MADE IN HOLLAND
HIGH TECH

Global challenges • Hotbed of innovation • Cross-over industry • Nanotechnology • Atmospheric research • Smart and sustainable mobility
No need to fear the unknown

An examination under the MRI-scanner is an exciting experience for any adult, let alone children. This is why Philips Healthcare innovations concentrate on the patient and not just on technology. Innovation improves the entire care pathway from prevention to screening, from diagnostics to treatment and aftercare. Philips Healthcare gets the users involved in this process of innovation. Children are calmer if the room is specially adjusted to their requirements, so that they are surrounded by cartoons, light displays and comforting sounds throughout the scan. Adults feel less anxious as well when they can exercise some control over the images projected around them. Nobody undergoes a medical examination for fun, but Philips Healthcare does everything possible to reduce the stress. [www.healthcare.philips.com](http://www.healthcare.philips.com)
Welcome

Holland has a long tradition of ingenuity, pragmatism, business spirit and openness. We like to work as a team and are always looking for partnership. We remain a nation of inventors and entrepreneurs to the present day. Our high-tech sector is world-class. Holland has a celebrated track record when it comes to practical inventions, from the sawmill to the microscope and the submarine. From the 6-cylinder engine and variometric control to navigation systems and power generation from agro-waste. The Netherlands is the place to be for companies and researchers looking for solutions to the challenges of modern society. Thanks to innumerable cross-over technological solutions to issues of health, security, renewable energy, mobility and climate, the Netherlands stays in high-tech at the top of the league. Join our team, we are in a winning mood.
In the spotlight

Source: RVQ.nl/ASML Netherlands B.V.
Dutch high-tech companies and knowledge institutes are world-renowned for their drive to excel in technology. Not just for the sake of technological progress, but to meet the challenges faced by society with regard to such things as mobility, health, renewable energy and safety. The growing proportion of elderly also presents a new set of challenges. All over the world people are living healthy, independent lives for longer. But sometimes the elderly find themselves in unsafe circumstances, a problem no society can ignore. For decades now the Dutch company Vahlkamp has been helping the elderly to live safe, independent lives for longer. By providing such things as alarm systems for geriatric care. These allow residents to move around freely and staff immediately receive a signal if a resident happens to ‘stray’. Vahlkamp also supply special mats carefully placed in and around the beds and chairs of residents to register any movement that could indicate a fall. The older we get, the longer it takes to recover from such a fall. And that puts additional pressure on medical care. Thanks to the solutions of Vahlkamp we are ready to face the challenges of an ageing society. www.vahlkamp.nl

Holland is strong in technologies that stimulate other sectors. The high-tech sector for example facilitates growth and innovation in the energy, chemistry and life science sectors. Dutch high-tech focuses on products and services with high added value in specialised areas like microelectronics, embedded systems, smart materials, advanced manufacturing, photonics and nanotechnology. A good example is the chip machines of ASML, a company in one of the world’s smartest regions with its headquarters in Veldhoven. This Dutch company is a world leader in the supply of lithographic systems for the semiconductor industry. The complex machines of ASML are a vital link in the production process of integrated circuits and chips. Progressively reducing the line thickness (lower resolution or feature size) increases the speed of the electrons across the chip. ASML’s systems have exposure wave lengths of 193, 248 and 365 nm. Soon the company will also integrate extreme ultraviolet (EUV) in its chips. It is lithographic improvements like these that make a smart and sustainable future possible. Thanks to ASML phones and laptops can be made ever smaller, faster and energy-efficient. www.asml.com
In the spotlight

Photo: Bart van Overbeeke
The top sector high-tech is a vital engine and booster of the Dutch economy because it delivers technical products and services for application in other sectors. High-tech provides key solutions to the challenges facing society in areas like energy, health care and mobility. The output is a vast array of end-products, semi-finished products, components and materials for global markets. The Holst Centre is an independent open-innovation R&D centre that develops generic technologies for Wireless Autonomous Sensor Technologies and Flexible Electronics. A key feature of Holst Centre is its partnership model with industry and academia, based on shared roadmaps and programmes. It is this kind of cross-fertilization that enables Holst Centre to tune its scientific strategy to industrial needs. Thanks to the location on High-tech Campus Eindhoven, Holst Centre is able to take advantage of the advance research infrastructure present. Holst Centre has more than 170 employees from 28 different countries and an ongoing commitment from more than 45 industrial partners. Their slogan resonates with the Dutch mentality: ‘The future belongs to those who create it’. www.holstcentre.com

