Holland High Tech

Global Challenges, Smart Solutions

The complete Semicon value chain in one country

The Netherlands is one of three countries in the world, to have a complete value chain within its borders.

High Tech NL | Holland Semiconductors

Dear Visitor,

Welcome to the Holland High Tech Pavilion at the SEMICON Japan Expo 2022! The Netherlands has a strategic position in the semiconductor sector, a sector that is rapidly attracting increased attention in the ongoing digital transition worldwide. The Dutch semiconductor ecosystem consists of more than 300 companies and institutes active in all segments of the supply chain. The sector is growing, both in terms of revenue (+29% in 2021) and labour (+11%).

In line with the importance of this sector to the Dutch economy, the government and the private sector have developed various initiatives in support of the industry. The government joined the EU Chips Act which promotes open strategic autonomy in chip manufacturing. The IPCEI Microelectronics 2 was launched and European alliances have been formed. At a national level, National Growth Fund applications were granted to high-tech consortiums benefiting innovation in AI, quantum, integrated photonics, and semiconductors.

From a broader perspective, it is of key importance that we also stay connected with developments in other parts of the world, whether it concerns the latest photonics integrated chip technologies or the potential rise of super and quantum computers. In this framework, we are developing bilateral relations with Japan, including policy consultations, business activities like the Pavilion at this Expo and a Semicon Innovation Mission to Japan before summer 2023.

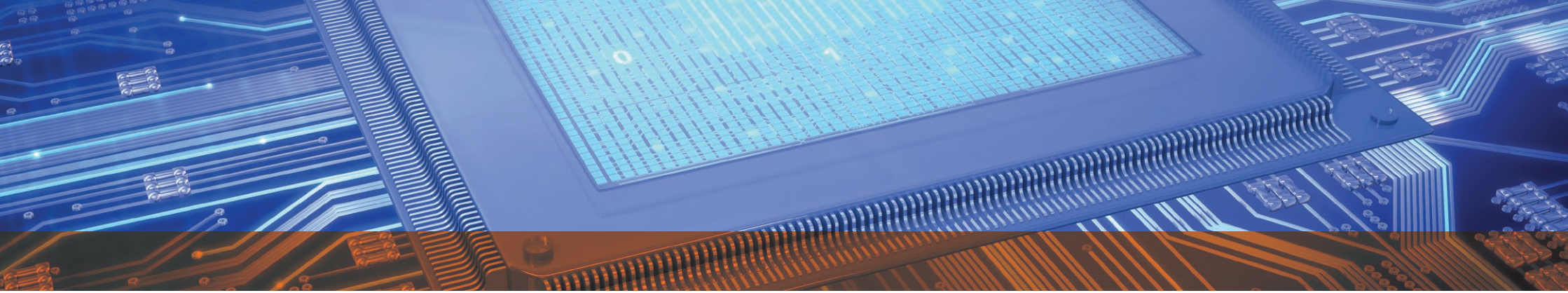
The ten companies in our Holland High Tech Pavilion are active suppliers of equipment and components for the semiconductor industry. They have close links with the advanced Japanese semiconductor industry. The Holland High Tech Pavilion presents itself as a location to give insight into the Dutch ecosystem and find new collaborations in the fast-moving semiconductor sector. We look forward to meeting you!

The Holland High Tech Pavilion is a joint activity by the Top Sector High Tech Systems and Materials, High Tech NL, the participating companies and the Netherlands Embassy in Tokyo. We are here to support you in growing your business and in finding research opportunities. So please do not hesitate to contact us!

I wish you all a very fruitful and productive week!

Kind Regards,

Eric van Kooij
Counsellor for Innovation, Science and Technology
Embassy of the Kingdom of the Netherlands



Contents

The Dutch Semiconductor Industry

The Netherlands is one of only three countries in the world, together with the USA and Japan, to have all steps of the value chain within its borders. From design and fabrication to packaging, testing and assembly of the end product – all within a 200-km radius. The Netherlands can provide key enabling technology solutions for themes such as healthy aging, carbon reduction, energy savings, secure societies, and green transport.

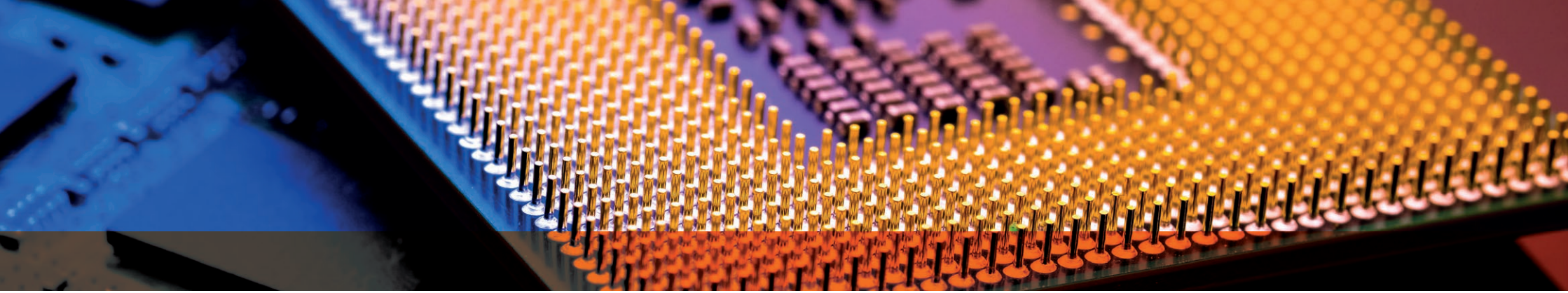
The close proximity of members of the ecosystem keeps the lines of communication short and accelerates innovation. Similarly, in the Netherlands, governments, businesses, research and local stakeholders work together in what is known as the quadruple helix. This model reinforces the effectiveness of the ecosystem, by nurturing interaction at all levels. The lack of a hierarchical system makes it easier for quick decision-making and bottom-up ventures. Centuries of joining forces against the elements has taught the Netherlands how inclusive action provides better results and out-of-the-box solutions.

Equipment – a front-runner in key technologies

The Netherlands semicon equipment industry is leading in extreme ultra-violet (EUV) lithography, atomic-layer deposition, advanced packaging, and metrology.

