saving lighting systems, green ICT using energy saving photonics in data transmission and switching, photonic monitoring of mechanical stability in windmill propeller blades.

Photonics for Chemicals

Low cost and high performance spectroscopy of chemicals and pharmaceuticals using integrated photonic devices. Fiber based sensors for temperature measurement and detection of fractures or leakage in processing installations or storage tanks.

Photonics for Logistics

Photonic devices enabling obstacle detection and position- and speed sensing for vehicles

Photonics in Healthcare and Life Sciences

Medical devices including medical therapeutical systems and systems for in vivo and in vitro diagnostics. Major products include endoscopes, therapeutic laser systems, medical imaging systems, CR systems, ToF-PET and PET-MRI, fluorescence diagnostics systems, coherent detection, optical coherence tomography systems, SPECT, Raman (CARS) based diagnostic systems, Photo Acoustic imaging technologies. All systems comprise a combination of photonic components (lasers, detectors), micro-electronica, mechanics and software. Miniaturization of these systems is often desirable to bring these technologies from the clinic towards the practitioner/patient.

Photonics in Security, Metrology and Sensors

Enhanced sensitivity operation, single-photon detection. Self-sustaining sensors with low ultra-low power consumption. New sensing functionalities, including unexploited wavelengths, active vision, 3D-Vision. The ability to operate sensors in all ambient conditions, including lighting, temperature, pressure, humidity. New applications in the soft X-Ray, VUV and EUV wavelength region (<200 nm) as well as infrared, > 2µm for gas detection).

Photonics in Lighting

New materials and structures targeting performance enhancement. The need for better components and in particular device integration for smart lighting systems, LEDS and OLEDS.

Photonics in Manufacturing

New manufacturing processes and process monitoring with extraordinary quality that will allow mass customization, rapid manufacturing, non-destructive testing via THz imaging and zero-fault production.

Photonics in Automotive

With a focus on intelligent electromechanical systems, the photonics based sensor technology will be integrated in mechanical parts requiring robust components for in-car communications, monitoring, warning and vision.

Photonics in Aerospace

New optical equipment using e.g. radar, LIDAR and space communication.

3.1.2 Components + Systems

Photonic components and systems span a broad frequency range from high energies (EUV) to low energies (THz) and can be divided in the following four main topics. However, in most high-tech applications a combination of these topics are present.

Generation of Light

Sources include integrated lasers, solid state green LEDs, photonic crystal lasers and materials for light conversion (such as phosphors and quantum dots), CMOS and other single photon technologies, quantum cascade lasers, VCSELs, plasma sources, ultra-short pulses, high power lasers, THz sources, nano- and, non-

linear optical sources, free-electron based sources, broadband VUV sources, fast tunable nanosecond lasers and new scintillation materials. Work on sources includes improved emission by engineering of optical density of states and/or scattering structures, and by improved excitation mechanisms.

Light propagation and manipulation

Integrated optical circuits, micro resonators, optical fibers, photonic crystal waveguides, plasmonics and metamaterials, spatial modulation by refractive, diffractive and adaptive optical elements, scattering, beam shaping and deflecting, optical cloaking, temporal modulation of light or slowing of light, filters, non-linear optics and switching of light.

Light interaction

Nanostructures for light interaction at sub wavelength scales (nanophotonics), interaction of light with waves, such as with plasmons, phonons, or light waves, coherent control, light for manufacturing (lithography) or data storage, light for medical diagnosis and treatment, optical tweezers, bio-optics, new materials for collecting light and optimizing interactions.

Light detection

Novel types of spectroscopy and microscopy, also with sub-diffraction limited resolution, (remote) sensing, new imaging systems, highly efficient light harvesting structures, optical antennas, optical signal processing, near-field detection, interferometry and metrology, single photon and plasmon detectors.

3.1.3 Technology

Photonic integration

Includes the development of generic integration platforms and foundry models. Addressed technologies comprise III-V semiconductors, SOI and TriPLeX, CMOS post processing; assembly, alignment and fixation, RF processing in optical domain (microwave photonics). Also photonics technology will be combined with e.g. fluidics and mechatronic technologies.

Photonic-electronic integration

At the chip, board and system levels. Hybrid and heterogeneous integration. Si-III/V integration; process control/improvement; assembly technologies; pick-and-place tools, optical PCB.

Packaging technologies

Packaging and assembly technologies for low cost sources and detectors, flip-chip optical coupling, combined glass and non-hermetic packaging. Assembly equipment for prototyping of bulk optics with high tolerance requirements.

Core and disruptive technologies

Includes application-specific components and systems such as laser and other light sources, imaging units, transmitters and receivers, detectors and sensors and hybrid integration. Disruptive technologies often exploit effects at the limits of photonic interactions, including nanophotonics, sub-wavelength and near-field effects, plasmonics and quantum effects.

Free space and micro optics

Architecture and assembling of optical components into an advanced photonic device. This includes remote solid state lighting, photovoltaics, microscopy, advanced spectroscopy, health instruments and lithography.

New materials

Includes semiconductors, glasses, plasmonic materials, metamaterials, photonic crystals, nano- (plasmonic) structures, quantum dots, nano-crystals, nonlinear materials, doped materials, magneto optical, electro optical and random materials, organic materials, organic-inorganic combinations and new bio materials.

3.1.4 Processes

Equipment

In order to manufacture integrated devices, development of new process equipment for front-end and back-end manufacturing and testing have to be developed. This includes new assembly and packaging processes for 2D and 3D assemblies towards volume production, including novel interconnection techniques for photonic interfaces. Packaging and assembly technologies for low volume, high end optics and micro-optics need to be developed as well. It is worth noting that the world's first ASML DUV scanner (90 nm resolution) for III/V photonic circuits has been installed at the TU Eindhoven in 2011.

Manufacturing and prototyping

The need for cost effective photonic devices drives the need for (standard) technologies for cost-effective high speed manufacturing of these components and subsystems including packaging and assembly processes for volume production and photonic prototyping. Fast time to market is required.

Simulation and design tools

New simulation and design tooling must be developed enabling the designs of new devices and circuits, and link the tooling with the new integration technologies and the manufacturing and prototyping processes (validation). The overall quality of the supply chain will increase by putting more "feedforward" into these tooling, building a living database for further improvements of this supply chain, products and processes.

3.2 Proposed implementation (NWO, TNO/GTI/international R&D, regional)

- Photonics is a driving force in the fundamental research programmes of NWO, and the EU programmes FP7 and Horizon2020 with their specific photonic calls and increased budget.
- Dutch R&D is well presented in Photonics21: the European Photonics Industry Association that produce the photonics roadmap for the EU. In particular, Lionix and TUE/COBRA play a very active role.
- Valorization projects will be carried out together with TNO/GTIs including projects with SMEs and links with IPCs and other Innovation Funds to secure commercialization and market introduction for innovative components and systems.
- During 2012 and 2013 follow up programmes in Topconsortium Kennis & Innovation (TKI's) will be initiated based on the roadmap e.g Memphis Platform.
- An association will be set up with the following activities: setup, maintain and develop the Photonics roadmap; to coordinate and initiate new collaborative projects; strengthen and maintain national and international contacts; promote Holland Photonics at national and international exhibitions and conferences.

- Furthermore a Photonics Development Lab (GPICSFAB) has been initiated in 2012 by a number of SME's to speed up the availability of integrated photonics chips by a shared wafer approach made at photonic foundries based on market demand.
- Education: SMEs lack sufficiently educated employees skilled in modern photonics and test equipment. Participation of e.g. HBO, WO and graduate schools in collaboration with projects will stimulate students in this field. Support of setting up curricula on photonics at all levels, including business development (Bachelor, Master and Graduate Schools) has a high priority.

3.3 Collaboration activities qualifying for TKI

The Netherlands is in a unique position with world leading groups at Universities and Institutes actively researching each of the topics mentioned in 3.1.1. The academic research in support of and in collaboration with Dutch industrial photonics research and development in large companies (e.g. Philips and ASML), Dutch SME's and Institutes such as TNO, ASTRON, SRON and VSL will be continued.

3.4 Engaged partners in photonics from industry and science

Industry Partners

Philips, ASML, TE Connectivity, Neways Micro Electronics, BESI, NXP, TOPCON Europe, MicroVision Medical, Dalsa, Esaote Europe, Oldelft, Melles Griot.

SME's

Avantes, EFFECT Photonics, Genexis, SATRAX, Sensor Sense, Technobis, Hybriscan Technologies, RiverDiagnostics International, LioniX, MA3 Solutions, PhoeniX, Bright Photonics, 2M Sensors, Xio Photonics, VTEC, Bruco, Luminostics, Smart Photonics, Lactronic, HEDON, Vermeulen Printservice, Anteryon, 4PICO, Cosine, FTS, Solmates, Unitron, Mach8 Lasers, MILabs, Lambert Instruments, Hemolabs, HQSonics, HollandPTC, Percuros, O2View, IMS, Diagnostix, PhotonTech, Photonis, OGS Systems, Octoplus, NTS Optel, Lightmotiv, Laprocon, i-Optics, Flexible Optical, Cosine.

Universities and Institutes

TNO, TUE, UTwente, TUDelft, VU, UMC Radboud, AMC, Erasmus MC, AMOLF, ASTRON, SRON, Deltares, NLR, Kavli, Medical Spectrum Twente, Netherlands Cancer Institute, Utrecht Medical Center, VSL.

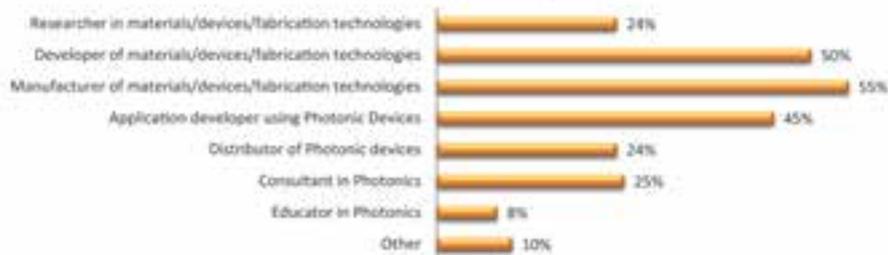
International partners

IMEC (B), Oclaro (UK), IBM (Switzerland), Fraunhofer-HHI (D), Toptica AG (D), Coherent Europe.

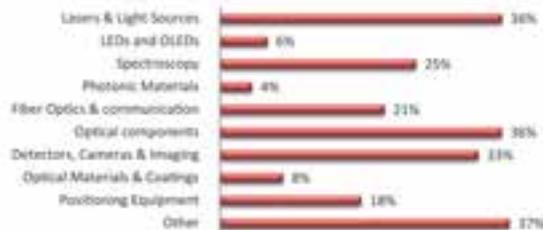
Photonics Company Profiles

This company guide gives an overview of 99 Dutch Photonic companies and institutes. Statistic information on their position in the supply chain, products or services, which markets they are involved and their competences are displayed in the charts below. In the next pages you will find a summary of each company or institute with a brief description of their activities, contact information and their profile (Level, Products, Markets and Competences).

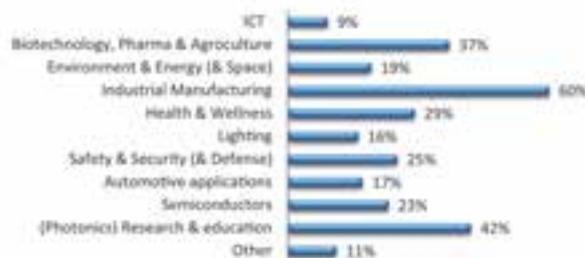
What is your company position in the Photonic value chain ? (Level)



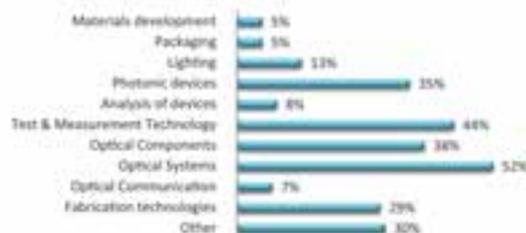
Which type of products do you supply? (Products)



In which markets are you involved? (Markets)



What are your competences in Photonics? (Competences)





2M Engineering ltd.

