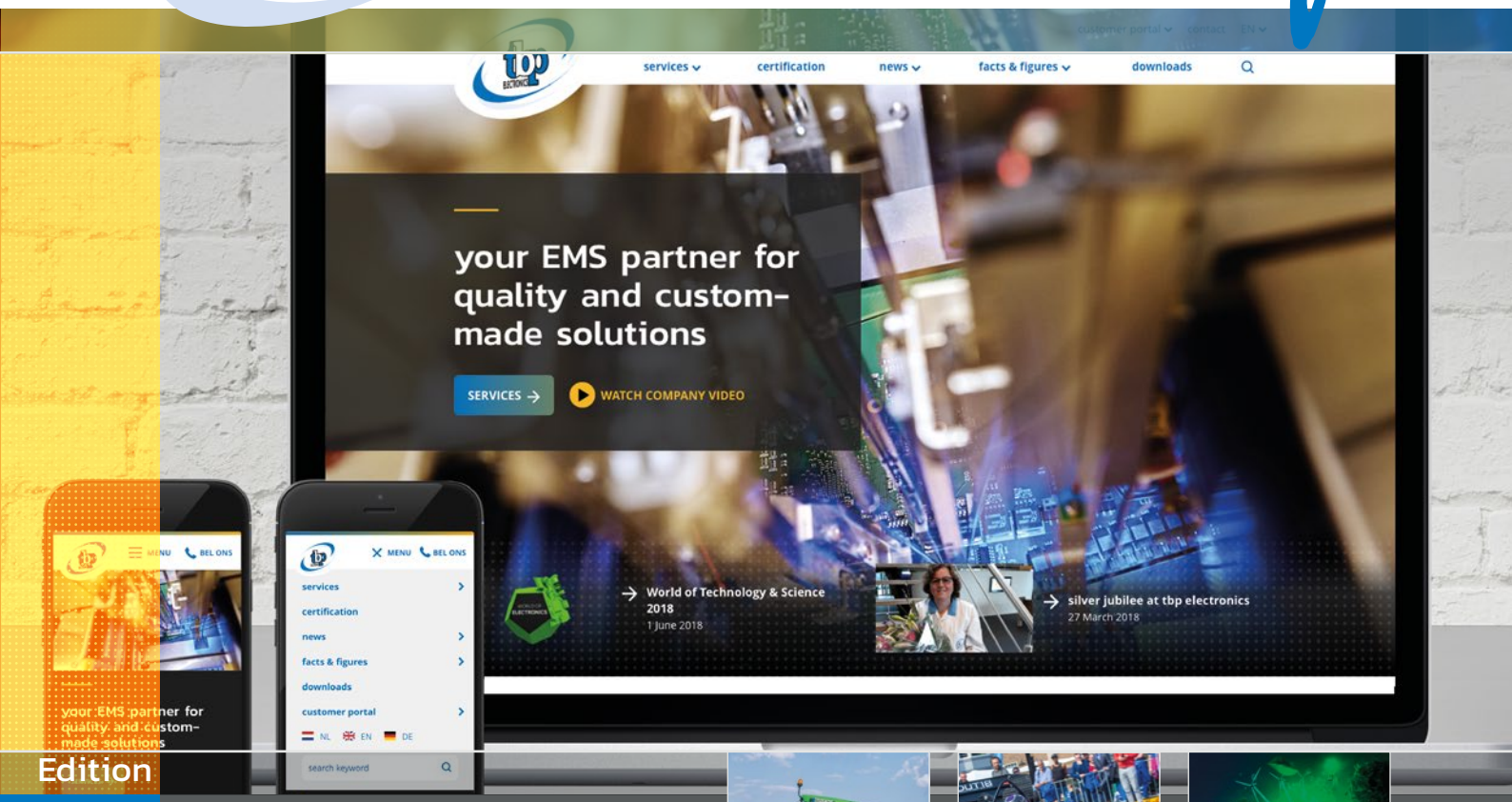
the business of perfection

tbp ELECTRONICS

WAY of life



Edition
42
Sept 2018

column

call for help

Not much has changed. I've got four years older and to quote myself from this column in September 2014: "I am certainly not saying that it is impossible, but that it will require a lot of time and energy."