Just under 50 Dutch companies build machines for the chip industry ranging from large companies like ASML to startups like Nearfield Instruments. Around 58 companies are involved in supplying equipment components with the argest segments in positioning systems, mechatronics, metal components, and environmental conditioning.

With an 85% share of the market, wafer-fab equipment makes up the largest segment of the total market by far. As front-runner in key technologies like mechatronics and optics, the semiconductor manufacturing equipment industry enables many high-tech and other markets. This includes equipment for bio-medical instrumentation, and space & astronomy instrumentation.



Radio Frequency (RF) – controlled energy delivery

Radio frequency (RF) technology makes wireless applications possible via wifi, Bluetooth, microwave, radar and mobile devices. The Dutch strengths lie in radar and near field communication (NFC), power electronics and new technologies such as self-noise cancelling receivers.
There are up to 30 companies including large firms like NXP and Nexperia. There are also upcoming players such as Altum RF, pinkRF and Bruco IC. These companies make chips for amplifiers, filters, antennas, radar, and smart devices in the telecom, aerospace, automotive and defence industries.

RF energy technology makes it possible to deliver energy in a controlled manner. For example in plasma lamps, precision medical tools and start-stop engines. This reduces energy and fuel consumption and in health leads to better outcomes and faster recovery for patients.

Integrated photonics – next-gen technology

The Netherlands is one of the countries leading Europe in integrated photonics.
Integrated photonics is a vibrant next generation technology using light instead of electric signals, which can be used for sensing and for data communication and quantum computing. By integrating multiple photonic functions on a single Photonic Integrated Circuit (PIC), data processes can be dramatically speeded up while their size, cost and energy consumption reduced. Among the 25 Dutch companies active in this field are Smart Photonics, LioniX, PHIX, EFFECT Photonics and PhotonFirst.

With global data traffic doubling every two years, this innovation has huge potential for making technology more sustainable. Data centres worldwide use 200 Terawatt hours of electricity a year (more than some countries) – that's about 1% of the world's total electricity consumption. Thanks to energy efficiency measures, this figure has not grown significantly since 2010 despite the exponential growth in data traffic. Innovation in integrated photonics has caused a paradigm shift in technology, where once expensive, complex, centralised processes could only be operated by experts. Today those processes can be executed cheaply in the field or at home by trained personnel or consumers.

Quantum technology – beyond traditional computing

Quantum technology exploits a new type of physics that goes far beyond the capabilities of traditional computers. Where conventional computers rely on bits that represent 1s and 0s, quantum computers use quantum bits (or 'qubits') which can be 1, 0, or both at he same time. Until recently quantum technology had been elusive and theoretical. Today quantum technology works and has the potential to radically change other technologies.
Although extremely fragile, qubits are used to build quantum computers, the quantum internet and other quantum devices. Quantum physics introduces a new dimension to conventional systems which are used to today. It is a gamechanger creating secure cloud applications or communication systems based on quantum laws. Economic and social sectors such as health, agriculture, climate and safety stand to benefit hugely from the potential quantum technology presents.

QuTech, a research institute for quantum computing and quantum internet, founded by TNO and Delft University of Technology, has built Europe's first ever quantum computing platform – Quantum Inspire. This is the world's first system to contain a processor made of highly promising semiconductor 'spin qubits' on which the public can run their own quantum experiments. QuTech has also developed the Quantum Network Explorer (QNE), on which everyone is freely able to simulate and experiment with the quantum internet.

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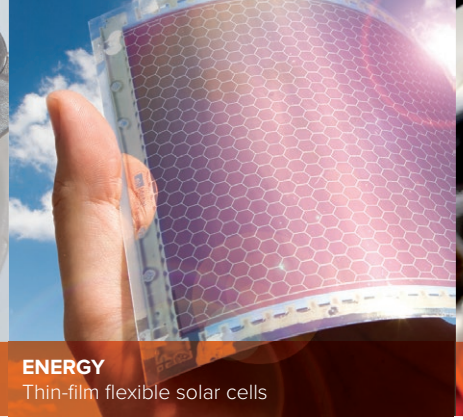
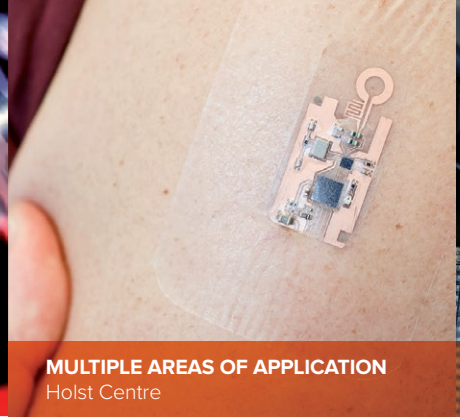
HEALTH
Micro needles for painless injections

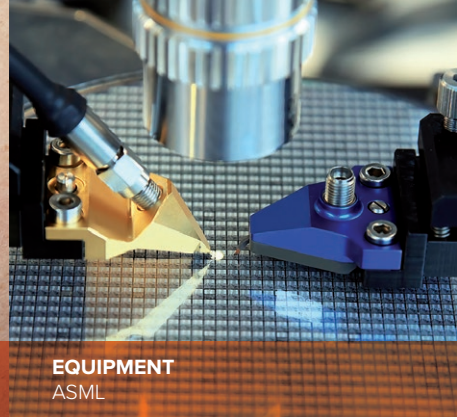


ENERGY
Thin-film flexible solar cells

INDUSTRY
MicroGas Analyzer



MULTIPLE AREAS OF APPLICATION
Holst Centre



EQUIPMENT
ASML

Examples of Dutch semicon solutions

Health

U-Needle uses a unique in-plane silicon etching method to produce micro-needles with an extremely short bevel.

The micro-needles are atom sharp and facilitate perpendicular injections. Their high precision and astonishing ease of use enable accurate, quick, pain-free intradermal and subcutaneous delivery, for example, of vaccinations, drugs, and in-skin aesthetic treatments. The cooperation with other Dutch companies such as Advanced Packing Centre (APC) for the challenges in the packaging of the needles, and with Micronit Microfluidics for the combination with lab-on-a-chip solutions, enabled U-needle to innovate faster and develop and manufacture actual solutions.