In the busy Netherlands there is a flourishing electronic ‘ecosystem’. Three parties work in close cooperation: the Dutch government, universities and knowledge institutes, high-tech companies and their suppliers. It provides fertile soil for targeted innovation. On the Automotive Campus in Helmond this has led to smart and green mobility solutions; innovations that are useful to society. To take effective steps the Dutch automotive sector needs 4000 technicians per year. Fortunately Dutch automotive courses at the Eindhoven University of Technology and the Fontys University of Applied Science are increasingly popular, as are the vocational courses of the Regional Training Centres. Students work together with companies on the Automotive Campus to exchange knowledge. This hotspot is the home of the European Electric Mobility Center (EEMC), a Driving Guidance Center, a Manufacturing & Process Center, a Test & Education Center, and an Automotive Accelerator & Incubator Center. Here the automotive industry is taking the next quantum leap by developing such things as vehicle-to-vehicle communication. Cars, for example, that can communicate with one another. Thereby reducing both fuel consumption and accidents. www.automotivecampusnl.com

In a cross-over industry you need one another

A breeding ground for clean mobility solutions
The Netherlands is a high-tech nation. This is reflected by world rankings. And also by the irresistible lure of the ‘smart regions’ of the country.

€ 32 billion
In 2009 (latest available data) the export value of the high-tech sector was € 32 billion.

Capital-intensive
The high-tech industry is capital-intensive collectively investing more than € 2.3 billion a year in house research and development, which is almost 50% of all private R&D in the Netherlands and 10% of the sector’s added value.

60 nationalities
There are some 60 nationalities working and studying in the Netherlands in the field of high-tech systems and materials, proving the attractiveness of the Netherlands for foreign knowledge workers.
Every 5 minutes a truck is born in Eindhoven, at DAF Trucks.

5 out of 12

The Netherlands won 5 of the 12 World Solar Challenges, a race for cars powered by solar energy held every two years. The race goes straight across Australia and covers a distance of 3021 kilometres.

Inventor nation

Dutch companies invented WiFi, the CD and the DVD. Bluetooth was invented by a Dutchman. And high-tech equipment from Dutch companies is used in 90% of all the silicon chips produced worldwide.
Interview

‘The Netherlands has much to offer business and talent’
Amandus Lundqvist is figurehead of the Dutch Top Sector High Tech Systems and Materials (HTSM). He started his career at IBM in 1968, where he served as general manager and chairman of the management board from 1992 to 2001. Until 1 May 2010 he was president of the Eindhoven University of Technology executive board. Lundqvist is also chairman of the SURF foundation, where institutes of technology, universities and research institutes cooperate on pioneering ICT innovations.

The solution is high tech

Holland, land of tulips and cheese. Not the worst image for a country to have, as Amandus Lundqvist admits, but it is needs adjusting. “We have an excellent high tech sector employing 400,000 people where businesses, researchers and government all work in close cooperation. This is how we develop high tech solutions to global problems and the world should know about it.”

You say that in other countries the Netherlands stands for tulips and cheese. But what about Philips?

“Everyone has heard of Philips. But talking to people in Germany, one of Holland’s biggest markets, you soon discover that most of them do not even know that the multinational Philips is a Dutch company. In recent years Philips concentrated its efforts on lighting and medical equipment. The company is a world leader, but not in a sector that produces the same kind of fame and recognition as consumer electronics.”

Why does that matter? Surely the high tech sector has more to offer?

“As you well know, Philips started out in the late nineteenth century as a light-bulb factory and has countless innovations in its name. But knowledge clusters and specialised chains of supplier companies sprang up around companies like Philips, aircraft component manufacturer Fokker and truck maker DAF, so that these companies are often world players in their chosen niche. This is the way we do things in the Netherlands. There is excellent coordination between entrepreneurs and research scientists inside the chains, to encourage innovation and attract and train young people, setting common objectives and drawing up roadmaps in the process. Such open cooperation, in a country where people are never physically far apart, makes the Netherlands a highly attractive location for starting a business. Not only for foreign companies but also for high tech talent.”