2M Engineering is specialized in research, development and industrialization of medical & industrial products. We have expertise in a wide range of optical, imaging and sensing techniques and are experienced in applying these to a broad spectrum of application areas (e.g. petro-chemical industry, telecommunications and medical devices). We research and develop state of the art optics, lasers and opto-electronics to create practical solutions for real problems. The company, founded in 2004, has partnerships with leading universities and has established strong industrial cooperations with a number of leading (laser) manufacturers to industrialize and manufacture new products in volume.

2M Engineering ltd.

De Run 4352
5503 LN Veldhoven
The Netherlands
Contact: G. Mimmagh
Phone: +31 40 2982020
Email: mimmagh@2mel.nl
Website: www.2mel.nl



Level	Researcher Developer Application developer
Products	Lasers & Light sources Fiber optics & communication Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Health & Wellness
Competences	Photonic devices Test & Measurement technology Optical systems



Acal BFi Nederland bv (formerly BFi OPTiLAS)

Acal BFi Nederland offers high tech solutions for a broad range of optical and electronic systems. Our engineers draw from their expertise and work together with you to find the most practical and appropriate solution for your project.

Adaptive Optics • Lasers • Laser Beam Analysis • Laser Diodes • Laser Modulation • Laser Rods & Non-linear Crystals • Laser Safety Equipment • Light Shaping Diffusers • Optical Components • Optical Shutters • Photodiodes • Photometry & Colorimetry • Power & Energy Meters • Scanners & Galvanometers • Spectrometers • Tables & Breadboards • Wavelength Meters

Don't hesitate to contact us to discuss your requirements on +31 172-44 60 69.

Acal BFi Nederland bv (formerly BFi OPTiLAS)

J.P. Thijsseweg 1e
2408 ER Alphen aan den Rijn
Contact: Mr. R. Satink
Phone: 0172-44 60 69
Email: photonics.nl@acalbfi.nl
Website: www.acalbfi.nl

Level	Distributor
Products	Lasers & Light sources Optical components Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Test & Measurement technology Optical components Other





Admesy BV

Admesy develops leading innovative colour measurement equipment for use in production processes. Our products vary from colorimeters, controlled light sources to our new spectrometers.

Admesy BV

Branskamp 5
6014 CB Ittervoort
Contact: Steven Goetstouwers
Phone: 0475 600232
Email: info@admesy.com
Website: www.admesy.nl

Level	Developer Manufacturer Application developer
Products	Spectroscopy Detectors, Cameras & Imaging
Markets	Industrial manufacturing Lighting (Photonics) Research & education
Competences	Photonic devices Test & Measurement technology Optical systems



Advanced Laser Separation International (ALSI) N.V.

Advanced Laser Separation International (ALSI) N.V., is the inventor of laser dicing and the world's leading provider of laser dicing systems for the semiconductor industry. These systems enable the production of integrated circuits or microchips meeting the electronic consumers demands such as increased functionality, reduced size and cost reduction. The process is based on a unique multi beam laser dicing technology, which has very low thermal impact to the material achieving a very high productivity. Our solutions enable to reduce manufacturing cost significantly and allow to execute semiconductor technology road map to meet Moore's Law. ALSI controls the design, development and manufacturing of advanced laser dicing systems as well as the marketing and servicing of these systems worldwide.

Advanced Laser Separation International (ALSI) N.V.

Platinawerf 20G
6641 TL Beuningen
The Netherlands
Contact: René Hendriks
Phone: +31 24 678 2888
Email: sales@alsi-international.com
Website: www.laserdicing.com

Level	Developer Manufacturer Application developer
Products	Lasers & Light sources Optical components Positioning equipment
Markets	Industrial manufacturing Lighting Semiconductors
Competences	Packaging Fabrication technologies





Anteryon BV

Anteryon has a team of design and manufacturing professionals co-create who can create innovative high-tech optical solutions and sub-assemblies from design to mass production.

Anteryon is a spin-off of Philips Electronics with an extensive track record in micro-optic technologies and solid customer base. The core technologies of Anteryon are glass replication, surface structuring and opto-mechanical / opto-electronic assembly. Combining the core technologies we are able to provide innovative product solutions for i.e. wafer level camera objectives, aspherical lenses and lens arrays, laser, planar optics and mastering substrates. For more information, take a look at our website www.anteryon.com.

Anteryon BV

Zwaanstraat 2a
5651 CA Eindhoven

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Phone: +31 40 25 61 500
Email: info@anteryon.com
Website: www.anteryon.com



Level	Developer Manufacturer Distributor
Products	Lasers & Light sources Optical components Optical materials & Coatings
Markets	Safety & Security (& Defense) Other
Competences	Optical components Other



Applied Laser Technology BV

ALT represents world-class A-brands of lasers, light sources, (fiber) optics, nanopositioning equipment & optomechanics.

We serve scientific-, research- and industrial markets. The motto that exemplifies the way we work is: "Help others as you would want to be helped yourself". We are committed to long-term relationships, characterized by open and clear communication lines.

Applied Laser Technology BV

De Dintel 2
5684 PS Best
Contact: D. Moerman
Phone: +31-499-375375
Email: info@alt.nl
Website: www.alt.nl

Level	Distributor Consultant
Products	Lasers & Light sources Optical components Positioning equipment
Markets	Industrial manufacturing Semiconductors (Photonics) Research & education
Competences	Photonic devices Optical components Other



ASTRON

ASTRON is the Netherlands Institute for Radio Astronomy. Its main mission is to make discoveries in radio astronomy happen, via the development of new and innovative technologies, the operation of world-class radio astronomy facilities, and the pursuit of fundamental astronomical research. Engineers and astronomers at ASTRON have an outstanding international reputation for novel technology development, and fundamental research in galactic and extra-galactic astronomy.

In its technology R&D, ASTRON works on the development of both innovative instrumentation for existing telescopes and new technologies needed for future observation facilities.

Parallel to the design, fabrication and construction of electronic phased array receiver systems, a photonic R&D programme is conducted which focuses on the development of broadband radio telescope technology.

ASTRON's photonic technology R&D concerns the development of both (integrated) photonic smart antenna and optical signal/data transport technologies.

ASTRON

Oude Hoogeveensedijk 4
7991 PD Dwingeloo

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Phone: +31 (0)521 595 100

Email: maat@astron.nl

Website: www.astron.nl

Level	Researcher Application developer Consultant
Products	Fiber optics & communication Optical components Other
Markets	ICT (Photonics) Research & education Other
Competences	Analysis of devices Optical systems Optical communication



Avantes

Avantes is a world leader in the field of spectroscopy.

They develop and manufacture spectrometers, light sources, software, fiber optic cables, and accessories. Avantes' products are highly customizable, adaptable to any specific application, and integrated into even the smallest housings. These products therefore find usage in many OEM applications and markets, as well as in the scientific and industrial world. With over 18 years of experience, Avantes continues to produce innovative applications in diverse fields including chemical, solar energy, agriculture, gemology, (bio)medical, semiconductor, light measurement and food processing technology.

Avantes

Oude Apeldoornseweg 28
7333 NS APELDOORN

Contact: Caroline Bach

Phone: 0313 670 170

Email: info@avantes.com

Website: www.avantes.com

Level	Developer Application developer Distributor
Products	Lasers & Light sources Spectroscopy Fiber optics & communication
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Analysis of devices Test & Measurement technology Optical systems





AWL-Techniek

AWL-Techniek is the specialist manufacturer in state-of-the-art automated welding machines. Together with over 250 dedicated colleagues, based in our offices in The Netherlands, Czech republic and China, we provide creative machine concepts that satisfy the requirements and wishes of our customers. Our primary focus is on the automotive suppliers, where high volumes, speed and quality are essential. AWL is a strong partner on which customers can rely when optimal welding solutions are demanded. The culture within AWL is characterized by innovation and quality. We want to keep our customers ahead in the field of automated welding. This ambition enables us to maintain a strong position in the market.

AWL-Techniek

Nobelstraat 37
3846 CE Harderwijk
Contact: Marlou van de Wiel
Phone: +31 (0)341 411 811
Email: info@awl.nl
Website: www.awl.nl



Level	Application developer
Products	Lasers & Light sources Fiber optics & communication
Markets	Industrial manufacturing Automotive applications Other
Competences	Optical systems Fabrication technologies Other



Bright Photonics B.V.

BRIGHT Photonics B.V. is a design house for Photonic Integrated Circuits (PICs), and with its partners leading the European development in making PICs accessible to (small) businesses, research institutes and universities. PICs offer solutions for applications such as:

- Interferometric devices
- Transmitters & Receivers (FM, OOK, QAM, ...)
- Structural & Medical Sensing (FBG, Raman, Brillouin, ...)
- Datacom & Telecom (WLAN, LAN, FTTH, WDM, OCDMA, ...)

Bright typically operates as an intermediate company between foundry services and product developers. In addition to full design services, we can support you with advanced photonics libraries in technologies such as InP, Sol, Triplex, glass and polymers. Contact Bright Photonics for understanding what PICs can do for your product or research.

We offer

- Feasibility
 - Packaged prototypes
 - Design layout, -libraries and -support
 - Product-development support and simulations
- Make light Bright!

Bright Photonics B.V.

Burgemeester van den Helmlaan 67
3604 CE Maarssen
Contact: Ronald Broeke
Phone: +31 64 67 22 099
Email: contact@brightphotonics.eu
Website: www.brightphotonics.eu

Level	Developer Application developer Consultant
Products	Photonic materials Optical components Other
Markets	Environment & Energy (& Space) Health & Wellness (Photonics) Research & education
Competences	Photonic devices Other





Bystronic

Bystronic develops and sells systems for processing sheet metal. Its headquarters are in Niederönz in Switzerland. Bystronic is active with its own sales and services companies in around 30 countries on three continents. In Niederönz Bystronic constructs laser cutting and waterjet cutting systems and automation modules, in the manufacturing plant in Gotha the pressbrakes. Components that are crucial to the performance of the systems are developed by Bystronic itself or together with selected partners. Every tenth Bystronic employee works in the development of products and services. Bystronic offers a proprietary software package Bysoft for its machines and ByVision for machine control. Bystronic maintains a global network of service technicians and spare parts warehouses to offer instant service.

Bystronic

Stek 8
3371 KG Hardinxveld-Giessendam
Nederland
Contact: Cees Wolters
Phone: 0031 (0)184 620511
Email: sales.nl@bystronic.com
Website: www.bystronic.nl

Level	Application developer Other
Products	Other
Markets	Industrial manufacturing Automotive applications Other
Competences	Other



Caliopa

Caliopa aspires to be a market leader in advanced optical transceivers for the data and telecommunication markets. The company was incorporated in 2010 as a spin-off of the Photonics Research Group of Ghent University and imec to commercialize a decade of research in Silicon Photonics. Benefitting from the advantages of Silicon Photonics, Caliopa will develop and market optical transceivers that offer advanced functionality, higher port density and lower power consumption.

Caliopa

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9052 Zwijnaarde
België
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Phone: +3292415606
Email: info@caliopa.com
Website: www.caliopa.com

Level	Researcher Developer Distributor
Products	Fiber optics & communication Optical components
Markets	ICT
Competences	Photonic devices Optical components Fabrication technologies





Centre For Laser Technology

The Centre For Laser Technology CFLT is a cooperation between several companies. We are an independent laser knowledge centre and application lab. for laser micro and nano machining, welding, soldering, engraving, cutting, surface structuring, cleaning and so on. Experiments can be carried out on our own equipment. We can machine a lot of materials: metals, polymers, glass, diamond, ceramics, organic materials like paper, composites. Details down to a few microns in the plane and below one micron in depth can be achieved. Our philosophy is that only one contact must be enough to help you further. Our experience, in-house equipment covering wavelengths from UV to IR, from extreme short pulses to CW and our network will ensure this. Because we are independent from equipment suppliers we can advise you like we advise ourselves. Other activities:

- carry out feasibility studies, technical and economical
- characterisation of your process
- design of laser optics
- advice about laser safety
- laser system design/engineering, construction/realisation, service and maintenance
- courses Jobshop: capacity for small series and prototyping

Centre For Laser Technology

Steenovenweg 9

5708 HN Helmond

Contact: H. v. Esdonk

Phone: 0492 - 526836

Email: info@cflt.nl

Website: www.cflt.nl

Level	Developer Consultant Educator
Products	Lasers & Light sources Optical components Detectors, Cameras & Imaging
Markets	Industrial manufacturing Safety & Security (& Defense) (Photonics) Research & education
Competences	Test & Measurement technology Optical components Fabrication technologies



DCD

DCD is an integrated product developer, active in the smart products, motion systems and human interface devices markets. We design, develop and manufacture these products from prototype up to and including serial production.