Energy

Tf2devices, a spin-off from Radboud University Nijmegen, developed a innovative production process called 'thin-film lift-off' to produce high-efficiency and flexible solar cells. These cells will be used in the aerospace domain and have advantages in both efficiency (up to a world record 38%), low weight and extreme flexibility.

Industry

Qmicro, specialist in advanced MEMS product development and supply, developed a micro gas-chromatograph for on-the-spot analyses. In cooperation with Maser Engineering and Advanced Packaging Centre, a lab-on-a-chip solution was developed that enables the detection of very low volumes of gas (Part Per Billion or PPB levels), thus providing on-the-spot measurements of gas or breath, without the need of large and expensive labs. Cooperating with both clinical partners such as Radboud University Medical Centre and technical partners such as University of Twente, Maser Engineering and Advanced Packaging Centre (APC), enabled Qmicro to develop and test a revolutionary new high-tech product.

Multiple areas of application

Holst Centre, the open innovation initiative of imec and TNO, has 10 years of experience in the development of radio chips with significantly reduced power consumption compared with off-the-shelf alternatives. Applications are personal health monitoring, smart homes, intelligent cars, and monitoring of machines, buildings or the environment. Holst Centre also works on biomedical circuits that track physiological parameters such as ECG, EEG, bio impedance and blood pressure for medical-grade health monitoring.

Equipment

ASML is one of the world's leading manufacturers of chip-making equipment. ASML invents and develops lithography machines, metrology systems and software products that together allow its customers to follow Moore's Law and produce ever smaller, cheaper, more powerful and energy-efficient semiconductors. The result? Increasingly more powerful and capable electronics, with faster processing speeds, that enable the world to progress within a multitude of fields, including healthcare, technology, communications, energy, mobility, and entertainment. An improvement of the quality of life. ASML (Euronext Amsterdam, NASDAQ stock exchanges) employs 28.000 people, has over 60 locations in 16 countries, and supplies most of the world's major chip manufacturers such as Samsung, Intel and TSMC.

Holland High Tech Global Challenges, Smart Solutions

Technology Cluster of High Tech NL

Holland Semiconductors

WWW.HOLLANDSEMICONDUCTORS.NL

YOUR GATEWAY TO THE NETWORK OF SEMICONDUCTOR COMPANIES AND KNOWLEDGE ORGANIZATIONS ACTIVE IN THE ENTIRE SEMICONDUCTOR VALUE CHAIN IN THE NETHERLANDS

High Tech NL

Holland Semiconductors

High Tech NL | Holland Semiconductors

With some 230 members, High Tech NL | Holland Semiconductors is the gateway to the full value chain of the Dutch Semiconductor and Electronics industry and fosters innovation and business creation.

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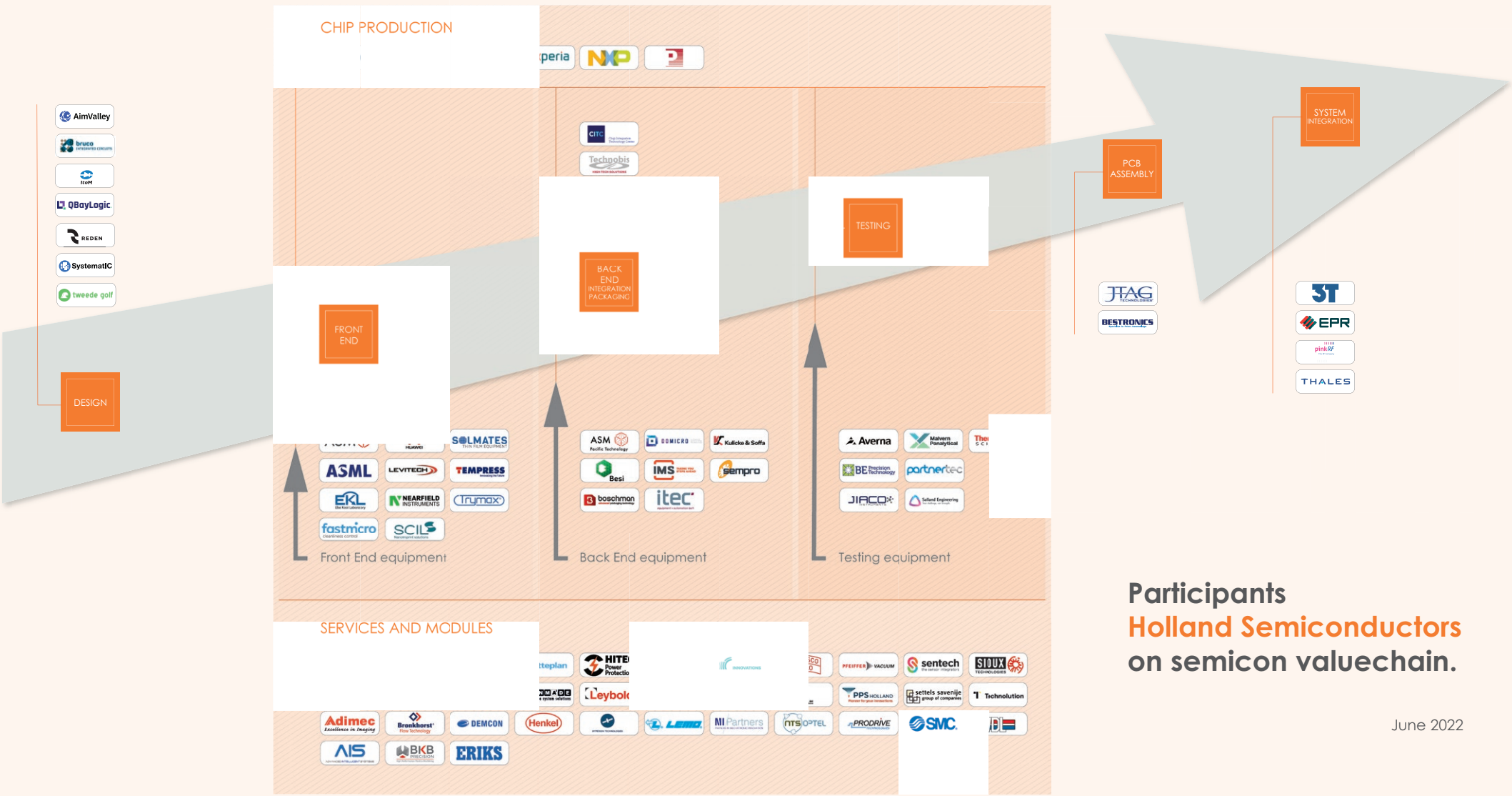
High Tech NL is the branch association of the Dutch high-tech industry consisting of some 230 members, both companies (OEM, SME and startups) and knowledge institutes. We are committed to the collective interests of the sector, with a focus on long-term innovation and international collaboration. To share specific knowledge, each member participates in one or more of our three clusters: Robotics, Semiconductors and Lifescience Technologies.