So you are a kind of lobbyist?

“I wouldn’t put it that way. A lobbyist serves a single interest, whereas I work for the Netherlands. I am the standard bearer of the High Tech Systems and Materials Top Team, which also includes a scientist, a top civil servant and an innovative SMB player. Our aim is to encourage mutual cooperation, draw up roadmaps and sign innovation contracts in the sector. It is a sector in which the Netherlands excels worldwide. We want to secure and strengthen that position through investment and innovation. By putting SMBs in contact with researchers at universities we also hope to make them more innovative. ‘Global challenges, Dutch solutions’ is the ambition of the sector. We are of course referring to high tech solutions that contribute to present and future prosperity. And help us meet global challenges in health, mobility, energy, climate and safety.”

How do you become a world problem solver?

“We open up the fundamental research carried out at universities by connecting it to research on practical applications. This has led to the manufacture in the Netherlands of ultra light, durable, fuel-saving materials for the automobile and aviation industries. And robots that do the heavy lifting for physiotherapists, so that more people can receive rehabilitation treatment for longer. Nano-microscopics recently led to a breakthrough in cancer research. Without innovation I don’t think prosperity and well-being are possible. But the growing role of technology touches important social issues. We can monitor elderly people 24 hours a day for example, or have them looked after by robots. But is that a good idea? Fortunately we have not lost sight of the human perspective in the Netherlands. And the reason for that, if you ask me, is because we work so close to actual practice.”
Eye operation with steel grip
During operations eye surgeons have to be extremely careful not to damage delicate tissues. This is where the Eye Robot for Haptically-Assisted Surgery (Eye RHAS) being developed by Preceyes Medical Robotics at the Eindhoven University of Technology (TU/e) can help. Surgeons can operate with twenty times more precision, because now for the first time they can feel the force exerted on the eye by their instruments. By deploying a joystick-controlled robot new procedures are brought within reach, which surgeons cannot perform by themselves. The robot also allows older surgeons, whose hands tremble more, to carry on longer in their profession. [www.preceyes.nl](http://www.preceyes.nl)

Rehabilitation robot does not tire
Learning to walk again is hard work when you are paralysed on one side or have partial paraplegia due to a brain haemorrhage. As it is for the physiotherapist. This kind of work is highly labour-intensive. Walking exercises sometimes have to be supervised by several therapists, who run the risk of injury due to the repeated lifting. In a world whose population is aging there is a growing need for this kind of physiotherapy.

A rehabilitation robot, developed by researchers of the University of Twente in cooperation with the business community, takes over the most physically demanding work of the physiotherapist. LOPES (LOwer-extremity Powered ExoSkeleton) is an ‘exoskeleton’ worn by the patient during rehabilitation. The ExoSkeleton enables users to exercise more and longer and therefore to make quicker progress.

[www.utwente.nl/ctw/bw/research/projects/lopes.doc](http://www.utwente.nl/ctw/bw/research/projects/lopes.doc)

Strongest fibre floats as well
The strongest fibre in the world, Koninklijke DSM says so itself. And since the super strong and light synthetic fibre Dyneema was developed in a DSM laboratory more than thirty years ago, no-one has succeeded in refuting that claim. 95 percent of the polyethylene molecules are aligned to the length of the thread, so almost all contribute to the tensile strength. Dyneema is used in protective gloves for butchers, in medical applications (to repair damaged connective tissue) and in the shipping industry for ropes, sales and boats. Efficient, sustainable and delivering better performance. The same thing can be said of Arnitel Eco from DSM, a copolyester thermoplastic 50 percent comprised of sustainable materials, used in consumer electronics and the automotive industry. [www.dyneema.com/emea](http://www.dyneema.com/emea)