For a few years now we have been in the middle of the transformation to industry 4.0, often referred to as smart industry. And smart ... that means clever doesn't it? The main objective is to connect everything together using "the internet of things". But what needs to be connected in our manufacturing industry? In practice, suppliers and customers inhabit their own islands and they want to keep it that way. Frantic attempts are being made to meet each other, but to do so you have to choose an island [note: we recommend Goeree-Overflakkee].

There is still no overall solution. The ultimate intention is for software packages to "speak" to each other. But this has not happened yet. To achieve that – even nowadays – people need to speak to each other, which in practice appears to be something of a utopia. At tbp, a great deal of time and money is being spent on M2M communication, but the headwind we are struggling against is caused by the world around us.

Everyone is convinced that a standard must first be set. Various standards are under development, but where is the standard for the standard? We have one that is already several years old, SMEMA, but we know that this can be interpreted in several different ways. With all of the associated consequences ... The problem often lies with its inventor: a thorough understanding of software, much better than ours in fact, but unfortunately no understanding whatsoever of our processes.

And that's just one problem with smart industry. Not to mention the component suppliers. You don't want to know how many different components there are without a standard: some fifteen million! When components reach our manufacturing industry - which is no longer certain at the moment - all of the data attached to the MPN number disappears. Why?

This might appear to be a complaint, but nothing is further from the truth, as despite everything, it works pretty well. And let's be honest, it looks easier than it is. So we must take courage and not give up!

Ton Plooy
CEO

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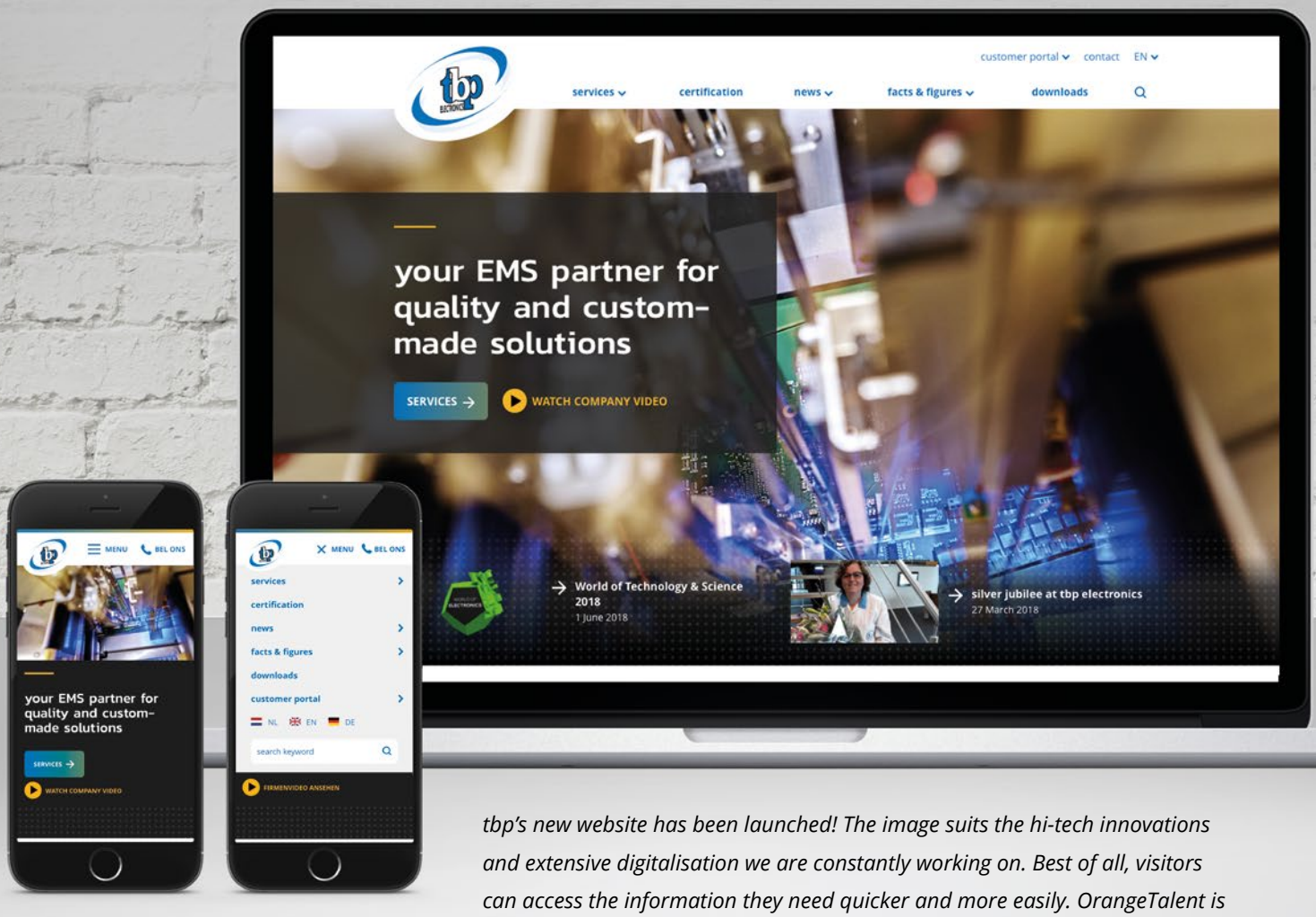
contents