Holland Semiconductors is the Dutch national network of semi-conductor companies and knowledge institutes active in the entire value chain. It is our aim to strengthen the semicon sector by stimulating (international) cooperation, initiating new (international) innovation projects and facilitating crossover projects with semi-conductors as a key enabling technology (KET). We support international innovation missions, and organize, support and host workshops, seminars, webinars and joint booths at international semicon tradeshows. We fully support the European ambitions for intensifying European and global collaborations. Connecting to the leading high-tech clusters in Europe, Dutch companies and institutes get access to innovative partners throughout Europe. Participation in European projects and in Silicon Europe Alliance are explicit examples of our international collaborative innovation.

Would you like to cooperate and innovate with Dutch companies, technical universities and research institutes? High Tech NL opens the doors to successful cooperation!

KNOWLEDGE INSTITUTES AND OTHERS (completing the triple helix)



Participants
Holland Semiconductors
on semicon valuechain.

June 2022

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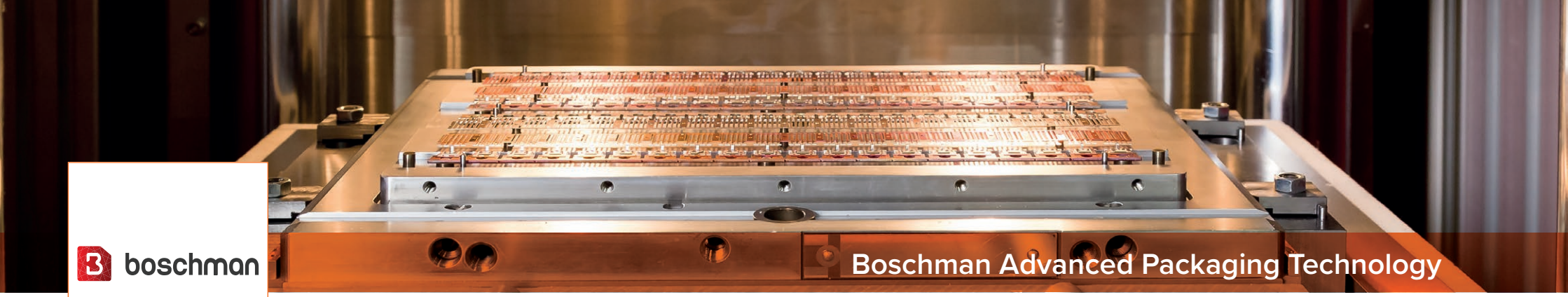

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Boschman is a high-tech, technology driven company, specialized in advanced back-end semiconductor packaging solutions. We are headquartered in the Netherlands with a system assembly facility in Singapore and expanding in China.

We focus on Pressure Sintering and Transfer Molding, two technologies that are in high demand now as the world is converting to high levels of electrification, creating unprecedented opportunities for companies active in the power electronics supply chain.

Core to our strategy is a unique business model, “from Idea to Industrialization”, with 3 highly complementary activities:

- **Package Development**: co-development of semiconductor packages and processes, including concept and design for manufacturing (DFM), prototyping and engineering samples for our (end) customers. Historically this activity was mainly focused on MEMS and Sensors, but is currently shifting towards Power Modules and Inverters, driven by market demand in the xEV segment.
- **Assembly Services**: small to medium volume micro assembly of MEMS, Sensors and Power Modules, with a fully equipped inhouse lab (from wafer dicing to die attach bonding, molding and laser marking). For higher production volumes, we can support to transfer the production to in-house production or high-volume OSAT.
- **Production Equipment**: pressure sintering & transfer molding equipment, a range of systems from R&D Labs to High Volume production solutions.

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ボッシュマン社は、先進的な後工程半導体パッケージング・ソリューションに特化した、ハイテクで技術主導型の企業です。オランダに本社を置き、シンガポールにシステム組立施設を持ち、中国にも進出しています。

私たちは、世界が高度に電化され、パワーエレクトロニクスのサプライチェーンで活躍する企業にかつてないチャンスをもたらしている今、需要が高まっている2つの技術、加圧焼結とトランスファー成形に焦点をあてています。

当社の戦略の核となるのは、「アイデアから製品化まで」という独自のビジネスモデルであり、相互補完性の高い3つの事業で構成されています。

- **パッケージ開発:** 半導体パッケージとプロセスの共同開発で、コンセプトと製造用設計 (DFM)、プロトタイピング、エンジニアリングサンプルを顧客向けに提供。従来、この活動は主にMEMSとセンサーに集中していましたが、現在はxEVセグメントにおける市場の需要に牽引され、パワーモジュールとインバーターにシフトしています。
- **アセンブリサービス：** MEMS、センサー、パワーモジュールの小～中量マイクロアセンブリで、社内ラボを完備（ウェハダイシングからダイアタッチボンディング、モールディング、レーザーマーキングまで）。生産量が多い場合は、自社生産への移行や量産型OSATへの移行をサポートします。
- **生産設備：** 加圧焼結装置、トランスファー成形装置、R&Dラボから大量生産ソリューションまで、さまざまなシステム。

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As a full-service design house, customers can tap into our profound expertise and unlimited creativity to help solve your technological and social challenges. We build on our extensive mechatronic engineering track record in a wide range of markets and applications. We provide contract R&D and related services, often starting from technology readiness levels 3-4.