DCD has a great deal of experience with photonics and products in which optics are integrated, whether or not in combination with software. DCD has been active for many years in the development of low-power consumption lighting, especially LED modules and LED lighting solutions with integrated optics. In addition, we are witnessing the increasing incorporation of optical systems in consumer products, such as for example robot applications or oral inspection systems.

DCD

Esp 208

5633 AC Eindhoven

Contact: Rob Boereboom

Phone: 0402484300

Email: info@dcdeurope.com

Website: www.dcdeurope.com

Level	Researcher Developer Manufacturer
Products	LEDs and OLEDs Fiber optics & communication Optical components
Markets	Health & Wellness Lighting (Photonics) Research & education
Competences	Lighting Optical systems Fabrication technologies



de tijdelijke expert

de tijdelijke expert

Independent professional in computer vision. Customizing technology to help customers in detection, identification and measurement of products. Knowledge of the complete field including lighting and optics.

de tijdelijke expert

Van Goghstraat 98
9718 MV Groningen
Contact: Tom Koopen
Phone: +31 6 26 508 083
Email: info@tjindex.nl
Website: www.tjindex.nl

Level	Application developer Consultant
Products	Detectors, Cameras & Imaging Other
Markets	Biotechnology, Pharma & Agroculture Health & Wellness (Photonics) Research & education
Competences	Lighting Test & Measurement technology Optical systems



DEMCON

DEMCON is a high-end supplier of technologies for the high-tech systems and medical devices markets. Within these markets, our focus is primarily on development and production. Due to our production capabilities, DEMCON can differentiate our self from other suppliers. Our clients receive not just a blueprint but also a working product or system.

DEMCON's high level of expertise in many engineering disciplines together with our outstanding proficiency in applying these skills enables us to develop and implement original solutions to complex problems.

The know-how gained from supplying technology to diverse markets provides us with unique vantage points to look at problems in new applications in an open and creative manner.

DEMCON

Institutenweg 25
7521 PH Enschede
Contact: Marvin Klein
Phone: 088-1152000
Email: info@demcon.nl
Website: www.demcon.nl

Level	Developer Manufacturer Application developer
Products	Optical components Other
Markets	Industrial manufacturing Health & Wellness Other
Competences	Test & Measurement technology Optical systems Other



DiagnOptics Technologies B.V.

DiagnOptics develops and markets a non-invasive diagnostic technology, which can assess the tissue accumulation of AGEs. Since 2006 the AGE Reader offers an immediate cardiovascular risk assessment that is essential in diabetes management. Diab-spot is a new and non-invasive test to identify people at risk for (pre)diabetes without overnight fasting, blood being drawn, or waiting hours for lab results.

DiagnOptics will introduce the AGE Reader mu in 2013.

The revolutionary AGE Reader mu combines the same high measurement quality standard with an innovative design at a reduced price level. The AGE Reader mu is a perfect tool for diabetologists and family doctors.

DiagnOptics Technologies B.V.

L.J. Zielstraweg 1
9713 GX Groningen

Contact: Piet van der Zee

Phone: +31 (0)505890612

Email: info@diagnoptics.com

Website: www.diagnoptics.com

Level	Application developer
Products	Other
Markets	Biotechnology, Pharma & Agroculture Health & Wellness
Competences	Test & Measurement technology Optical systems



Eagle Vision Systems bv

From the early nineties Eagle Vision Systems is developing systems and has become a dominant technology provider in the Dutch market for industrial vision systems.

Eagle Vision develops, designs, implements, delivers and supports advanced optical inspection systems for the food and beverage and pharmaceutical industry as well as optical people tracking systems for the public markets as People Logistics (health care, retail, safety & security).

Eagle Vision Systems bv

Energiestraat 16B
1411 AT Naarden

Contact: Arend van de Stadt

Phone: +31 35 695 2818

Email: info@eaglevision.nl

Website: www.eaglevision.nl

Level	Developer Manufacturer Application developer
Products	Detectors, Cameras & Imaging Other
Markets	Industrial manufacturing Lighting Safety & Security (& Defense)
Competences	Optical systems Other





Elmekanic B.V.

Elmekanic is a distributor, engineer and system integrator for electrical-mechanical positioning components.

Elmekanic B.V.

Spelleweg 3
7475 GV Markelo
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Phone: +31 -(0)547-367 357
Email: info@elmekanic.nl
Website: www.elmekanic.nl



Level	Developer Distributor
Products	Lasers & Light sources Photonic materials Positioning equipment
Markets	Industrial manufacturing Semiconductors
Competences	Photonic devices Test & Measurement technology Optical systems



Excilas

Excilas is a R&D company in the field of micro and nano lasertechnology. Most materials can be machined with details down to a few microns (lateral) and less than 1 micron in depth. We use UV excimer lasers and Nd:YAG lasers for micromachining, laser engraving and laser welding. Besides this we design optical systems for laser machining, develop processes and have some job shop facilities. Our network ensures in most cases a one stop approach for your questions.

Excilas

Steenovenweg 9
5708 HN Helmond
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Email: info@excilas.nl
Website: http://www.excilas.nl



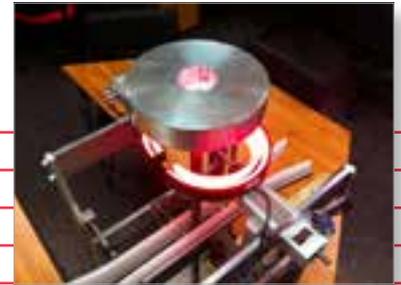
Level	Researcher Application developer Consultant
Products	Lasers & Light sources Optical components Other
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Other
Competences	Optical components Fabrication technologies Other

FALCON LED Lighting Benelux B.V.

FALCON is the number one expert for machine-/computer-/robot-vision light, laser, lens, filter solutions. FALCON has rapidly become the reliable specialist and distributor for the better lighting, laser, lens and filter solution. FALCON has the knowhow and as an expert we advise you for every application the most optimal, on continuity oriented light, laser, lens, filter solution. For every machine-/computer-/robot-vision application develops, produces and delivers FALCON LED affordable top-quality LED solutions. Our product range includes not only the newest LED models and strobes, but also Xenon light, fiber-optic light guides, laser, lens and light-filter solutions. We're specialized in developing and manufacturing OEM lighting and laser solutions.

FALCON LED Lighting Benelux B.V.

Steiger 23
6581 KZ Malden
Contact: Gert H.J. van Zeist
Phone: +31 24 357 35 02
Email: info@falcon-lighting.eu
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Level	Manufacturer Distributor Consultant
Products	Lasers & Light sources LEDs and OLEDs Optical components
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Semiconductors
Competences	Lighting Optical components Fabrication technologies

Genesis BV

Genesis is a trendsetting European company focused on the development, manufacturing and marketing of active equipment dedicated to fiber-to-the-home (FTTH) networks.

At Genesis we are convinced that we can make a difference in today's world, by combining state-of-the-art technology with a mission to provide open access broadband networks based on fiber. With the Genesis CPEs (Customer Premises Equipment), our customers can revolutionise the cost-base of their networks and create reliable and future proof networks. Our customers are worldwide network operators, providing open access to multiple service providers.

Genesis BV

Lodewijkstraat 1a
5652 AC Eindhoven
The Netherlands
Contact: Maurice de Laat
Phone: +31 (0) 40 747 0247
Email: info@genexis.eu
Website: www.genexis.eu



Level	Researcher Developer Other
Products	Fiber optics & communication Other
Markets	ICT Other
Competences	Photonic devices Optical components Optical communication

Hamamatsu Photonics Deutschland GmbH

Hamamatsu Photonics produces and sells optoelectronic sensors, emitters and systems: photo ICs (for example for light barriers, colour measurement, expose meters), MSM photodetectors, photodiodes and photoresistors (silicon, InGaAs), infrared detectors (InGaAs, PbS, PbSe, InSB, InAs, MCT), InGaAs Line Sensors, CMOS, NMOS and CCD sensors, MPPC (Multipixel Photon Counter), Mini-Spectrometer, position sensitive diodes (PSDs), emitters and receivers for optoelectrical communication, LEDs, laser diodes, photomultiplier, photomultiplier modules, lamps (Xe, HgXe, D2...), light sources for UV glueing, CCD cameras, streak cameras.

Hamamatsu Photonics Deutschland GmbH

Televisieweg 2

1322 AC ALMERE

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Phone: 036 5383123

Email: info@hamamatsu.nl

Website: www.hamamatsu.com

Level	Developer Manufacturer Distributor
Products	Lasers & Light sources Spectroscopy Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Health & Wellness Semiconductors
Competences	Lighting Photonic devices Optical components



Hittech Multin

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 Multin

Oostsingel 209

2612 HL Delft

Contact: Philip Bakker

Phone: +31 15 2150300

Email: Info-multin@hittech.com

Website: www.hittech.com

Level	Developer Manufacturer
Products	Positioning equipment Other
Markets	Biotechnology, Pharma & Agroculture Health & Wellness Semiconductors
Competences	Test & Measurement technology Optical systems Fabrication technologies

IDCP B.V. / Dino-Lite Europe

Dino-Lite digital microscopes provide a powerful, portable and feature rich solution to microscopic inspection at up to 500x magnification and 5 Megapixel resolution. High quality imaging and advanced software and hardware features set the Dino-Lite range apart from any comparable product.

Dino-Lite is the inventor and industry standard for digital handheld microscopes and an irreplaceable instrument for thousands of professionals worldwide. With over 70 models the Dino-Lite range offers multiple connectivity options and specialized illumination, including UV and Infrared and several magnification ranges. All these features make the Dino-Lite digital microscope an ideal solution for industrial inspection: such as quality control, assembly, repair, materials failure analysis as well as scientific and educational applications.

Dino-Lite: Small in size, but full of functionality.

IDCP B.V. / Dino-Lite Europe

Energiestraat 23-A

1411 AR Naarden

Contact: Martijn Valkenburg

Phone: 020-6186322

Email: info@dino-lite.eu

Website: www.dino-lite.eu

Level	Distributor
Products	Optical components
Markets	Industrial manufacturing Automotive applications Semiconductors
Competences	Test & Measurement technology Optical systems

IDEX Optics & Photonics

The IDEX Optics & Photonics platform of companies currently includes: ATFilms/Precision Photonics — High-performance optics and custom IBS coatings for intra-cavity laser applications and advanced metrology and epoxy-free bonding of laser optic assemblies Semrock — Spectrally complex and durable optical filters for biotech & analytical instrumentation CVI — A wide catalog and semi-custom selection of high precision, laser grade optics Melles Griot — A broad spectrum of gas, diode and DPSS lasers, opto-mechanical and electro-optical assemblies World-class Optics from a Growing Family of Brands The IDEX Optics & Photonics family of best-in-class brands delivers premium products, engineered solution and precision fabrication to scientific, commercial and industrial customers around the world. From custom components and subsystems to high-volume production, the IOP manufacturing and distribution platform integrands leading photonics technologies in advanced

coatings, filters, and laser optics for manufacturers of light-based instruments, tools and systems. With headquarters in Albuquerque, NM and facilities across North America, Europe, and Asia, IOP drives state-of-the-art technical expertise and collaboration between its optical industry partners including ATFilms / Precision Photonics, CVI Laser Optics, Melles Griot, and Semrock.