new online business card



tbp's new website has been launched! The image suits the hi-tech innovations and extensive digitalisation we are constantly working on. Best of all, visitors can access the information they need quicker and more easily. OrangeTalent is responsible for the design and technology.

'The sleek design suits tbp's sophisticated nature. We want to surprise visitors to the new website with fascinating photos and films', says Niels Callenbach, the founder of OrangeTalent. 'As an online communication specialist, we ensure that our clients achieve the stated objectives via online channels. So we develop websites, webshops, digital newsletters and other communications based on an existing or new corporate identity.'

It is important to clearly establish the objectives and also to select the resources, as you can only spend the budget once. We help clients with this and also work out their entire marketing strategy including the required resources. Our designers create intuitive designs and our programmers ensure links to software packages.

"we want to surprise visitors to the new website"

combining expertise

'As a trend we are seeing that information is increasingly personalised by fine-tuning it to groups or even individual visitors. For us it is particularly important that the expertise of a client like tbp and our online marketing expertise converge. That leads to great results. And they are directly measurable digitally.'

check out tbp.nl

Here you will find an explanation of tbp's services, industry news, digital newsletters and the practical customer portal with access to the component list, online quotation request, order tracking and secure data transfer.

orangetalent.nl

ORANGETALENT opvallend online

Energy Island on innovations and sustainability

Goeree-Overflakkee wants to be fully energy-neutral by 2020. This ambitious objective has led to many initiatives on the island. On 8 and 9 December, Energy Island brought all of the developments in the field of sustainable energy and innovative care together. The borough of Goeree-Overflakkee organised a trade fair and conference in De Staver in Sommelsdijk. With the innovative care sub-session and a trade fair stand full of sustainable innovations by clients, tbp became very involved in the current local event.

Councillor Arend-Jan van der Vlugt gave the opening address, following which Maarten Steinbuch (TU Eindhoven) spoke about the sustainable future, Bernard Wientjes (University of Utrecht) about the sustainable Construction Agenda and Steven van Eijck (RAI Vereniging) about sustainable mobility. Various sub-sessions and drop-in sessions then alternated between various locations, presenting many promising ideas.

hydrogen

The King's Commissioner Jaap Smit summed up the successful conference. The 28 regional partners then signed the 'green' hydrogen covenant.