Each time we embark on a customer journey we start by defining, analyzing and comprehending the problem at hand. During the entire project, we work shoulder-to-shoulder with our customers. This collaborative way of working provides a wider range of expertise to use and enables a shortened development lead time.

We have a structured and results-oriented project approach with a pragmatic, agile way of working. This helps to introduce the product at right time, which gives our customers the chance to take a strong position in the market.

We are your partner in continuous innovation to create shared value together.

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課題解決に当たっては、お客様と共に十分な分析を行い、課題を明確にしております、その上でお客様とは緊密に連絡を取りプロジェクトを推進いたします。このような取り組みにより色々な角度から技術リソースを活用することが可能になり、開発期間を短縮しております。

私共は、素早く、現実的なアプローチでお客様のお役に立てる結果を提供することを試みております。その結果として、製品をタイムリーに市場に提供できるようになり、お客様の市場競争力強化に貢献してきております。

私共は、そのような価値を技術のイノベーションを通じてご提供し、良きパートナーとしてお客様の業績向上に貢献することを目指しております。

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We help our customers to overcome today's cleanliness challenges in microtechnology. At Fastmicro, we believe you can accomplish breakthroughs in cleanliness control with fast, accurate and quantitative surface particle measurements.

Fastmicro was founded in 2019 after 15 years of research and development based on technology co-developed with research institute TNO. In just three years, Fastmicro has delivered installations in seven countries worldwide. Our customers in the semicon industry are involved throughout the processes of the semiconductor supply chain.

Are you preparing your next step in cleanliness control? Fastmicro understands your needs, like producing according to semicon industry standards (like ISO-14644-9/17), reducing yield losses, and keeping up with ever-increasing cleanliness requirements. We even have our own demo (cleanroom) center located in the Brainport Eindhoven area. Here, we test our newest innovations, you can experience our product portfolio and conduct cleanliness research as well as technical feasibility studies.

This enables us to supply the required metrology solution for surface particle measurements. We enable process quality engineers to make reliable decisions on where and how to improve their cleanliness processes and deliver consistent quality products. And ultimately, achieve high equipment performance for their end users.

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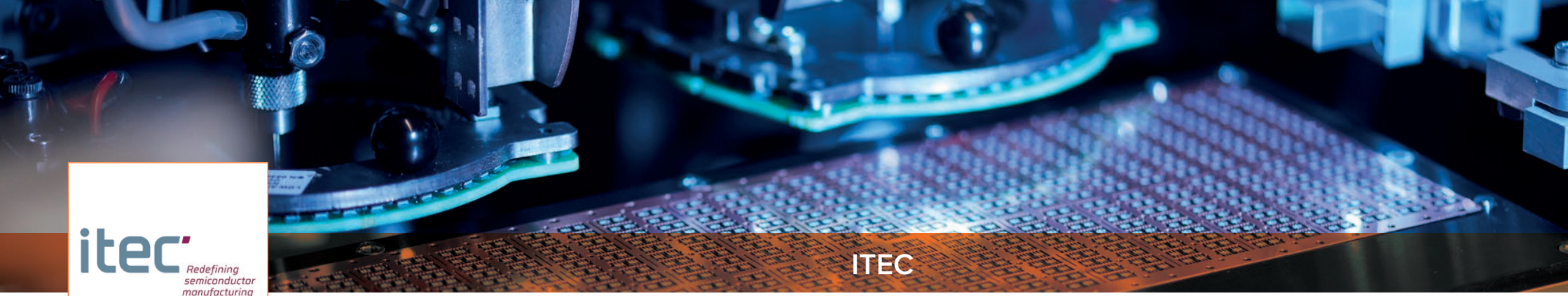
私たちは、お客様がマイクロテクノロジーにおける今日の清浄度の課題を克服するお手伝いをします。Fastmicro は、高速、高精度、定量的な表面粒子測定により、清浄度制御のブレークスルーを達成できると信じています。

Fastmicroは、研究機関TNOと共同開発した技術をベースに、15年間の研究開発を経て、2019年に設立されました。Fastmicroはわずか3年で、世界7カ国に導入実績を上げています。半導体業界のお客様は、半導体のサプライチェーンの全プロセスに携わっています。

クリーン度管理の次のステップを準備中ですか？Fastmicro は、半導体業界標準（ISO-14644-9/17 など）に準拠した生産、歩留まり損失の低減、増加し続ける清浄度要件への対応など、お客様のニーズを理解しています。私たちは、Brainport Eindhoven地区に独自のデモ（クリーンルーム）センターを持っています。ここでは、当社の最新のイノベーションをテストし、当社の製品ポートフォリオを体験していただくとともに、クリーン度試験も行っています。また、技術的なフィージビリティスタディも行っています。

これにより、表面粒子測定に必要な計測ソリューションを提供することができます。私たちは、プロセス品質エンジニアが、どこでどのように清浄度プロセスを改善し、一貫した品質の製品を提供するかについて、信頼性の高い決定を下すことを可能にします。そして最終的には、エンドユーザーのために高い装置性能を実現します。



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ITEC combines state-of-the-art equipment and automation expertise. With more than 30 years of semiconductor manufacturing experience as an equipment and automation partner. With an installed base of more than 2500 of the industry's best tools, we enable our customers to test and assemble with the fastest production rates.

To truly deliver the efficiencies needed to assemble and test high-volume, high-quality semiconductors, requires both technical expertise and manufacturing insight. Technical expertise delivers advanced mechatronic systems, accurate test electronics, inspection algorithms and smart manufacturing and big data handling. However, to ensure the highest productivity, throughput and quality at the lowest total cost of ownership, a deep insight into the day-to-day challenges of manufacturing is required.

But it doesn't stop there. Ever since the introduction of the Breakthrough in Manufacturing (BIM) concept, ITEC is committed to incorporating the latest technologies and process expertise into tailored solutions. Enabling our customers to excel in quality, productivity, and sustainability with the lowest total cost of ownership. Whether that is for standard discrete devices in the smallest packages and the latest dedicated high-power packages for wide bandgap (WBG) semiconductors, or for new package materials and processes demanded by advanced RFID labels and LED displays. Ensuring that the best commercial options are available for proven, high-quality, sustainable volume assembly and test operations.