IDEX Optics & Photonics

Aalsbergen 2, 6942 SE Didam, The Netherlands

Contact: Klaas Hop

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Level	Manufacturer Distributor Consultant
Products	Lasers & Light sources Optical components Optical materials & Coatings
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Semiconductors
Competences	Photonic devices Optical components Optical systems





Imago Group Benelux

Imago Group Division Machine Vision and Measurement (VIM) Benelux (formerly Aims Optronics) specializes in Machine Vision and Measurement components such as industrial cameras, lighting, lenses, frame grabbers, software, fiber optic sensors etc. Our team (technical support but also our sales department) consists of engineers and technicians with experience in machine vision, image processing and analysis and automation. The company has offices in Brussels and in Waalre-Eindhoven.

Imago Group Benelux

Nederlands kantoor:

Van Dijklaan 15S
5581 WG Waalre (NL)

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Contact: ing. Mart Mijnsbergen

Phone: 040-8200368 (Vision)

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Website: www.imagogroup-benelux.com/vim



Level	Application developer Distributor Other
Products	Lasers & Light sources Fiber optics & communication Detectors, Cameras & Imaging
Markets	ICT Biotechnology, Pharma & Agroculture Environment & Energy (& Space)
Competences	Analysis of devices Test & Measurement technology Optical components



INNLab

The Innovation Laboratory (INNLab) closes the gap between design and automated production by offering its services in the field of manufacturing technology. Through product modifications, prototyping, process development and equipment validation, INNLab provides the basis for automated production. In the field of photonics we have experience in the alignment of optical fiber arrays to photonic chips and additional assembly processes. INNLab has a strong focus on manufacturability and design for assembly. We are a member of the WWINN group.

INNLab

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Level	Researcher Developer Manufacturer
Products	Positioning equipment Other
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Automotive applications
Competences	Test & Measurement technology Fabrication technologies Other



Innoluce BV

Innoluce, an entrepreneurial spin-off of Royal Philips Electronics, develops and sells an optical component which can be used for laser scanning in very small environments. This component is called a Laser Scanning Module (LSM), and is built around a resonant micro mirror. This mirror is manufactured from silicon, using Micro Electro-Mechanical Systems (MEMS) technology. Applications of these LSMs can be found in laser printing, gesture control for gaming and consumer electronics, motion and object detection for automotive applications, medical diagnostics, and (video) projection in e.g. smartphones. Innoluce strongly believes their technology will enable new applications, which will improve the quality of life. Using its unique technology, Innoluce acts as a development partner and provides a well established supply chain.

Innoluce BV

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Website: www.innoluce.com

Level	Developer Manufacturer
Products	Optical components
Markets	Industrial manufacturing Health & Wellness Automotive applications
Competences	Optical components Fabrication technologies



Inventech Benelux BV

Inventech Benelux BV is a well-known distributor company for highly advanced process and laboratory equipment. We closely work together with an established group of principals, including Teledyne, Thermo Scientific, ASD and LaserComp. In the countries of the Benelux we offer complete analytical solutions, technical support and after-sales. The portfolio includes: online gas en liquid analysers, oxygen analysers, densitymeters, tunable diode lasers, viscositymeters, environmental dust monitors, particle size and shape analysers (online & lab), Vis/NIR spectrometers (portable & lab), in line food analyzers, moisture and density sensors (online & lab), thermal conductivity meters. Our technicians of the technical service department perform start-up & commissioning installations, maintenance and repair (on-site).

Inventech Benelux BV

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Level	Distributor
Products	Spectroscopy Fiber optics & communication Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Photonic devices Test & Measurement technology Optical systems





Janssen Precision Engineering B.V.

Janssen Precision Engineering, or JPE in short, stands for concept design and realization of high-tech mechatronic and optomechanic equipment and instruments. Unique expertise concerns: accurate positioning in vacuum and cryogenic environment. With our multidisciplinary educated team, our design skills cover the fields of system architecture, mechanics, electronics, control and operation software. From system level down to component level, from definition and design to prototyping. By following a systematic approach with high involvement, quality and efficiency are guaranteed.

Janssen Precision Engineering B.V.

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Level	Application developer
Products	Positioning equipment
Markets	Environment & Energy (& Space) Semiconductors (Photonics) Research & education
Competences	Test & Measurement technology Optical systems



Kipp & Zonen

Kipp & Zonen is the leading specialist in the measurement of solar radiation. We offer a range of instruments for the measurement of global, diffuse and direct radiation. From the entry level SP Lite2 pyranometer to the world-class CMP 22, we offer a solution for every requirement. Kipp & Zonen has been designing and manufacturing solar radiation measurement equipment for over 75 years and supplies leading meteorology and climatology organisations, research institutes and energy companies around the globe. Our experience, and continuous process of development and improvement, has resulted in some of the best instruments available for the measurement of solar radiation. We have a world-wide reputation for quality, reliability and expertise.

Kipp & Zonen

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2628 XH Delft
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Level	Manufacturer
Products	Other
Markets	Biotechnology, Pharma & Agroculture Environment & Energy (& Space) Research & education
Competences	Test & Measurement technology Optical components





Konica Minolta Sensing Europe BV

Konica Minolta Sensing Konica Minolta Sensing Inc., part of Konica Minolta Holdings Inc. Japan is a leading provider in Radiometric Instruments for Color, Light and 3D shape, with a heritage of more than 30 years and a global sales and support network. For the field of Light- and Display measurement, we offer products serving many industries and applications for R&D as well as quality control. From handheld Illuminance-Meters, Luminance-Meters and Colorimeters to high-end Spectroradiometers and sophisticated 3D Display measuring solutions. To maintain highest levels of accuracy and reliability, Konica Minolta Sensing offers calibration, maintenance and technical services from its central Service Centre in Germany.

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 Website: www.konicaminolta.eu



Level	Manufacturer
Products	Spectroscopy Optical components Detectors, Cameras & Imaging
Markets	Health & Wellness Lighting Automotive applications
Competences	Lighting Test & Measurement technology Other



K-Vision bv

Supplier of professional digital cameras, image analysis systems and products for electron microscopy Specializing in microscopy and macroscopy applications. Also supplier for electron microscopy related preparation and analysis equipment

K-Vision bv
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Level	Distributor
Products	Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Optical components

Laboratorium voor Lichttechnologie

The Light and Lighting Laboratory located Gent (Belgium) provides Education, Research and Consultancy in the following fields:

- Interior Lighting
- Optical Design
- Visual Appearance of materials

Our metrology capabilities include

- Spectral measurements of radiance, irradiance and radiant power
- LED measurements: electrical, optical and thermal
- Near Field goniophotometry, including ray-file generation
- Scatter properties of materials (spectral measurement of the BSDF)

Our industrial network consists of more than 50 Flemish companies

Laboratorium voor Lichttechnologie, KaHo Sint-Lieven

Technologie campus
Gebroeders Desmetstraat
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Level	Researcher Consultant Educator
Products	Other
Markets	Lighting (Photonics) Research & education Other
Competences	Photonic devices Test & Measurement technology Optical systems

Laguski (trademark Lumigrip)

As manufacturer Laguski has developed the label Lumigrip, under which the company develops and produces stainless steel handrail and balustrade systems with integrated LED solutions. The Lumigrip design products are tailor made for the private and the public sector, enhancing safety on stairs and sustainability with its low energy usage.

Laguski (trademark Lumigrip)

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Email: info@lumigrip.nl
Website: www.lumigrip.nl

Level	Application developer
Products	LEDs and OLEDs Other
Markets	Health & Wellness Lighting Safety & Security (& Defense)
Competences	Other





Lambert Instruments BV

Lambert Instruments is an SME that specializes in intensified CCD/CMOS camera systems, as well as image intensifiers as attachment for several camera systems. Activities include development, production, assembly and sales, serving a global market. There are two main product lines. The FLIM (fluorescence lifetime imaging) line includes the use of modulated intensified cameras in a complete system with light source and software package. These systems are used as attachment to widefield fluorescence microscopes in fundamental biological research and by pharmaceutical companies. As a second product line Lambert Instruments exploits its vast knowledge of fiber optics and image intensifiers for intensified high speed imaging, nanosecond gating and a wide range of customized fiber optically coupled CCD/CMOS cameras including area, line scan and cooled cameras.

Lambert Instruments BV

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9301 ZP Roden
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Level	Developer Manufacturer Application developer
Products	Lasers & Light sources Spectroscopy Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Photonic devices Test & Measurement technology Optical systems



LAPROCON

LAPROCON is a laser technology, engineering and consultancy firm and is the leading laser safety authority in The Netherlands and Belgium.

LAPROCON Laser Technology 'Design for laser manufacturability':

- Technical-economic feasibility studies
- Products, processes, machines and equipment
- Laser application lab: welding, cutting, engraving/marking, drilling
- Job-shop, prototyping, small series production

LAPROCON Laser Safety LAPROCON is the largest supplier of laser safety solutions, services and products in the Benelux to create laser safe work conditions. In relation to laser safety LAPROCON classifies laser products, machines and equipment according to the international laser safety standards. LAPROCON submits FDA laser

products reports with respect to USA federal law. LAPROCON executes laser hazard and risk assessments in connection with European Health and Safety directives and gives advice regarding laser safety precautions: engineering controls, administrative procedures and personal protective equipment.

LAPROCON

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Website: www.laprocon.nl/
www.lasersafety.nl

Level	Developer Consultant Educator
Products	Lasers & Light sources Optical components Detectors, Cameras & Imaging
Markets	Industrial manufacturing Safety & Security (& Defense) (Photonics) Research & education
Competences	Test & Measurement technology Optical components Fabrication technologies





Laser 2000 Benelux

Laser 2000, distributor for light, laser and positioning products offers the latest available technologies. If you are interested in optical instruments, components, light sources, lasers or laser safety; don't look any further. Laser 2000 represents 50 of the most innovative suppliers in this field. Please feel free to contact us with any question you may have. Contact one of our team members on 0297-266 191, or send an email to info@laser2000.nl.

Laser 2000 Benelux

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3645 GV Vinkeveen
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Phone: 0297-266 191
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Website: www.laser2000.nl

Level	Distributor Consultant
Products	Lasers & Light sources Detectors, Cameras & Imaging Positioning equipment
Markets	Industrial manufacturing Lighting (Photonics) Research & education
Competences	Lighting Optical components Optical systems



LEMO Connectors Benelux

LEMO Connectors Benelux

- High quality connectors
- Standard and complex cable assemblies
- Founder of the Push-Pull mechanism
- Design experience for more than 6 six decades
- Special and standard connector solutions
- Electrical, Fibre, Fluidic, Coax, Triax
- Up to 106 contacts
- Stock deliveries and special agreements

If we don't have it we make it!

LEMO Connectors Benelux

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Website: www.lemo.nl

Level	Manufacturer
Products	Fiber optics & communication Other
Markets	Industrial manufacturing Automotive applications (Photonics) Research & education
Competences	Optical components Optical communication Other



Lencon Ingenieursbureau

Lencon provides high-quality knowledge and capacity in mechanical engineering. Core competencies are the development and optimisation of complex products and systems. Lencon's expertise includes precision and optomechanical design for defence, semiconductor and medical systems. For many SME businesses, Lencon is the obvious partner for new product development and engineering. Intensive collaboration with our manufacturing partners also enables us to optimize existing products to reduce production costs and increase reliability. Lencon is also a matchmaker between our customers and our manufacturing partners. For larger companies and scientific institutes, Lencon is a flexible engineering supplier. Lencon distinguishes itself by offering high-quality engineering both at the client's location and in-house, adding both capacity and knowledge to a development department.

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Level	Researcher Developer
Products	
Markets	Health & Wellness Safety & Security (& Defense) Semiconductors
Competences	Optical components Optical systems Fabrication technologies

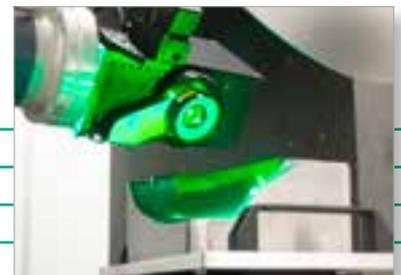


Lightmotif

Lightmotif develops production solutions for micromachining based on the use of ultrashort pulsed lasers. These lasers enable more accurate processes for cutting, drilling, milling and structuring on the microscale. By using extremely short light pulses the material removal process is very gentle and no heat or other detrimental effects are generated in the surrounding material. Lightmotif is an expert in development of processes and machines for this new micromachining technology. The company sells semi-custom micromachining equipment combined with the best processes in the field. Lightmotif supports its customers from feasibility study up to the implementation of the final process in production.