Hydrogen plays a significant role in energy transition. The surplus sustainable energy which will be available on the island after 2020, lends itself perfectly to the production of 'green' hydrogen. The province of South Holland has designated Goeree-Overflakkee as a testing ground for innovative projects in this field.

www.business-class.nl/nl/uitzendingen/video/q/onderwerp/energy_island/id/2410

innovative care

In addition to sustainable living and construction, sustainable mobility and food, innovative care was a significant theme of Energy Island. On the eve of the conference, the island-wide partnership arrangement Paulina.nu organised its own panel discussion with Ton Plooy as a panel member, in the presence of some 180 care providers, healthcare insurers and bank representatives. Paulina.nu, together with its affiliated partners, aims to maintain a high level of care on Goeree-Overflakkee that is also locally accessible and affordable.

Innovative care was also on the agenda during one of the sub-sessions of Energy Island which was intended for secondary schools in the region. Ton Plooy and Maja Rudinac, CEO & co-founder of Robot Care Systems, gave fascinating presentations to generation Z. The venue was tbp's own auditorium in Dirksland.

Ton has a clear vision of the future: care must be quicker, better and cheaper. Technological innovations play a significant role in this, with much greater precision. Thanks to our early supplier involvement, we cooperate with our customers at a much earlier stage. It is with good reason that we now have the medical accreditation ISO 13485. Promising products are now well under development, they just need to be accepted by all of the parties involved.'

With Design for eXcellence-analyses (DfX) and production of printed circuit board assemblies (pcba's), tbp is fully involved in technological care innovations. Examples of this are the intelligent blood pressure meters from Finapress*, the digital hand scanner from Macawi*, the EVA eye operation robot, Philips Healthcare facilities (editor's note: please see page 15 of Way of Life 39/40) and LEA care assistant. 'The first 100 units of this assistant have now been delivered and are being trialled on Goeree-Overflakkee. Care is going to change completely over the next few years, driven by technology. Young people are much more open to these developments. The students who visited the conference gave Paulina.nu an innovative care idea. 'We really need these types of ideas', says Ton.

** a subsidiary of Demcon*

On its own stand, tbp presented sustainable innovations from its customers Cleantron, Robot Care Systems, PHYSEE and DEMCON (see framed texts). The Formula Student Team Delft was also a guest with its DUT17 electric racing car. The new team is also sponsored by tbp with DfX analyses and the manufacture of pcba's for its successor, the DUT18 (see page 15 on).

Cleantron designs and manufactures battery packs based on lithium chemistry. The aim is to make them even cleaner and more affordable. Using smart cell management, cells can be re-used, as a result of which the batteries have a longer life. The energy sources are suitable for electric vehicles, care and industrial applications, as is the Triple, a flexible and sustainable vehicle based on Cleantron batteries.

cleantron.nl

cleantron®

Robot Robots Company supplies robots to organisations and companies. With Robot Care Systems, the company focuses specifically on care. One of the new applications is LEA, the 'Lean Empowering Assistant'. This personal care assistant provides elderly people and patients with support with their everyday activities. As a result they can remain independent and continue to live at home for longer. Communication is via the interactive dashboard.

robotcaresystems.nl

LEA LEAN EMPOWERING ASSISTANT

PHYSEE develops multifunctional windows for sustainable buildings. The PowerWindow is a fully transparent window that uses solar cells to convert light into electricity that is immediately available. This type of window is installed at tbp. Another type is the SmartWindow, with its sensors that record information from the outside environment and adjust ventilation and shade accordingly. The result: high light and air quality. The integrated control systems in the window ledges operate by sustainable solar technology.

physee.eu

PHYSEE

DEMCON designs and manufactures high-end technology for the hi-tech and medical sectors. For a new system of eye operations, EVA, DEMCON developed an innovative pump for the Dutch Ophthalmic Research Center (D.O.R.C.), which pumps sterile rinsing fluid through the eye. The pump accurately controls fluid flow and pressure thanks to sensors, enabling the surgeon to operate better and more stably. DEMCON integrated all of the modules to form the advanced but user friendly EVA.

demcon.nl

DEMCON

Children are the future

Young people from Goeree-Overflakkee have an interest in the developments in the field of sustainable energy and care on the island. Various students came to Energy Island, including 6th year technical secondary pupils from CSG Prins Maurits in Middelharnis. Ronéll Rosier, Marry van Ede and Lisa van Ede visited the trade fair, the conference and the tbp Innovative care sub-session to gain new expertise. This additional insight into technological care innovations has helped them with their profile papers on healthcare.