Have a NICETRIP!
A tilt rotor is the ideal combination of an airplane and a helicopter. In horizontal flight a tilt rotor machine is not just quicker but more economical and quieter than a helicopter. At the same time it has the speed, capacity and range of an airplane. A tilt rotor is just as flexible as a helicopter making it an efficient means of transport in e.g. the niche market of supplying oilrigs and flights to other places not easily accessible. The National Aerospace Laboratory of the Netherlands (NLR) is making a vital contribution to the Novel Innovative Competitive Effective Tilt Rotor Integrated Project (NICETRIP). NICETRIP is aimed at producing an advanced European tilt rotor with both adjustable rotors and wings. NLR has designed and built to scale a model of a highly complex wind tunnel. Wind tunnel testing at the DNW, a subsidiary of NLR and DLR Germany, has cleared the way for a demonstration aircraft capable of flight. As mass production of the tilt rotor takes off, future business prospects for Dutch industry will be enhanced thanks largely to the pioneering role of the NLR in this project. [www.nlr.nl](http://www.nlr.nl)

Best Practices
Lighter and more aerodynamic
Although modern aircraft have become more fuel efficient, little has been done to make the materials used in the aircraft body more sustainable. This, however, is about to change: DSM has developed a carbon fibre composite resin which makes light aircraft even lighter and more aerodynamic. This means greater flight speeds, less fuel consumption and a reduction of the environmental impact. LH Aviation’s LH-10 for example – made of DSM’s Aerolite® carbon fibre resin – is the fastest plane in its class and has the lowest environmental footprint. With a fuel tank of 70 litres, it can fly for 8 hours at a top speed of 370 km/h with a maximum range of 1480 kilometres. This is the equivalent of Paris to Lisbon, with lower fuel consumption than the average car! Royal DSM is a global science-based company active engaged in health, nutrition and materials. www.dsm.com

Browse and discover geo-layers
Smartphones can add an entirely new layer to our reality. Data in the browser is set up in the form of layers. Layers are web services serving geo-located points of interest in the vicinity of the user. They are developed and maintained by third parties using a free API. The Layers section is home to thousands of ‘geo’ layers, which tell you more about the world around you. Users get started by browsing catalogue categories such as Food & Drink, Weather, and Art. Layer is the world’s largest mobile augmented reality platform, with more than one million active users and thousands of developers. Layar brings impactful augmented reality experiences into people’s everyday lives. The Layar platform is available on Android, iPhone, and Bada devices, comes globally pre-installed on millions of phones, and is promoted by leading handset manufacturers and carriers like Samsung, Verizon, and Sprint. Layar as a Dutch company is responsible for their validation in the publication process. www.layar.com

Inkjet: sustainable digital textiles
They have always been pioneers and innovators at Koninklijke Ten Cate. Ten Cate was designated ‘Koninklijk’ (Royal) in 1852, when the company successfully applied the revolutionary English steam technology. In 2013 the textile technology concern completed the transition from analogue to digital refinement of technical textiles. A digital inkjet machine was deployed after eight years of development at the Ten Cate Protective & Outdoor Fabrics location in Nijverdal. Digital revolution inside the technical textile industry brings substantial savings with respect to water, energy and the amount of chemicals used, such as dyes and pigments. This enables Ten Cate to deliver mass-customised goods on-demand on the basis of a flexible, sustainable and cost-effective production process. www.tencate.com

Smart with electronics
How can you generate power with alternative methods? How do you save energy? People insulate their homes, lower the heating and switch off the lights when they don’t need them. Now we are taking one step further towards a sustainable future with smart electronics. The Dutch company NXP is helping the process along. NXP designs and produces chips that can substantially reduce power consumption throughout the entire (energy) chain. These chips improve both energy-efficiency and the quality of life. They take a smart approach to the generation, transport, storage and conversion of energy. As the efficiency of these processes is improved, less power is used by the equipment. The GreenChip makes computers more economical because they make more efficient use of the available energy. Many lamps also have a chip for efficient energy consumption. As a bonus, these lamps can be connected to the internet so that the user can control the lights in his house using a Smartphone. www.nxp.com
Into the future

Hundreds of container ships pass by the Hook of Holland every day on their way to the port of Rotterdam or having just left it. In clear weather, you can see the ships sailing out in all directions. It is strange to think, though, that the mouth of the river they pass through can be completely closed. But it can. If there is a heavy storm and safety in the delta can no longer be guaranteed, the hefty doors of the Measlant flood barrier close against the water. Ships cannot get in or out. “Living in a delta is fantastic but you always have to be on your guard,” says Sybe Schaap, chairman of the Netherlands Water Partnership.