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Email: info@lightmotif.nl
Website: www.lightmotif.nl

Level	Developer Manufacturer
Products	Other
Markets	Industrial manufacturing Health & Wellness Semiconductors
Competences	Fabrication technologies





LioniX BV

LioniX is a leading co-developer, manufacturer and provider of products and components based on cutting-edge micro/nano technology for its original equipment manufacturer (OEM) customers. LioniX provides design to manufacturing and 'horizontal integration' by partnering with foundries, suppliers of complementary technologies and R&D institutes. The company specializes in applications of integrated optics, microfluidics and optofluidics including surface functionalization. LioniX offers small volume manufacturing, second sourcing as well as transfer to medium and high volume manufacturing. The integrated optics technology of LioniX (TriPleX™) allows for medium and high index-contrast waveguides with low channel attenuation in a wavelength range from 405nm to 2.35µm. The high index-contrast and broad wavelength range make the technology extremely suitable for a variety of applications ranging from telecom to sensing.

LioniX BV

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Level	Researcher Developer Manufacturer
Products	Spectroscopy Fiber optics & communication Optical materials & Coatings
Markets	Biotechnology, Pharma & Agroculture Environment & Energy (& Space) Health & Wellness
Competences	Photonic devices Optical systems Fabrication technologies



Luminostix b.v.

Luminostix commercialises Differential Pathlength Spectroscopy (DPS), a patented optical technology for quantitative measurements in optically diffuse media. Currently the main focus of Luminostix is the field of non invasive diagnosis of superficial cancer. Currently, Luminostix is developing its first medical product. CE-certification and market introduction are expected at the end of 2013. Founded in 2006, Luminostix is a spin-off company from the Center for Optical Diagnosis and Therapy at the Erasmus Medical Center in Rotterdam.

Luminostix b.v.

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Website: www.luminostix.com

Level	Manufacturer Application developer Consultant
Products	Other
Markets	Health & Wellness
Competences	Photonic devices Other





LUXeXcel Group B.V.

LUXeXcel Group develops, manufactures and markets optical solutions for the global LED lighting industry.

Printoptical Technology, invented by LUXeXcel, is a novel and patented digital printing, optical and lighting technology and a fundamental innovation in the Additive Manufacturing of optics. LUXeXcel leads the "digitization of optics", and offers OEM lighting manufacturers and Optics Engineers significant cost reductions, time savings and affordable solutions through adopting their one step "CAD-to-Optic" process.

The company was recently honored by the Frost & Sullivan "Enabling Technology Innovation Award for Advanced LED Lighting Optics".

Printoptical Technology is seen as an Emerging Technology for the 3D Printing / Additive Manufacturing Industry.

LUXeXcel, headquartered in Goes, the Netherlands, was founded in 2009 and offers manufacturing as a service.

LUXeXcel Group B.V.

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The Netherlands

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Website: www.luxexcel.com

Level	Researcher Developer Manufacturer
Products	Optical components
Markets	Lighting Automotive applications
Competences	Lighting Optical components Optical systems



MACH8 Lasers BV

MACH8 Lasers is commercializing a proprietary breakthrough in opto-electronics for a new generation of high-performance tunable diode lasers.

MACH8 Lasers BV

Weidehek 8C

4824 AS Breda

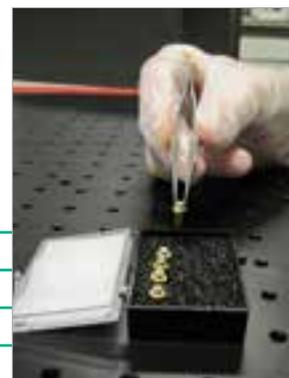
Contact: Michael Engelmann

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Email: info@mach8lasers.com

Website: www.mach8lasers.com

Level	Researcher Developer
Products	Lasers & Light sources Fiber optics & communication
Markets	ICT Environment & Energy (& Space) Safety & Security (& Defense)
Competences	Photonic devices Optical components Optical communication





Mera Benelux BV

Mera Benelux is importer/wholesaler/technical specialist of measuring instruments for all kinds of industries, laboratories and universities. We have specialists in Infrared thermometers, thermo graphic camera's, thermo graphic ink, digital measuring instruments, industrial endoscopes and data loggers for temperature, relative humidity, light, CO₂ etc. We are master distributor in the Benelux for Heitronics – Systems and solutions for non-contact temperature measurement in the range from – 100°C to 3000°C. We are established in 1976 and situated in Technical Center 'De Hunekamp' in Loenen (Gelderland).

Mera Benelux BV

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Level	Researcher Distributor Consultant
Products	Detectors, Cameras & Imaging Optical materials & Coatings Other
Markets	Biotechnology, Pharma & Agroculture Environment & Energy (& Space) Industrial manufacturing
Competences	Packaging Test & Measurement technology Optical components



Mesu-Optics

Mesu-Optics offers a comprehensive design and development service for mechanical and optical components and subassemblies. Mesu-Optics has the engineering skills to solve complex problems related to fine mechanical and optical components and systems. Whenever possible, solutions are proposed that save time and money. Furthermore Mesu-Optics can build first prototypes, both mechanical and optical, based upon the design and development done for you. Mesu-Optics can offer you also SEM research upon a resolution until 8 nanometer.

Mesu-Optics

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Level	Researcher Manufacturer Application developer
Products	Optical components Detectors, Cameras & Imaging Positioning equipment
Markets	Industrial manufacturing (Photonics) Research & education Other
Competences	Materials development Test & Measurement technology Fabrication technologies





Micro Lasersystems BV

Micro Lasersystems is a system supplier for multiple applications with both standard as well as customized machines for marking / engraving, cutting, welding and drilling. Besides that Micro Lasersystems is also the address for laser components and safety equipment, with service capability on existing lasers & systems.

Micro Lasersystems BV

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Level	Manufacturer Distributor
Products	Lasers & Light sources Spectroscopy Optical components
Markets	Industrial manufacturing Safety & Security (& Defense) Semiconductors
Competences	Other



Mikrocentrum

As an independent knowledge institute, Mikrocentrum has been supporting companies and other organisations in improving knowledge levels, skills and technical business networking since 1968. We achieve this by organising trade fairs, conferences, lecture days and trainings. In addition Mikrocentrum facilitates the Mikrocentrum High Tech Platform consisting of 500 companies which are presented in a High Tech Company Guide and for which special business networking events are being organized. Mikrocentrum offers 200 practical and theoretical trainings on technical and managerial subjects, aimed at all levels of education. These trainings, both in open enrollment as well as in tailor made in-company format, are held at different locations in the Netherlands and Belgium or if desired at your own location. Amongst others we offer various trainings in the fields of (applied) optics, lasers and high power LEDs.

Mikrocentrum

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Level	Educator
Products	Other
Markets	Industrial manufacturing Health & Wellness Semiconductors
Competences	Optical components Fabrication technologies Other



MILabs

MILabs provides high-end pre-clinical molecular imaging solutions (SPECT/PET/CT) for biomedical and pharmaceutical research. Today these systems contribute worldwide to the development of new diagnostic solutions and therapies for diseases such as cancer, cardiac and neurodegenerative diseases, depression and diabetes. U-SPECT/CT provides the fastest, most sensitive and highest resolution small-animal SPECT currently available. Recently MILabs introduced VECTor and VECTor/CT providing extremely user friendly, fully integrated and simultaneous ultra-high resolution SPECT/PET.

MILabs

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Level	Researcher Developer Manufacturer
Products	Detectors, Cameras & Imaging Other
Markets	Biotechnology, Pharma & Agroculture (Photonics) Research & education Other
Competences	Photonic devices Test & Measurement technology Other



Miyachi Europe

Miyachi Europe is the market leader in developing, building and servicing machines and components for laser welding, laser marking, resistance welding, hot bar soldering and systems. Miyachi solutions are an integral part of the production process to connect, to join, to automate, to identify or to customise components in a very reliable and very sustainable fashion. Miyachi products are in use in a variety of modern high-tech application fields. These application fields are our areas of expertise to the benefit of our customers' and our vendors future growth in Automotive, IT & Multimedia, Electronics/Solar Cells/Batteries, Medical, Aerospace, and Defence.

Miyachi Europe

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Level	Researcher Developer Manufacturer
Products	Lasers & Light sources
Markets	Environment & Energy (& Space) Industrial manufacturing Safety & Security (& Defense)
Competences	Materials development Other

Molenaar Optics VOF

Molenaar Optics offers innovative support for applications using optical- and opto-mechanical components. For system designs, but standard and custom-made parts are available. Optical components range from simple lenses, mirrors and prisms to complex multi-element laser objectives for material processing or telecentric camera lenses for vision systems. Opto-mechanical components comprise holders for optics as well as manual and motorized positioning systems. Molenaar Optics is further advising and delivering optical measuring instruments, from simple microscopes and modular microscope components to digitally controllable profile projectors and video inspection equipment.

Molenaar Optics VOF

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 Phone: 030-6951038
 Email: info@molenaar-optics.nl
 Website: www.molenaar-optics.eu



Level	Developer Distributor Consultant
Products	Optical components Optical materials & Coatings Positioning equipment
Markets	Environment & Energy (& Space) Industrial manufacturing Research & education
Competences	Test & Measurement technology Optical components Optical systems

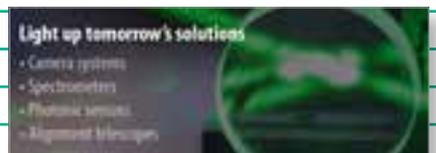
Nedinsco

Nedinsco supports customers in the field of advanced optical sensing solutions within the medical, analytical, science and food markets. We develop and produce customised optical sensing applications within categories such as camera systems, spectrometers, photonic sensors and alignment telescopes, with many years of experience in the field of opto-mechatronics. Our goal is to supply our customers with qualified serial products and to be able to manage the complete lifecycle of the product, starting with a basic customer idea up to the service and after sales. We are continuously looking to optimise the price-performance ratio to enable our end customers to be successful in their markets.

Nedinsco

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Level	Developer Manufacturer Application developer
Products	Spectroscopy Detectors, Cameras & Imaging Positioning equipment
Markets	Biotechnology, Pharma & Agroculture Health & Wellness Safety & Security (& Defense)
Competences	Photonic devices Analysis of devices Optical systems





Neways Micro Electronics

Company and History Neways Micro Electronics (NME) B.V. has been founded in 1981. Since January 1998 it is part of the Neways International Holding and is an important player in Micro Electronics. Over the last 30 years, NME has built up an international reputation as a reliable, high tech manufacturing company with specific and comprehensive micro-electronics technology. The development, prototyping and (low) volume production is located in Sittard (the Netherlands) and volume production in Wuxi (China, own company). Know How and Mission Design, development, assembly and testing of hybrid circuits & micro-electronics based on ceramic thick film or printed circuit boards (both rigid and flexible). Own cleanroom facilities for flip-chip, wafer dicing, fine placement, die and wire bonding. NME is increasingly developing photonic and integrated optical capabilities

Neways Micro Electronics

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Level	Developer Manufacturer Application developer
Products	Detectors, Cameras & Imaging Other
Markets	Lighting Automotive applications Semiconductors
Competences	Packaging Test & Measurement technology Fabrication technologies



Newport Spectra-Physics BV

Newport Corporation is a leading global supplier of advanced technology products and solutions for Scientific Research, Life & Health Science, Aerospace & Defense, Photovoltaics, Industrial Manufacturing, Semiconductors, and Microelectronics markets. Established in 1969, Newport has over 40 years of industry knowledge and expertise across a broad range of technologies allowing the company to continually deliver innovative products in the areas lasers, photonics instrumentation, sub-micron positioning systems, vibration isolation, optical components and subsystems and precision automation to enhance the capabilities and productivity of its customers' manufacturing, engineering and research applications. In addition, Newport has built a strong history of partnering with OEM customers delivering solutions from sub assemblies to full solutions including design, testing and manufacturing.