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ITECは、最先端の装置とオートメーションの専門知識を兼ね備えています。装置とオートメーションのパートナーとして、30年以上にわたる半導体製造の経験を有しています。2500台以上の業界最高のツールのインストールベースにより、お客様が最速の生産速度でテストとアセンブリーを行うことを可能にします。

高品質の半導体を大量に組み立て、テストするために必要な効率性を実現するには、技術的な専門知識と製造に関する洞察力の両方が必要です。技術的な専門知識は、高度なメカトロニクスシステム、正確なテストエレクトロニクス、検査アルゴリズム、スマートマニュファクチャリング、ビッグデータの取り扱いを実現します。しかし、最小の総所有コストで最高の生産性、スループット、品質を確保するためには、製造の日々の課題に対する深い洞察が必要です。

しかし、それだけにとどまりません。BIM（Breakthrough in Manufacturing）のコンセプトを導入して以来、アイテックは最新のテクノロジーとプロセスの専門知識をテーラーメイドのソリューションに取り入れることに専念しています。私たちは、お客様が品質、生産性、持続可能性において卓越し、かつ最も低い総所有コスト（TCO）を実現することを可能にします。標準的なディスクリートデバイスの最小パッケージから、ワイドバンドギャップ（WBG）半導体用の最新のハイパワー専用パッケージ、あるいは高度なRFIDラベルやLEDディスプレイが求める新しいパッケージ材料やプロセスまで、さまざまなニーズにお応えします。実証済みで高品質、かつ持続可能な量産組立とテストオペレーションを実現するために、最高の商業的オプションを確保します。

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Levitech is a global player in the semiconductor industry for Rapid Thermal Processing (RTP) solutions and in the photovoltaic industry for Atomic Layer Deposition (ALD) applications. Levitech offers engineering support for customer projects. The company maintains a strong technological base, a state-of-the-art manufacturing facility, a competent and qualified workforce, and a highly trained, strategically located support network.

Levitech's leading-edge RTP equipment is qualified for 200 mm and 300 mm wafer processing for the semiconductor industry. Together with its advanced ALD equipment and process development for the solar industry, Levitech's technology portfolio is strongly positioning the company for future growth.

Levitech is your partner of choice for research, development and engineering projects. Levitech can deliver optimal, high-quality designs based on your requirements and outline. The solution is based on our multidisciplinary knowledge.

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レビテックは、半導体業界では高速熱処理（RTP）ソリューション、太陽光発電業界では原子層蒸着（ALD）アプリケーションの世界的な企業である。レビテックは、顧客のプロジェクトにエンジニアリングサポートを提供しています。レビテックは、強力な技術基盤、最先端の製造施設、有能で資格のある従業員、高度に訓練され戦略的に配置されたサポートネットワークを維持しています。

レビテックの最先端RTP装置は、半導体産業向けの200mmおよび300mmウェハープロセスに適合しています。先進的なALD装置や太陽電池産業向けのプロセス開発とともに、レビテックの技術ポートフォリオは、将来の成長に向けてレビテックを強力に後押ししています。

レビテックは、研究・開発・エンジニアリングプロジェクトのパートナーとして、皆様のお役に立ちます。レビテックは、お客様のご要望とアウトラインに基づき、最適で高品質な設計をお届けします。そのソリューションは、私たちの多分野にわたる知識に基づいています。

Nearfield Instruments

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Nearfield Instruments is a semiconductor metrology equipment company developing and delivering ground-breaking process control metrology solutions for the worldwide advanced semiconductor I.C. manufacturing industry.

To achieve new functionalities and to make optimum use of the available wafer space, IC devices will shrink to atomic-scale dimensions using novel, sensitive materials while at the same time being designed in full three-dimensional configurations.

Since Roland van Vliet and Hamed Sadeghian founded Nearfield Instruments, the company has striven to accommodate these trends in a technologically and economically viable way by developing and delivering daringly innovative solutions to process control challenges in the premium nano-electronics industry.

QUADRA is Automated High-Throughput 3D Scanning Probe Metrology. QUADRA enables an entirely new approach to in-line 3D process control metrology, providing unique non-destructive high-aspect ratio 3D metrology on even the most challenging critical layers, such as Gate and FinFET structures. QUADRA's architecture is founded on a number of revolutionary mechatronic concepts, enabling an industry-best precision, stability, and repeatability, while maintaining ultimate throughput (the highest of any AFM available in the semiconductor industry today) and ensuring true non-destructive measurements.

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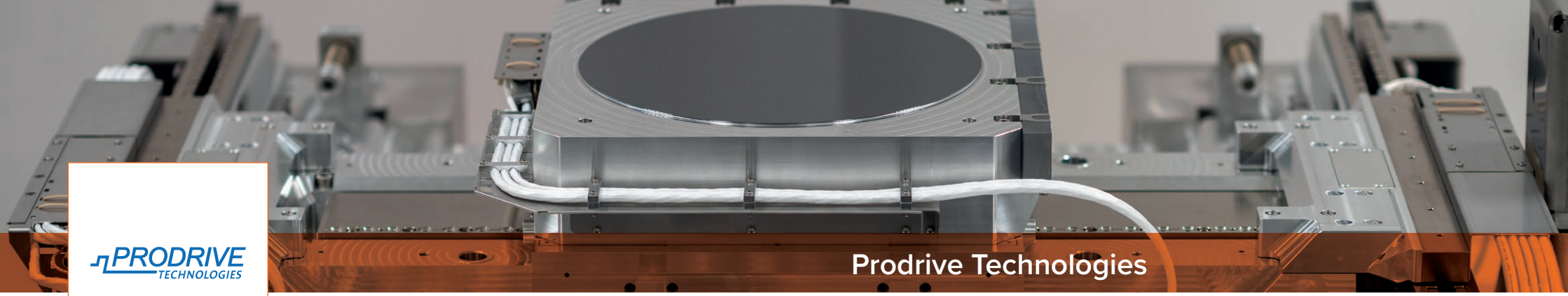
Nearfield Instruments社は、世界中の先端半導体I.C.製造業界向けに画期的なプロセス制御計測ソリューションを開発、提供している半導体計測機器メーカーです。