A high-tech ecosystem

The best supply chain in the high-tech sector? That is to be found, of course, in the smartest region in the world. There is no lack of confidence at Brainport Eindhoven! Thanks to smart cooperation and setting common objectives, the 82 Dutch companies of the high-tech manufacturing industry – Brainport Industries – are ready for the Fourth Industrial Revolution. From implementer to developer.
Suppliers in the high-tech industry stopped being no more than implementers a long time ago. “The role of supply companies has grown steadily in recent years”, says John Blankendaal, director and initiator of Brainport Industries.

Big Dutch companies like chipmaker ASML, developer of electron microscopes FEI Company, printer and photocopier maker Océ and Philips Healthcare are increasingly outsourcing the manufacture of components. “Including the engineering and development of component production”, according to Blankendaal. “Big companies like Philips used to do everything internally. Now production is left to the chain of businesses in the high-tech manufacturing industry. Such a chain is flexible. When market demands change, it is far easier to adjust and steer such a chain than it is with a giant concern.”

Industry 4.0

Blankendaal saw the start of that development ten years ago. He also saw that not all suppliers had the size or clout to attract and keep talent or get involved in foreign markets. So in 2011 Brainport Industries was launched, ‘a cooperative society’ according to Blankendaal, in which the companies are the shareholders. Within two years the numbers grew to 82 companies of which 55 have their headquarters in the Eindhoven region. Motto: ‘Your high-tech open supply chain’. Blankendaal: “In today’s world everyone is talking about Industry 4.0 and decentralised, flexible, digitised production. The Fourth Industrial Revolution. ‘Network-economy’ is the new buzzword. That proves we are on the right track, because we form just such a network in the field of high-tech manufacturing technology.”

The best supply chain

Not only that, it shows that Brainport Industries has a head start when it comes to becoming the best supplier chain in the world. In Germany – one of the most important markets for the Dutch high-tech sector – there are similar clusters of a strongly regional nature. But in Eindhoven they go further than simply sharing infrastructure. “We work more closely as a team, in a business-oriented way. We draw up roadmaps, setting out the goals and markets we are joining forces to tackle. In areas like 3D-printing.” Those who join us gain access to a gamut of knowledge and capabilities and chain of 9000 people. Blankendaal: “Competition is increasingly between chains rather than companies. Every time we admit a new member, we look at how the company in question can help to improve the competitive strength and professionalism of the whole.”

Think: co-creation

The choice of Brainport Regio Eindhoven as middle point is no coincidence. In the shadow of Philips, which has its roots in Eindhoven, numerous small and medium-sized companies sprang up there in the previous decade, from applied sciences to industrial design. Add to that the leading Eindhoven University of Technology (TU/e) and it is obvious why Brainport Regio Eindhoven has twice been hailed the ‘smartest region in the world.’ But, as Blankendaal is quick to point out, the members come from all over the Netherlands and their scope is global. Think: co-creation. Forget the classic model in which an outsourcer passes on the specifications and price for which it has to be made. Blankendaal: “Because a year later he is bound to be back at your door asking you to make it for 10 percent less. Our answer to this problem is cooperation.” One example of co-creation by customer and supplier is the revolutionary fast Pathology Scanner. The brand name is Philips, but three other companies from Brainport were involved in its development and production: CCM, Frencken and Prodrive. The electron microscopes of FEI Company were also created in cooperation with various companies.

From implementer to developer

Together the member companies of Brainport Industries develop new prototypes and new production lines which will ideally serve as collective platforms for several companies at once. Their new role is also leading to an internal revolution among suppliers as they make the transition from implementer to developer. “We need the best people and the best brains”, says Blankendaal. “Attracting and holding on to skilled workers is very difficult for individual companies, especially considering that as a result of the changing tasks, the need for appropriately qualified personnel is greater than ever. Under the umbrella of Brainport, collectively, it is a lot easier to promote technology. We set up a board to train people. And together we are big enough to take the step abroad. By connecting we expand the competitive strength of the Dutch high-tech manufacturing industry.”
Innovations