Newport Spectra-Physics BV

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Level	Manufacturer
Products	Lasers & Light sources Optical components Positioning equipment
Markets	Industrial manufacturing Semiconductors (Photonics) Research & education
Competences	Photonic devices Optical components Optical systems



Next Scan Technology B.V.

Next Scan Technology enables reliable throughput in advanced laser material processing by the introduction of polygon scanning systems. With the advent of ultra-short pulsed lasers and their improving rep rates the polygon scanner is a natural fit for high density patterning & drilling, decoating, laser direct writing, (hexagonal) dicing, complex 3D printing and many other micromachining applications.

Next Scan Technology B.V.

Company Address:
 Ulftseweg 14
 7064 BD Silvolde
 Visiting Address:
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 9940 Evergem (Belgie)
 Contact: Lars Penning
 Phone: +31 844 211717
 Email: lars@nextscantechnology.com
 Website: www.nextscantechnology.com



Level	Developer Manufacturer Application developer
Products	Other
Markets	Industrial manufacturing Safety & Security (& Defense) Automotive applications
Competences	Fabrication technologies



NHL Kenniscentrum Computer Vision

In cooperation with your company the NHL Centre of Expertise in Computer Vision (CEVC) will carry out research projects. These projects start with a feasibility study or advice. With possible financial contributions from existing grants this initial stage will follow by a test setup to a 'proof of concept'. Since 1996, the NHL CEVC has successfully initiated and completed more than 160 projects for different companies and institutions. The strength of the NHL CEVC lies in the knowledge of, and the equipment necessary for, the complete chain of:

- Lighting;
- Cameras;
- Optics;
- Set-up;
- Image processing algorithms.

As well as providing an introduction course to Computer Vision we offer to analyse the technical feasibility of the implementation of Computer Vision for your company.

NHL Kenniscentrum Computer Vision

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 Website: <http://www.nhl.nl/computervision>



Level	Application developer Consultant Educator
Products	Other
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Lighting Photonic devices Optical systems



Notavis Netherlands

Notavis develops customer-specific projects. Notavis is a supplier of custom-tailored sensor solutions for industrial image processing. The company provides intelligent cameras, lenses, lighting, software and, if required, specially developed enclosures. These complete packages are designed for one or several specific inspection tasks, e.g. completeness checks, thereby minimizing in-house development effort for users. Unlike system integrators who implement projects for individual applications, Notavis develops suitable cross-sector solutions for series applications. Notavis' clients are mainly OEMs, for instance in the semiconductor industry. Notavis Netherlands is head of the Software & Solutions division. Vision Components GmbH is supplier from Notavis of intelligent cameras and basic software, while Notavis provides the next step, i.e. a complete product for series development. This approach allows us to take our customer service to a new level."

Notavis Netherlands

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Level	Other
Products	Optical components Detectors, Cameras & Imaging
Markets	Industrial manufacturing Other
Competences	Other



NTS Optel, NTS Systems Development BV

NTS Optel, NTS Systems development is your one-stop-shop partner if you are looking for skilled and smart partner that develops, engineers and produces (sub)systems for high-tech precision technology applications based on opto-electronics and opto-mechatronics. NTS Optel is a part of the division NTS Systems Development BV at the NTS Group. The NTS-group is a system supplier in the high-tech industry, specialized in the development, production and optimization of opto-mechatronic systems and mechanical modules

NTS Optel, NTS Systems Development BV

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Level	Developer Manufacturer Application developer
Products	Spectroscopy Detectors, Cameras & Imaging Positioning equipment
Markets	Industrial manufacturing Health & Wellness Semiconductors
Competences	Photonic devices Test & Measurement technology Optical systems





Ocean Optics BV

Ocean Optics is the leading manufacturer of miniature fibre optics spectrometers supporting a wide range of applications in amongst others medical and biological research, environmental monitoring, life science, science education and process and quality control. Our extensive line of complementary technologies includes spectrometers, optical sensors, metrology instrumentation, light sources, sampling accessories, fibres and probes. Our customers range from research scientist to original equipment manufacturers (OEMs) and industrial customers. With almost 200,000 spectrometers in the field and our wide range of products and capabilities, we have the knowledge and portfolio to serve as your ideal partner in photonics.

Ocean Optics BV

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Level	Manufacturer Distributor Educator
Products	Lasers & Light sources Spectroscopy Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Lighting (Photonics) Research & education
Competences	Photonic devices Analysis of devices Test & Measurement technology



OGS Systems B.V.

OGS Systems develops, manufacturers, and sells portable and stationary single- or multi-component gas-monitoring instruments based on optical techniques; laser-based, DOAS, or NDIR, UV to IR. Additional non-optical sensors like electrochemical cells (EC), PID's, or pellistors can be integrated. Furthermore we can help with advice, a second opinion, or consultancy in the field of optical gas monitoring/detection.

OGS Systems B.V.

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Level	Developer Manufacturer Application developer
Products	Lasers & Light sources Spectroscopy Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Health & Wellness Safety & Security (& Defense)
Competences	Test & Measurement technology Optical systems Other



OMT Solutions BV

We are an R&D led technology company providing inovative solutions for optical measurement and testing problems and an extensive package of testing services and consultancy for the Optical industry Glass and coating industry Solar energy industry Universities and R&D institutes Our mission is to support the Industry and Scientific Community with world class innovative solutions for optical measurement and testing problems and new optical materials.

OMT Solutions BV

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Level	Researcher Developer Manufacturer
Products	Spectroscopy Optical materials & Coatings Other
Markets	Environment & Energy (& Space) Industrial manufacturing Research & education
Competences	Materials development Test & Measurement technology Optical systems



Optics11

Optics11 is developing nano-indentation products, systems combining AFM and optical scanning as well as industrial sensors, all based on our fiber-top and ferrule-top technology to market. Over the last few months, we realized that our technology offers an unprecedented opportunity in the field of nanotechnology and material analysis. Thanks to its unique properties, ferrule-top cantilevers can be used to develop an instrument that can simultaneously assess the mechanical properties of a specific point of a sample and look at an optical signal (fluorescence or Raman) generated in that very same point. We can also help with engineering new optical devices and sensors.

Optics11

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1081 HV Amsterdam

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Level	Developer Manufacturer Application developer
Products	Optical components Detectors, Cameras & Imaging Positioning equipment
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Health & Wellness
Competences	Test & Measurement technology Optical systems Fabrication technologies



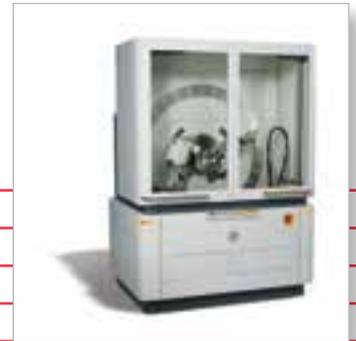


PANalytical B.V.

PANalytical is the world's leading supplier of analytical instrumentation and software for X-ray diffraction (XRD) and X-ray fluorescence spectrometry (XRF), with more than half a century of experience. With the acquisition of ASD, PANalytical has added near-infrared analysis capabilities to its portfolio. The materials characterization equipment is used for scientific research and development, for industrial process control applications and for semiconductor metrology. A sales and service network in more than 60 countries ensures unrivalled levels of customer support. The company is certified in accordance with ISO9001-2008 and ISO 14001.

PANalytical B.V.

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Level	Researcher Developer Manufacturer
Products	Spectroscopy Optical components Detectors, Cameras & Imaging
Markets	Environment & Energy (& Space) Industrial manufacturing (Photonics) Research & education
Competences	Photonic devices Test & Measurement technology Optical components



Perdix Analytical Systems BV

Perdix Analytical Systems BV is developing and producing in-situ particle viewers (ISPV). The ISPV is an advanced optical imaging system for particle analysis. Several probes are available, so we cover both R&D / laboratory, and production applications. Most of our clients are active in the pharmaceutical and chemical industry. This high-resolution, rugged system is compact and provides instant information on particle size, geometry, crystal inclusions, and surface properties. For image analysis, dedicated software is available. The ISPV offers new approaches of controlling production processes by in-line measurement of key particle properties. Sampling and off-line inspections, or indirect measurement of process parameters are no longer required. Perdix Analytical Systems is continuously working on product innovation and developing new applications.

Perdix Analytical Systems BV

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Level	Developer Manufacturer Application developer
Products	Detectors, Cameras & Imaging Other
Markets	Biotechnology, Pharma & Agroculture
Competences	Photonic devices Test & Measurement technology Optical systems



Philips Lighting B.V.

Facilities for glass development and small scale (high-tec) special glass production, in the range from several grams to some thousands pieces or kg's per year.

Philips Lighting B.V.

Department: Glass Special products
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Level	Other
Products	LEDs and OLEDs Fiber optics & communication Other
Markets	Environment & Energy (& Space) Safety & Security (& Defense) Automotive applications
Competences	Optical components Other

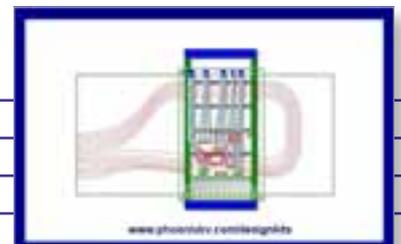


Phoenix Software

Phoenix Software is an independent high-tech company with offices in Dortmund (Germany) and Enschede (the Netherlands), which develops, sells and supports world-class software solutions for the Micro and Nano Technology marketplace. Founded in 2003 the company currently supports more than 120 companies and research institutes worldwide through its subsidiaries and network of sales representatives. Typical products include software for mask layout and process flow visualization, software for photonics simulations and the leading manufacturing execution system and technology knowledge base dedicated to the industry : the Living Database.

Phoenix Software

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Level	Consultant Other
Products	Fiber optics & communication Other
Markets	Semiconductors (Photonics) Research & education Other
Competences	Optical components Optical communication Other

Photonics Investments bv

Photonics Investments (PI) invests in start up level photonics companies and actively supports management of the companies it invests in until they become self sustaining. PI's prime markets are Europe and the U.S. PI is actively involved in mergers and acquisitions of photonics companies and has brokered over 50 transactions varying in size between \$5 million and \$100 million.

Photonics Investments bv

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Email: jmelles@photonicsinvestments.com
Website: www.photonicsinvestments.com

Level	Consultant
Products	Other
Markets	Industrial manufacturing Safety & Security (& Defense) (Photonics) Research & education
Competences	Test & Measurement technology Optical components Optical systems

PHOTONIS

PHOTONIS Netherlands B.V.

PHOTONIS is a market leader focusing on the design and manufacture of innovative photon, ion and electron sensor technologies for the Industry, Science and Night Vision markets. PHOTONIS products include Image Intensifier Tubes compatible with a broad range of applications. The company also manufactures a wide range of Mass Spectrometry products, including Channeltron® and MAGNUM® Channel Electron Multipliers, TOF-MS, Glass Capillary Arrays and Multi-Channel Plates. PHOTONIS also makes MicroWell Targets; Detectors for RGA, FIB, and SEM applications; Electron Generator Arrays; Power, IMS Drift and Streak Tubes; FieldMaster™ LC-MS Inlet Tubes, Image Intensifier Tubes, Neutron and Gamma Detectors, Hybrid Photo Detectors, Ion Guides, Reflectron Lenses, Glass Coated Wires, and HV Power Supplies.

PHOTONIS Netherlands B.V.

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Level	Researcher Developer Manufacturer
Products	Optical components Detectors, Cameras & Imaging Optical materials & Coatings
Markets	Environment & Energy (& Space) Health & Wellness Safety & Security (& Defense)
Competences	Optical components Optical systems





Picusled

PicusLED: We are an engineering office in the field of LED applications and we boast an experience of 10 years. Applying LEDs is a challenge to redefine the areas of light output, thermal household, color and power consumption. Innovation is the key to become and remain competitive. We design complete lighting fixtures with appropriate specifications. This includes LEDs, board, thermal, optical and mechanical issues. The production of small series can be included. PicusLED helps you to shorten the 'time to market' within the development process. We advise you and set to work as a professional engineer or as a technical manager. PicusLED supports those companies that have a strong desire for innovation in the field of illumination.