新機能の実現やウェーハスペースの有効活用のため、ICデバイスは新規高感度材料を用いて原子レベルまで微細化されると同時に、完全な三次元構造で設計されるようになります。

ローランド・ヴァン・フリートとハメッド・サデギャンがニアフィールド社を設立して以来、同社は、プレミアムナノエレクトロニクス産業におけるプロセス制御の課題に対する大胆な革新的ソリューションを開発・提供することにより、技術的・経済的に実現可能な方法でこうした傾向に対応するよう努めてきました。

QUADRAは、高スループットの3次元スキャニングプローブ計測を自動化した装置です。QUADRAは、インライン3Dプロセス制御計測への全く新しいアプローチを可能にし、ゲートやFinFET構造などの最も困難なクリティカルレイヤーに対しても、独自の非破壊高アスペクト比3D計測を提供します。QUADRAの構造は、画期的なメカトロニクスコンセプトに基づいており、業界最高の精度、安定性、再現性を実現しながら、究極のスループット（現在半導体産業で利用可能なあらゆるAFMの中で最高）を維持し、真の非破壊測定を保証しています。



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Prodrive Technologies is a privately owned Dutch company that develops, designs and manufactures hardware and software solutions for worldwide semiconductor manufacturing tool makers. Our development team consists of over 700 engineers from various disciplines. We own flexible and fully automated manufacturing capabilities in the Netherlands, U.S., and China where we effectively optimize product designs for each customer.

Semiconductor industry has been shifting its focus through the time to meet the harsh demand of a modern society. Semiconductor chips are now the core part of human civilization and exist beside our lives. Prodrive Technologies is thriving through the semiconductor industry's ever-changing landscape and the technological innovations of the times with market-leading customers.

Our products are widely deployed in the major semiconductor fabs by market-leading semiconductor tools makers worldwide. Cutting-edge solutions that we deliver is ceaselessly contributing the development of the next generation semiconductor industry.

- Embedded computing solutions provide computing systems, especially for heavy data processing workload with deep learning AI.
- Motion control solutions provide high-end servo drives, controllers, vacuum-compatible linear motors, interferometers and high-precision wafer stages with active vibration control.
- Vision solutions provide TDI and custom cameras, optical solutions, and E-beam detectors.
- Power solutions provide advanced power electronics and Tailored RF bias generator for next-generation plasma processes.

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プロドライブテクノロジーズはオランダに本社を置き、世界各国の半体装置メーカーに先端製品ソリューションを提供しています。当社では700人を超える優秀なエンジニアが様々な分野で活躍しています。また、柔軟性の高い設計力とオランダ、米国、中国でのグローバル製造能力を融合することで、製造装置の技術革新を加速する様々なサブシステムを供給しています。

半導体産業を取り巻く環境は、現代社会の劇的な変化に伴い変貌しつつあります。半導体チップは今やデジタル社会に欠かせない存在となっています。我々プロドライブテクノロジーズは、日進月歩する先端半導体装置メーカーと共に、様々なイノベーションを生み出してきました。

当社の製品はすでに世界各国の半導体装置メーカー及び半導体製造工場にて使用されており、次世代半導体技術の発展にも貢献しています。

- 組み込みシステム：高速・高精度画像処理やディープラーニングを用いたAIを実現する組み込みシステム
- モーションシステム：高性能サーボドライブ及びコントローラ、リニアモーター、干渉計、 アクティブ除振を搭載した高精度ウェハーステージ
- ビジョンシステム：カスタマイズ光学ソリューション、1MHz TDIカメラ・電子線検出器、レーザー干渉計等
- パワーエレクトロニクス：アドバンスドパワーエレクトロニクス、テーラード波形を用いてプラズマプロセスの効率を飛躍的に向上させるRFバイアスジェネレータ

Sempro Technologies

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Sempro Technologies is the expert in trim, form and singulation solutions for the semiconductor and micro-electronics industries.

Dedicated solutions for Mems-sensor and optical/advanced leaded packages. Packages as well as advanced Power modules. Our main market segments are Space, Health, Automotive and Energy.

Solutions

- R&D services on trim and form and singulation
- Soft tools and designs for R&D projects
  - Small series sample production for development purpose
- Trim and form and singulation standard and custom made automation equipment
- Package design
- Spare parts and services

Trim & form equipment

Sempro Trim and Form ensures the lowest cost of ownership, the lowest cost of maintenance and replacement of parts. Our systems are modular and used for single -matrix or super high density matrix products. A large number of custom configurations and combinations are possible.

Integrations

Direct liaison with other parties in the semiconductor or micro-electronics assembly process ensures complete integration of machines. Every aspect of the process is carefully controlled and documented at every step, from design and prototyping through to testing, validation and manufacture.

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センプロ・テクノロジーは、半導体およびマイクロエレクトロニクス産業向けのトリム、フォーム、シンギュレーション・ソリューションのエキスパートです。

Mems-sensor、光学/アドバンストリードパッケージに特化したソリューションです。パッケージ、および先進的なパワーモジュール。主な市場分野は、宇宙、健康、自動車、エネルギーです。

ソリューション

- トリム・フォーム、シンギュレーションに関する研究開発サービス
- 研究開発プロジェクトにおけるソフトツールおよび設計
  - 開発用の少量サンプル生産
- トリム＆フォーミング、シンギュレーション標準機、カスタムメイド自動化装置
- パッケージデザイン
- 補修部品とサービス

トリム＆フォーミング装置

Sempro Trim and Formは、所有コスト、メンテナンスコスト、部品交換コストを最低限に抑えます。当社のシステムはモジュール式で、シングルマトリックスまたは超高密度マトリックス製品に使用されます。多数のカスタム構成と組み合わせが可能です。

統合化

半導体やマイクロエレクトロニクスの組立工程では、他の関係者と直接連絡を取り合い、機械の完全な統合を実現します。設計、試作からテスト、検証、製造に至るまで、あらゆる工程を注意深く管理し、文書化します。

Sioux Technologies

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Sioux Technologies is a one-stop-shop for development, production and life cycle management of front-end and back-end production equipment for the semiconductor industry. Sioux supports OEMs in achieving a shorter time-to-market for new equipment.