Smarter living is better living

As we get older we need more care. How do we maintain and develop a high quality of life for people, irrespective of their age group? The cooperative society Slimmer Leven 2020 (knowledge institutes, hospitals, businesses, municipalities and other parties) is working on solutions in the field of care, residential accommodation and welfare. Care, mechatronics and ICT are cleverly combined so that in their advanced years people still have control over their own lives and care providers are able to operate more effectively and more efficiently. Using audiovisual contact for example, making it easy for the elderly and the sick to contact their doctor, family caregiver or fitness instructor.

www.slimmerleven2020.org/en

250 researchers, 1 goal

Solliance has everything going for it. A brand-new, multifunctional high-tech lab on the Eindhoven High-tech Campus. And a suitable ambition on the part of the six research institutes (ECN, TNO, Eindhoven University of Technology, Holst Centre, Imec and Forschungszentrum Jülich) cooperating under that name. Namely, to strengthen the region of Eindhoven (NL) – Leuven (B) – Aken (D) as a world player in thin-film solar cells by sharing state-of-the-art infrastructure, coordinating their research programmes, and close cooperation with the business community. And by synergy, with more than 250 international researchers working for a common goal!

www.solliance.eu

The power grid adopts a constructive approach

Smart Energy Collective (SEC), a joint venture of almost 30 companies, wants to keep the power supply affordable and reliable. Intelligent networks or ‘smart grids’ fine-tune the supply to the demand and vice versa (the actual load on a power grid to the availability of alternative energy). The end-user regulates his own (sustainable) energy housekeeping. All the parties in the energy chain work together on this, from network managers and power suppliers to installers and end-users. Trial projects with companies and households are under way at five locations in the Netherlands as a first step towards a smart national network. www.smartenergycollective.com
Innovative composite takes off

The search for light, tough materials goes back to the time when the Netherlands first started making its own aircraft. Under the wings of Fokker Aerostructures the TAPAS (Thermoplastic Affordable Primary Aircraft Structures) project concentrates on the application of innovative composite materials in aircraft components. With the help of such knowledge and skills the Dutch aviation cluster can compete for orders for work packages in future Airbus planes. Fokker already uses thermoplastic composite materials on the welded front edges of the wings of the A380 Jumbo and the rudders of the Gulfstream G650. Also taking part in TAPAS are Airbus, Ten Cate, six SMBs and knowledge institutes. www.fokker.com/Tapas-Project

A power plant in the home

Solar and wind energy cannot replace all of the energy we get from fossil fuels. Which is why we have to use those fuels as efficiently as possible. Micro Turbine Technology (MTT) in Eindhoven in cooperation with knowledge institutes and suppliers have developed a 'miniature power plant' which generates heat and electricity in the home using natural gas. Combined Heat and Power (CHP) means there is no transmission loss between the plant and the house, so that almost all of the available energy from the fuel is utilised. It is cheaper for the consumer to generate his own electricity because of the low price of natural gas in comparison to electricity. www.mtt-eu.com

A face in the crowd

The company Eagle Vision working with research scientists from the University of Amsterdam has developed a camera for analysing the behaviour of people in crowds. An advanced 3D sensor makes it possible to follow people's movements reliably over long distances. Such real-time measurements can be used to improve flow and safety, but the technology also has applications in health care and the analysis of consumer behaviour. And without infringing privacy since the identity of persons is not explicitly established. The sensors are easily installed and linked to a network for effective coverage of very large areas. www.eaglevision.nl
It can be lighter and stronger

Ten Cate is a world leader in thermoplastic – recastable and recyclable – composites for applications in aviation and space travel. These light but extremely strong high-value thermoplastic materials are increasingly used in the automotive sector as well. The big advantage of thermoplastic is the speed of processing – it is among other things easily recastable under high heat and pressure over a long period – allows companies to use these composites in large volumes for industrial manufacturing processes. “A sustainable and economically viable solution”, says Frank Meurs.
“I may be the last traditional textile engineer in our company”, says Frank Meurs with a laugh. ‘Our company’ is Ten Cate, one of the oldest companies in the Netherlands. The founders of Ten Cate began trading textiles in the early 18th century. Since the introduction of the then revolutionary steam technology in 1852, Ten Cate has been able to call itself ‘Koninklijk’ (Royal). Today it is a multinational enterprise, setting the tone in areas like artificial turf, bullet-proof materials, tent-cloth, protective fibres and thermoplastic composites. This was already the case when Frank Meurs came to work for Ten Cate more than twenty years ago: Ten Cate had grown from a textile factory into a textile technology concern employing 5000 people worldwide. As group manager Meurs directs Ten Cate Advanced Composites, which makes thermoplastic composites for applications in (among other things) the aviation and space travel industry. It started as a single department of thirty men; today it is a chain of nine business units in Europe and North America.