Picusled

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Level	Application developer
Products	LEDs and OLEDs
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Lighting
Competences	Lighting Optical components Optical systems



Progress Control

Multispectral Imaging is the key word of the solutions created by Progress Control. This has applications in designing and constructing instruments for product control and research; control in agro, waste, and minerals; and aerial and space instruments. Both in-line or batch solutions can be designed and constructed.

Progress Control

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Level	Manufacturer Application developer Distributor
Products	Lasers & Light sources Spectroscopy Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Health & Wellness
Competences	Test & Measurement technology Optical systems Fabrication technologies



Quest Innovations

Quest-Innovations develops and manufactures high quality multi-spectral cameras and dedicated software for advanced imaging applications.

The main markets that Quest focuses on are:

- Medical camera systems able to see tumors, creating more effective surgical tools for cancer surgery.
- Agricultural cameras to improve crop yields.
- Machine vision cameras help to improve customer businesses in numerous ways such print quality inspection, higher level of automation by adding vision or selection of foods.
- UAV; multi spectral cameras are used more and more in combination with unmanned aerial vehicles for purposes such as early fire detection, pipeline inspection, pollution and security.

Quest-Innovations delivers standard and customized solutions for any application making the invisible, visible from the ultra violet to the far infrared range.

Quest Innovations

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Level	Developer Manufacturer Application developer
Products	Lasers & Light sources Detectors, Cameras & Imaging
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Safety & Security (& Defense)
Competences	Lighting Optical systems



Reliance Precision Limited

Reliance Precision is an independent, UK-based engineering and manufacturing company. We specialise in the design, manufacture and test of high performance motion control systems, gears and geared systems, opto- and electro-mechanical and high-vacuum sub-systems. We provide design, development, validation testing, prototyping and production services, with unique facilities in design analysis and verification. Reliance is Supply Chain SC21 silver accredited, and has supplied the major OEMs and prime contractors in many different industries for over 40 years. The product range includes positioning stages, precision gears, precision ground racks and pinions, flexible shaft couplings, leadscrew assemblies, actuators and motors with integrated controllers. Typical industries served include scientific instrument, semicon, medical, laboratory automation, printing and scanning, photonics, aerospace and defence and process automation.

Reliance Precision Limited

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Level	Researcher Manufacturer Application developer
Products	Positioning equipment Other
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Health & Wellness
Competences	Test & Measurement technology Optical systems Fabrication technologies





RiverD International B.V.

RiverD International B.V. develops dedicated solutions for unmet diagnostics needs based on Raman spectroscopic analysis of cells or tissues. Its products comprise an in vivo skin analyzer, a.o. in use by almost all leading personal care companies, and the SpectraCell RA Bacterial Strain Analyzer for rapid analysis and prevention of hospital outbreaks. RiverD also develops and produces Raman-technology with and for third parties (OEM).

RiverD International B.V.

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Level	Developer Manufacturer Application developer
Products	Spectroscopy
Markets	Biotechnology, Pharma & Agroculture Health & Wellness (Photonics) Research & education
Competences	Photonic devices Optical components



ROFIN-BAASEL BENELUX

Rofin-Baasel Benelux B.V.

With more than 35 years of experience in laser technology, ROFIN has successfully focused its strategy on being an innovative leader in the industrial laser market and has consistently demonstrated its determination to deliver the most powerful and innovative manufacturing tools to a wide range of industries.

Rofin-Baasel Benelux B.V.

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Level	Manufacturer
Products	Lasers & Light sources
Markets	Industrial manufacturing Automotive applications Semiconductors
Competences	Fabrication technologies



SATRAX B.V.

SATRAX aims to become a global leader in providing integrated optical beamforming networks for microwave photonics systems using the benefits of TriPlex™ to satisfy the growing need for bandwidth and capacity in telecommunication. SATRAX proprietary beamforming technology is based on integrated optics and replaces the electronic-based technology for the key element of phased array antenna's. SATRAX has the opportunity to provide photonics based modules to OEM's in a suite of applications, including broadband integrated optical beamforming modules for flat tunable directional antennas, in particular the popular Ku- and emerging Ka-band. SATRAX also addresses the market of components for optical-fiber infrastructure which enable high dynamic range photonic links with higher bandwidth, combined with lower energy consumption, smaller size and lower weight.

SATRAX B.V.

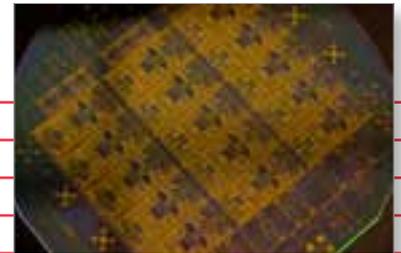
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Level	Developer Manufacturer Application developer
Products	Fiber optics & communication Optical components
Markets	ICT (Photonics) Research & education
Competences	Photonic devices Optical systems Optical communication



Sensor Sense B.V.

Sensor Sense B.V. is offering laser-based systems for on-line gas measurements in the ppbv down to pptv range. The company is using its own research expertise to develop extremely sensitive and selective laser-based trace gas analyzers. Several detection techniques, such as photoacoustic spectroscopy and cavity enhanced absorption spectroscopy are combined with compact laser sources. This results into robust and user friendly products that allow real-time and on-line measurements of trace gases at unprecedented detection limits within seconds time scale.

Sensor Sense B.V.

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Website: www.sensor-sense.nl



Level	Application developer
Products	Spectroscopy Other
Markets	Biotechnology, Pharma & Agroculture Environment & Energy (& Space) Automotive applications
Competences	Other



Sentix Stralingszorg

Sentix Stralingszorg is a consulting firm that advises in the field of laser safety and health physics. Our services include advice in the field of general laser safety, laser safety management and conducting risk assessments on laser applications. Sentix also conducts compliance assessment with respect to laser safety standards as part of CE-marking trajects and provides accredited laser safety training programmes at the level of laser worker and Laser Safety Officer.

Sentix Stralingszorg

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Level	Consultant Educator
Products	Other
Markets	Industrial manufacturing Health & Wellness (Photonics) Research & education
Competences	Analysis of devices Test & Measurement technology Other



SMART Photonics B.V.

SMARTPhotonics is a pure-play foundry for III-V Photonics components. we offer independent development, engineering, and production services according to the design of our customers. The SMART Photonics team has a long history in InP processing. Examples of products developed for customers include: EML, (high power) DFB lasers, integrated transmitters and receivers for FTTH. Our key competences are the knowledge and experience in Epitaxial growth and processing of Indium Phosphide (InP) products. Our uniqueness lies in the fact that we combine pure-play foundry approach (we do not develop or sell our own products), a dedicated photonics cleanroom for InP semiconductors, an experienced engineering team, and a generic process in which customers can design based on functional building blocks, rather than technological steps. The latter method is common in electronics, but new for the photonics industry.

SMART Photonics B.V.

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Level	Researcher Developer Manufacturer
Products	Lasers & Light sources Photonic materials
Markets	ICT Safety & Security (& Defense) (Photonics) Research & education
Competences	Materials development Photonic devices Fabrication technologies





Sumipro submicron lathing BV

Sumipro is your innovative partner in the development of optical components and systems. For a wide variety of applications Sumipro manufactures custom made optical lenses, mirrors, inserts and precision tools made from polymers, silicon, germanium and non-ferro materials like aluminium, nickel, copper etc. You will find our lenses in space, in defense products for night vision, in moulds and in custom made products from all kind of industries and research programmes. Sumipro is fully equipped with up to date measurement devices, including a Wyco interferometer and a Talysurf surface inspection system. Sumipro is certified according to ISO 9001:2008.

Sumipro submicron lathing BV

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Level	Researcher Manufacturer Other
Products	Optical components Optical materials & Coatings Other
Markets	Environment & Energy (& Space) Industrial manufacturing Safety & Security (& Defense)
Competences	Optical components Optical systems Fabrication technologies



Te Lintelo Systems BV

TLS is the leading company in the field of applications in the scientific, medical and industrial areas as well as the light engineering sector with specialization the "LED metrology". In this field we represent prominent suppliers from all over the world for the Benelux countries with well-educated engineers with a long experience and knowledge. In cooperation with our suppliers Te Lintelo Systems BV designs and produces custom-made systems as well.

Te Lintelo Systems BV

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Level	Distributor
Products	Lasers & Light sources Spectroscopy Optical components
Markets	Industrial manufacturing Lighting (Photonics) Research & education
Competences	Photonic devices Test & Measurement technology Optical components

Technobis Fibre Technologies

Technobis Fibre Technologies (TFT-FOS) is part of the Technobis Group and is specialized in the development and supply of fibre optic sensing systems and applications, based on spectrometry and interferometry principles.

Key products are the high speed Deminsys interrogator and the high resolution Lady Bug interrogator for Fibre Bragg Grating sensors.

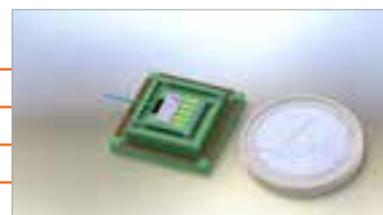
Our main activities are contract research, product development, application support and participation in (inter-)national funded development projects.

Our application activities primarily focus on sensing solutions in for instance Aerospace (low cost and high reliability SHM), Medical and Robotics (shape sensing and haptic control), Civil (analysis of load dynamics on pile-driving) and Automotive (crash tests and impact analysis).

Technobis Fibre Technologies

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Level	Developer Manufacturer Application developer
Products	Lasers & Light sources Spectroscopy Fiber optics & communication
Markets	Industrial manufacturing Safety & Security (& Defense) Automotive applications
Competences	Photonic devices Test & Measurement technology Optical systems



Teledyne DALSA B.V.

Teledyne DALSA Professional Imaging develops CMOS and CCD image sensors for high-end Photography, Photogrammetry and Biomedical applications; and integrated X-ray detector solutions for Medical, Dental and Scientific applications.

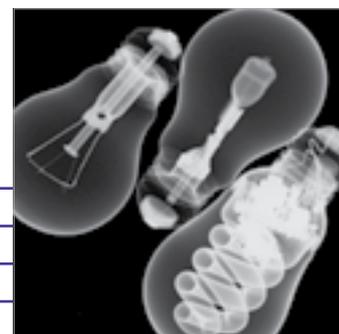
Our research focus is on development of CMOS and CCD image sensors. We also develop concepts, architecture and manufacturing processes for the most advanced X-ray medical detectors based on CMOS wafer-scale CMOS image sensors.

We have our own proprietary processes for precision assembly of integrated X-ray detectors Teledyne DALSA has many years of expertise on wafer-scale CCD and CMOS image sensors with low noise and high sensitivity. Our products are used worldwide by the industry leaders in the field of high -end Photography, Photogrammetry and Medical and Dental X-ray Imaging.

Teledyne DALSA B.V.

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Level	Researcher Developer Manufacturer
Products	Detectors, Cameras & Imaging
Markets	Industrial manufacturing Health & Wellness
Competences	Materials development Photonic devices Fabrication technologies





Test & Measurement Solutions

Test & Measurement Solutions is Your Concurrent Engineering Partner. Quality standards for products and production processes are so rigorous today that human precision is no longer sufficient to meet today's quality standards and expectations. Test & Measurement Solutions delivers technological solutions around the world for quality control of products and production processes on the one hand, and to optimise production and operational costs on the other. Every day, a highly motivated team of over 70 engineers and personnel works at locations in Belgium, the Netherlands and Poland on tailor-made inspection, testing, measurement and precision assembly systems for clients around the world. Our expertise in combination with Leading-edge technology results in Turnkey Solutions that keep businesses one-step ahead.