Multidisciplinary System House

Sioux is headquartered in Eindhoven, The Netherlands. With over 1.100 highly trained engineers working from development centres in Europe and Asia, Sioux develops, innovates, and assembles complex high-tech systems with advanced Software, Mathware, Electronics and Mechatronics.

Specialized services

Sioux is a specialist in semiconductor equipment development and is developing next generation equipment with increased yield and higher throughput. Uptime is critical for fabs and therewith for our customers. Sioux supports uptime by simulating tools and processes as early as the design phase by implementing new technologies such as digital twins and virtual and augmented reality. Sioux has expertise in the development of inspection systems, precision positioning systems and system level design.

High-tech solutions

Sioux also provides its own solutions related to accurate positioning. Sioux has a variety of stages available with positioning accuracy from 50 nanometres to a few microns that are ready for integration into OEM customers' tooling.

Sioux Technologies brings high-tech to life!

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スー・テクノロジーは、半導体産業向けの前工程および後工程の製造装置の開発、生産、ライフサイクル管理をワンストップで提供しています。Siouxは、OEMが新しい装置の市場投入までの時間を短縮することを支援します。

マルチディシプリナリーシステムハウス

Sioux 社は、オランダのアイントホーフェンに本社を構えています。ヨーロッパとアジアの開発センターで働く1,100人以上の高度な訓練を受けたエンジニアが、先進のソフトウェア、マスウェア、エレクトロニクス、メカトロニクスを使った複雑なハイテクシステムを開発、革新、組み立てています。

専門的なサービス

Sioux は、半導体製造装置開発のスペシャリストとして、歩留まりとスループットを向上させる次世代装置の開発に取り組んでいます。アップタイムは工場にとって重要であり、お客様にとっても重要です。Siouxは、デジタルツインや仮想現実、拡張現実などの新しい技術を導入し、設計段階の早い段階でツールやプロセスのシミュレーションを行うことで、アップタイムをサポートしています。また、検査システム、精密位置決めシステム、システムレベル設計の開発においても専門知識を有しています。

ハイテク・ソリューション

また、Siouxは高精度な位置決めに関する独自のソリューションも提供しています。Siouxは、50ナノメートルから数ミクロンの位置決め精度を持つ様々なステージを用意しており、OEM顧客の工具に組み込むことが可能です。

Sioux Technologiesがハイテクを実現する!

Tempress

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Tempress' mission is to support customers in the semiconductors, power, MEMS, photonics, solar, life sciences and coating markets to produce advanced materials and devices with high added value innovative furnace solutions.

Tempress' over 50 years of heritage in development and manufacturing of diffusion and deposition equipment as well as it's related processes is a testament to the company's flexibility, innovation, quality, and dedication. Tempress's headquarters is located in Vaassen, The Netherlands.

Our portfolio contains horizontal and vertical furnace equipment, ranging from small batch R&D systems up to high volume, fully automated manufacturing equipment.

Customers are supported throughout the world by our highly professional direct sales & service engineers and commercial partner network.

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当社は世界各国の半導体装置メーカーに先端技術及び装 テンプレスのミッションは、半導体、パワーデバイス、MEMS、ホトニクス、太陽電池、ライフサイエンス、薄膜コーティング分野のお客様に、高付加価値でイノベーティブな技術を提供し、お客様による先進的な材料生産やデバイス生産に寄与する事です。

テンプレスの５０年以上にわたる拡散炉、成膜分野でのプロセス開発、装置開発と量産は、企業としての柔軟性、革新性、品質力や専業化について強さの証です。テンプレスの本社は、オランダ王国のファースンにあります。

テンプレスの事業ポートフォリオは、横型及び縦型ファーネス装置であり、開発用から完全自動化された大量生産用装置と多岐にわたっています。

お客様は、グローバルに展開されたネットワークの中で高度に専門化されたエンジニアやセールススタッフ、ビジネスパートナーによりサポートされています。

TNO

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TNO is an independent research organization. We believe in the joint creation of economic and social value.

We focus on transitions or changes in nine social themes:

- Industry
- Mobility and Logistics
- Information and Communication Technology
- Healthy Living
- Energy Transition
- Defense and Safety
- Circular Economy and Environment
- Building, Infrastructure and Maritime
- Strategic Analysis and Policies

TNO for the Semicon Industry

For more than 20 years, TNO has been leading the industry in cutting-edge developments in nano-manufacturing. Our 170 dedicated researchers work to create equipment that can keep up with Moore's Law and consumer demand. Our sizeable portfolio and numerous patents show that we are a leader in the development of state-of-the art semiconductor equipment.

TNO's competence in optics, mechatronics and contamination control enable semicon equipment makers to innovate with disruptive technologies for the next generation of manufacturing processes.

Equipment manufacturers and users rely on us to fulfil all of their contamination control needs, thereby eliminating the need for in-house expertise and the additional costs of infrastructure.

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TNOは独立した研究機関です。私たちは、経済的価値と社会的価値を共同で創造することを信条としています。

9つの社会的テーマについて、その変遷や変化に着目しています。

- 産業分野
- モビリティとロジスティクス
- 情報・通信技術
- 健康的な生活
- エネルギー転換
- 防衛と安全
- 循環型経済と環境
- 建築・インフラ・海事
- 戦略的な分析と方針

半導体産業向けTNO

TNOは20年以上にわたって、ナノマニュファクチャリングにおける最先端の開発で業界をリードしてきました。170名の熱心な研究者が、ムーアの法則と消費者の需要に対応できる装置の開発に取り組んでいます。膨大なポートフォリオと数多くの特許は、私たちが最先端の半導体装置開発におけるリーダーであることを示しています。

TNOの光学、メカトロニクス、コンタミネーションコントロールの能力は、半導体装置メーカーが次世代製造プロセスのための破壊的技術でイノベーションを起こすことを可能にします。

機器メーカーやユーザーから、あらゆるコンタミネーションコントロールのニーズを満たすために、社内の専門知識やインフラの追加コストが不要になると信頼されています。

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High Tech NL | Holland Semiconductors connect knowledge institutes and companies in the semicon value chain, thus enabling innovative, fast and flexible semicon solutions and products.

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NL

Holland High Tech
Global Challenges, Smart Solutions