What do you consider to be the biggest challenge facing this ‘composite cluster’?

“To develop more industrialised modes of production. We currently supply welded front edges for the wings of the A380 Jumbo, the biggest passenger aircraft in the world. There is still a lot of manual work involved in both the materials and the processing. Fortunately this is no problem because no more than two planes are made each month. It is a different story with the TAPAS project, in which six SMBs and knowledge institutes take part, where we are in the race to develop components for the A320 – the plane used by EasyJet. Two A320s are made every day. That means we have to increase our production speeds and cut back the costs per unit.”

How do you plan to make the transition from manual work to large volumes?

“Among other things by putting a lot of work into applications for other sectors. Several years ago the use of thermoplastic composites in the automotive industry started to pick up momentum. Our basic strategy remains the same: to bring knowledge and skills together in a consortium, in this case eTAC, which stands for European Thermoplastic Automotive Composites. The EU has laid down strict requirements on the level of CO₂ emissions from cars but smaller engines are not enough, on their own, to fulfil those requirements. This encouraged the use of lightweight materials and therefore of thermoplastic composites.”

You saw it coming?

“You could say that. When other companies pulled out because the market was not ready and the car industry was still not thinking about composites, we carried on developing and processing. We started, in cooperation with our partners, on small applications in the aviation and space travel industry and we stuck with it, which is why we are now ready for the bigger task at hand.”
Atmospheric research into climate change

Tropomi is the only scientific instrument on board ESA’s Sentinel-5 Precursor satellite. Tropomi will map out the entire atmosphere on a daily basis, looking at things like carbon monoxide, methane, nitrogen dioxide, ozone and fine dust. The uniquely high resolution of Tropomi, seven times better than any previous instrument, makes it possible to look through the clouds and observe air pollution in urban areas. This means we can find out more about the causes of climate change. The building of Tropomi is part of the national space programme of the Netherlands. The launch of Tropomi is planned for 2015. www.spaceoffice.nl
More roads are not the answer here

Car ownership in Brazil has increased by 119% over the last ten years. Rio de Janeiro and São Paulo are among the worst affected cities in the world when it comes to traffic jams. The traditional answer? Build more roads or widen existing roads. But this is no longer practical or effective. Fortunately however there is a solution. The TomTom Traffic navigation system gives drivers accurate, up-to-date traffic information about their route. Forecasts tell you whether a traffic disruption is getting worse or clearing up, and approximately how long the disruption is expected to continue. This is one way to get the traffic of São Paulo moving again. [www.tomtom.com](http://www.tomtom.com)

High-tech agricultural management

When water is scarce, using every drop is essential. The Dutch consortium Dacom, Soil Company and WaterWatch demonstrated on three Egyptian farms (strawberries, grapes and potatoes) how water can be used more sustainably and optimal. Maps of the fields were compiled to show ten different soil parameters that influence the irrigation management. Remote sensing with satellite images was used to detect field differences in biomass and crop water use. As a result, the amount of water and fertilizer used in strawberries was reduced from 834 mm to 431 mm (48%) without negative effects. The yield of potatoes was increased with 8%. [www.dacom.nl](http://www.dacom.nl)
Is Peer+ about to become very big very fast?

TW: “I hope Smart Energy Glass grows fast, but we prefer Peer+ to stay small. I want to make sure we keep the independent spirit of a start-up, even if we do cooperate with a much larger company. Our small team has achieved great things, especially in comparison to the big glass companies and their massive budgets. We were the first to realise this unique product concept. And our future partners understand that innovation always benefits from a certain amount of freedom.”

Is it time to part company?