Test & Measurement Solutions

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Level	Manufacturer Application developer Other
Products	Spectroscopy Detectors, Cameras & Imaging Other
Markets	Industrial manufacturing Semiconductors (Photonics) Research & education
Competences	Test & Measurement technology Optical systems Fabrication technologies



Texim Europe BV

Texim Europe has rapidly become the reliable Technology and Supply Chain Solution Provider of choice for customers developing & producing Electronic Applications. The Technology Solutions division aims to provide maximum value for customers by offering optimal solutions for electronic applications from a carefully selected range of competitive, high technology suppliers. Texim Europe's team of experienced engineers specialises in the following Technology areas: Embedded Systems & Displays, Wireless Communication, Power Supply & Batteries, Passive & Timing Components, LED Illumination, and Connectivity & Switches. The Supply Chain Solutions division creates tailor made customer solutions, the aim being optimum management of the Cost-of-Ownership in the customers Value Chain. Texim Europe is part of TKH Group NV, a 1 Billion euro Dutch public company, with a strong position in the Telecom, Building and Industrial Solutions market segments.

Texim Europe BV

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Level	Distributor
Products	LEDs and OLEDs Optical components Other
Markets	Industrial manufacturing Lighting Safety & Security (& Defense)
Competences	Lighting Optical components Other

TNO

TNO is an independent innovation organisation. We connect people and knowledge to create innovation that sustainably boost the competitive strength of industry and the welfare of society. TNOs more than 4000 professionals work on practicable knowledge and solutions for global problems. As preferred technology partner, TNOs photonic sensing technologies and strong optical competences help innovate your sensing applications for space, semiconductor, medical, oil & gas and automotive.

TNO

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Level	Developer Application developer Consultant
Products	Spectroscopy Fiber optics & communication Optical components
Markets	Environment & Energy (& Space) Safety & Security (& Defense) Semiconductors
Competences	Photonic devices Test & Measurement technology Optical systems



Transfer BV

Since 1988, Transfer is well known in the BeNeLux for Electronic Design Automation (EDA) training, electronic design software and electronic design services. We deliver knowledge and tools, which enables our customers to control the complexity of the electronic design process. A lot of companies obtained and still obtain their electronic design tools and educational services for electronic design methodology from Transfer BV.

Education: Transfer offers since more than 20 years a wide educational and training programme in electronic design tooling and design technology.

Design services: Transfer offers her knowledge to our customers by services, primary related to System Design, including FPGA's and Embedded design as well as PCB design.

Transfer BV

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Level	Developer Other
Products	Positioning equipment Other
Markets	Industrial manufacturing Lighting Safety & Security (& Defense)
Competences	Lighting Test & Measurement technology Optical systems





Trotec Laser B.V.

Trotec offers laser engraving and cutting machines for treating different materials. Cut, engrave and mark wood, paper, metal, acrylic, leather, stone, plastics and many more. Our product range involves CO2 and fiber laser engravers, laser etchers and laser cutters with different power levels and marking area sizes. Choose from our flatbed laser plotters and galvo lasers the optimal solution for your application.

Trotec Laser B.V.

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Level	Manufacturer
Products	Lasers & Light sources
Markets	Health & Wellness Safety & Security (& Defense) Automotive applications
Competences	Other

TRUMPF



TRUMPF Nederland B.V.

The TRUMPF Group is one of the world leaders in the field of fabrication technology. The three business divisions (Machine Tools/Power Tools, Laser Technology and Electronics/Medical Technology) are combined in a holding. In the field of industrial lasers and laser systems, TRUMPF is the world market leader and technology leader. TRUMPF Laser Technology encompasses CO2-lasers, Solid-state lasers, marking lasers and laser systems. Whether cutting, welding, marking or forming - TRUMPF's wide spectrum of lasers and laser systems offers the customers an accurate solution. Customers from the TRUMPF laser technology business field mainly come from the automotive industry (and suppliers), electronics and precision engineering, mechanical engineering, tool and mold making as well as medical technology.

TRUMPF Nederland B.V.

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Level	Developer Manufacturer Application developer
Products	Lasers & Light sources Optical components Positioning equipment
Markets	Industrial manufacturing Automotive applications Semiconductors
Competences	Optical components Optical systems Fabrication technologies



Unitron Group B.V.

Unitron develops and manufactures complete products, such as electronic medical equipment and specific industrial products. This may involve the realization of a completely new concept, but also the modification and optimization of existing products. This, in combination with our experience and business strength, will result in a complete business concept. Unitron is active in several markets throughout the world. A great example of the projects Unitron has worked on is the building of the Differential Pathlength Spectroscopy DPS for Luminostix. The technology of the DPS is patented by the Erasmus Medical Center, and uses white light for measuring optical tissue properties. The system is based on absorption and reflection spectroscopy. The DPS has been tested successfully in the diagnosis of lung cancer, and soon this system will also be used within the Erasmus MC for research into breast cancer.

Unitron Group B.V.

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Level	Manufacturer Application developer
Products	Other
Markets	Biotechnology, Pharma & Agroculture Health & Wellness
Competences	Photonic devices



VADENO NEDERLAND

Optical and mechanical components, lasers, cameras, photodiodes, spectrometers and (handheld) Raman spectrometers. All brands which Vadeno represents are state of the art. With help of our network we offer you a wide range of solutions both for standard as for OEM application. Renowned (technical) universities, industrial research and manufacturing in the Benelux countries are among our customers.

VADENO NEDERLAND

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Website: www.vadeno.com

Level	Application developer Distributor Consultant
Products	Lasers & Light sources Spectroscopy Optical components
Markets	Semiconductors (Photonics) Research & education
Competences	Test & Measurement technology Optical components Optical systems





Van de Loosdrecht Machine Vision BV

Founded in 2001. Our product is the software package VisionLab. VisionLab is a portable library (C++) and a development environment for machine vision applications, pattern recognition and classification with neural networks. VisionLab runs on Windows, Linux and Android platforms with x86, x64, ARM or PowerPC architecture. More than 170 operators of the library have been parallelized using OpenMP for multi-core CPUs. There is also a toolbox for using OpenCL kernels from both script language and C++. We are specialized in accelerating sequential algorithms using commodity parallel hardware like multi-core CPUs and graphics cards. A course in the English language on Computer Vision and parallelizing algorithms, which is in use by 10 Universities, is available at our website.

Van de Loosdrecht Machine Vision BV

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Level	Application developer Other
Products	Other
Markets	ICT Industrial manufacturing (Photonics) Research & education
Competences	Analysis of devices Test & Measurement technology Other



VanderHoekPhotonics

With an experience of 30 years working and researching in the exciting Photonics Landscape, Marinus van der Hoek founded VanderHoekPhotonics in 2006. Its mission is to serve its customers in industry, scientific institutes and the educational community with a sound knowledge, a practical approach and innovative ideas in the field of photonics. Founded on a visionary view on the development and expansion of photonic technologies and applications, VanderHoekPhotonics also initiates, stimulates and supports new activities and initiatives, research and development, advanced products and services and dedicated high-level training. Over the past years, many companies, R&D groups and educational institutes have fruited from the expertise and support as offered by VanderHoekPhotonics.

VanderHoekPhotonics

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Level	Application developer Consultant Educator
Products	Photonic materials Fiber optics & communication Optical components
Markets	Environment & Energy (& Space) Safety & Security (& Defense) (Photonics) Research & education
Competences	Photonic devices Optical systems Optical communication





VibSpec

VibSpec is a company set up in 2004 by Peter de Peinder and Prof. Joop (John) van der Maas to meet the demands as regards training, software and consultancy services in the field of Vibrational Spectroscopy. VibSpec has access to high-end equipment to perform NIR, MIR and Raman measurements (IR and Raman microscopes, ATR, DRIFT and specular or grazing angle). Vibspec is available to advise on subjects in the field of Near-, Mid- and Far-infrared as well as Raman spectroscopy and chemometrics.

VibSpec

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Level	Researcher Consultant Educator
Products	Spectroscopy
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Research & education
Competences	Analysis of devices Optical systems Other



Vision Hardware Partner

Supplier of tailor made machine vision support electronics.
Specialist in LED lighting (Both pulse and continuous) with special requirements or cost effective OEM.

Vision Hardware Partner

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Website: www.VisionHardwarePartner.nl

Level	Developer Manufacturer
Products	Lasers & Light sources
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing Lighting
Competences	Lighting Fabrication technologies



VTEC Lasers & Sensors

VTEC Lasers & Sensors designs, produces and supplies semiconductor-lasers, systems and sensors based on the best solutions for the customer. VTEC offers consultancy and services for customers having a specific need for lasers and sensors. VTEC can develop a customized semiconductor laser and sensor and deliver the complete product or system.

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Level	Developer Distributor Consultant
Products	Lasers & Light sources Fiber optics & communication Optical components
Markets	ICT (Photonics) Research & education
Competences	Packaging Photonic devices Optical systems



Water Insight

Water Insight provides operational water quality remote sensing products and services. Remote sensing allows you to gather high resolution water quality products, both temporally and spectrally, in a very cost-effective manner. We have expertise in processing satellite data for large areas and performing and supporting optical in situ measurements for detailed monitoring. We have developed our own hand held water quality scanner, the WISP-3, for collecting optical in situ measurements. As an innovative company, Water Insight also participates in national and European research projects focused on water remote sensing.

Water Insight
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Level	Manufacturer Application developer Consultant
Products	Detectors, Cameras & Imaging Other
Markets	Environment & Energy (& Space) (Photonics) Research & education
Competences	Photonic devices Optical systems Other



WimOptik BV

WimOptik has specialized in optical design, optical & mechanical components and systems design, just from simple components up to fairly complex test- & measurement equipment. Since 5 years as an independent entrepreneur, after 30 years of experience at Philips CFT. Mission of WimOptik is to encourage MKB to profit from high level experience in technical and industrial optics and an extensive network in science and in optics fabrication industry in particular.

Typical components:
PBSC's & real zero-order QWP's with AR < 0.03%; XY-flexure adjustment plates (Qioptiq).

Typical projects:
distance sensor for Nanomefos (an unique measuring machine for large 'free forms', at TNO);

slope sensor for AspheroMaster (development at Trioptics GmbH, for measuring free forms by deflectometry);
a high power light projector for analyzing vegetables or fruits in agriculture automation; etcetera.

Most activities are supported by 'Expert-fellows' in finemechanics, electronics and optics fabrication.

WimOptik BV

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Level	Application developer Consultant
Products	Positioning equipment
Markets	Biotechnology, Pharma & Agroculture Industrial manufacturing (Photonics) Research & education
Competences	Test & Measurement technology Optical components Optical systems



XiO Photonics

XiO Photonics is an innovative company with strong competence in integrated optical products for visible light applications.

We have developed products to make laser technology more user-friendly. Our product portfolio addresses visible light applications in the biophotonics and life science. The ILBC provides is a compact and easy-to-use system that combines visible wavelength (400-700 nm) channels into one single-mode fiber. The combiner requires no alignment of optical components and is therefore stable and maintenance-free.

The optical-fiber based connectors allow the beam combiner to be easily plugged to various types of laser sources. The module combines 4 wavelengths and enables the "plug-and-play" and stable operation for use in for example confocal fluorescence microscopy.

XiO Photonics

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Level	Manufacturer
Products	Lasers & Light sources Spectroscopy Fiber optics & communication
Markets	Biotechnology, Pharma & Agroculture Health & Wellness (Photonics) Research & education
Competences	Packaging Photonic devices Optical systems





Photonics Event 2013

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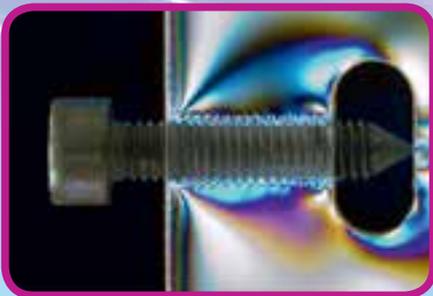
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Wednesday 24 and Thursday 25 April 2013

NH Conference Centre Koningshof, Veldhoven, the Netherlands



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Stay informed and discuss with your peers by joining our online community.
Link yourself to our LinkedIn Group "Dutch Photonics" by scanning the QR code
displayed below using your Smartphone or go to <http://www.dutchphotonics.nl>

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