SB: “Yes, that moment is approaching. The Innovation Lab offers guidance and supervision to dozens of start-ups to help them achieve success more quickly, both by financing and through our network. Since part of the technology often originates from research carried out at our university, we take a share in these companies. But when an external party starts to show an interest we sell our share. It is marvellous to be involved with these young and enthusiastic people, but perhaps the best moment of all is when they become independent.”

Why so much interest in this product from Peer+?

TW: “Offices are energy guzzlers, often not nice to work in because of the lack of natural light. We developed glass that can obstruct light or allow it to pass through according to the needs of the user. It can also generate electricity. The windows pay for themselves by effectively blocking heat and reducing the need for air conditioning. The potential of Smart Energy Glass is huge considering the number of office buildings worldwide. This ‘smart glazing’ can also be used in homes, and even on car roofs.”

What did Innovation Lab think of the idea?

SB: “This product could conquer the world, I agree with Teun there. It has all the potential to become a worldwide standard. You can already see the market responding and swinging into action. I am extremely pleased to see the perseverance of Teun and Casper rewarded after all these years. TU/e develops many other patents which are passed on to companies under licence. In the case of Peer+ it was decided to set up an internal university spin-off. That was undoubtedly a consequence of the
Peer+ Smart Energy Glass started out with two people and an idea in 2008. Today the company of Teun Wagenaar and Casper van Oosten employs nine people and is fully self-sufficient. The company still operates from the incubator building at the Eindhoven University of Technology, but it is outgrowing its original accommodation. A chemicals multinational is knocking at the door.

enthusiasm, professionalism, drive and entrepreneurial spirit of the founders.”

Is it hard going Teun?

**TW:** “I have to travel a lot. We prefer to work in partnership with big glass manufacturers rather than making the glass ourselves. That allows us to concentrate on developing the technology. We can test concepts on our trial production line for customers in Europe, America and Asia which means they don’t have to set up their own research departments. As a small-scale unit we can also respond very quickly to the demands of the market. This is what makes us so attractive as a potential partner.”

Do you keep in touch?

**SB:** “The University remains the knowledge base for companies we helped to create. They continue to have their research done in Eindhoven, even long after they have become fully-fledged, independent companies. At that stage we enter into research contracts with them, in the same way as we would with ASML or Philips.”

**TW:** “Yes, those ties continue as a matter of course. We are developing software with the Civil Engineering department to measure the effects of smart energy on buildings. This is something we prefer to do inside the academic world, so that customers can be absolutely sure our claims are well substantiated. This is another reason why we will never renounce our roots as a TU/e start-up.”
Doing business with the Dutch
This is the portal to doing business with the Netherlands. Here you can find information about Holland, markets, rules and regulations. The information centre will help to match you up with interesting Dutch partners: www.hollandtrade.com/business-information

Dutch diplomatic missions and Business Support Offices
This provides you with useful business leads and contacts through their international network. Staff will assist you with your trade requests and introduce you to the various trade programmes: www.minbuza.nl/en/services/tradeinformation/trade-information.html

Network of Innovation Attachés
Innovation Attachés act as liaison officers during international collaboration with Dutch top sectors. They are posted at embassies and consulates: http://english.rvo.nl

Netherlands Foreign Investment Agency
The NFIA is the first port of call for foreign companies wanting to set up business in the Netherlands and take advantage of the Dutch business environment as a strategic base for doing business in Europe: www.nfia.nl

Dutch Top Sectors
These are the sectors in which the Netherlands excels globally and which receive high government priority. They are as follows: Water, Agri-food sector, Horticulture and starting materials, High Tech, Energy, Logistics, Creative Industry, Life Sciences and Chemicals: www.government.nl/issues/entrepreneurshipandinnovation/investingintop-sectors

Top sector High Tech Systems and Materials
Top sector High Tech Systems and Materials (HTSM) is a collective project of the Dutch government, corporations and research institutes to promote and support the national and international HTSM sector. Top sector High Tech has set an ambitious and firm goal: http://topsectoren.nl/high-tech

Holland High Tech
Dutch companies and knowledge institutes in the high tech sector are renowned for their technological excellence and are among the world’s best in their market segments and niches. These properties make the Netherlands an excellent ‘place to be’ for technical solutions to challenges society is facing today in the areas of mobility, health, renewable energy, security, and climate change: www.hollanndhightech.nl/int