What was the reason for your visit?
We were in our final exam year and had the opportunity to write a profile paper. It had to be linked to our interests and profile subjects. All three of us had a nature-related profile. For our profile paper, we chose a subject that is related to healthcare and realistic, which is why we approached Paulina.nu as a client. The assignment also included activities to provide depth to the paper. That's why we registered for the sub-session. This enabled us to broaden our horizon and also it looked very interesting to us.

What do you think of the Energy Island initiative?
We think it's a good initiative, because it informs people about the developments on the island. You put people in touch with each other to consider the future together. You also learn a lot from it.

What did you think of the innovative care sub-session?
We found the sub-session very fascinating and informative from beginning to end. We didn't know that tbp electronics participated in so many innovative projects and that it is such a large and modern business. We found the story about LEA very interesting, as it gives you a vision of the future. We also got to know more about the possibilities for innovation in healthcare.

Goeree-Overflakkee is doing a lot for sustainability and innovations. If you work together on them, a great deal is possible.

from left to right: Lisa van Ede, Marry van Ede and Ronéll Rosier

putting energy into lowering energy consumption

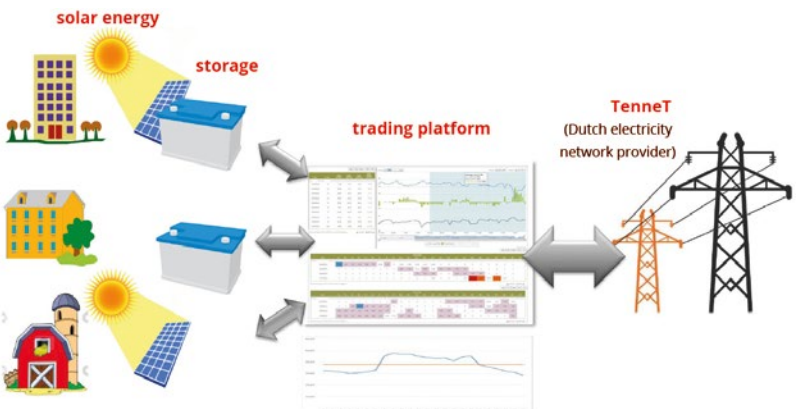
Energy consumption must continue to reduce, the management team at tbp is convinced of that. Energieke Regio, a local advisory body, conducted an energy scan which resulted in practical recommendations. In 2017, tbp achieved 10% saving, thanks to the energy reduction plan, and the same goal has been set for 2018.

In accordance with the recommendations from the scan, tbp invested in insulating retention walls for the synthetic façade elements to save energy. Solar panels on the roof generate energy which is used for production. The heating and cooling installations were also adapted, so that the residual heat from the machines can heat up cooler areas (also called a VRF system). And trainees critically analysed the lighting, which led to smarter switching using timers and motion detection to drastically reduce the consumption of lighting energy.

other measures

'We purchased a new vacuum pump that consumes less energy and only switches on when used. The effect is a 60% energy reduction', says Kees Vis, QA/QC & facilities manager at tbp. 'We have also segmented our premises in terms of lighting. The production hall and offices are not in use at the same times, which also applies to other areas, including the auditorium. We now switch the lighting on and off much more consciously. This saves a lot of energy, especially as we have installed LED bulbs and other types of sustainable lighting.'

There are two extra charging points for electric cars in tbp's car park, doubling the previous capacity. These are for visitors and for the company car drivers at tbp, as most of them drive a hybrid or electric vehicle. Sustainability is a structural focal point, also in 2018. For an ISO 14001 certified company like tbp, this is natural.

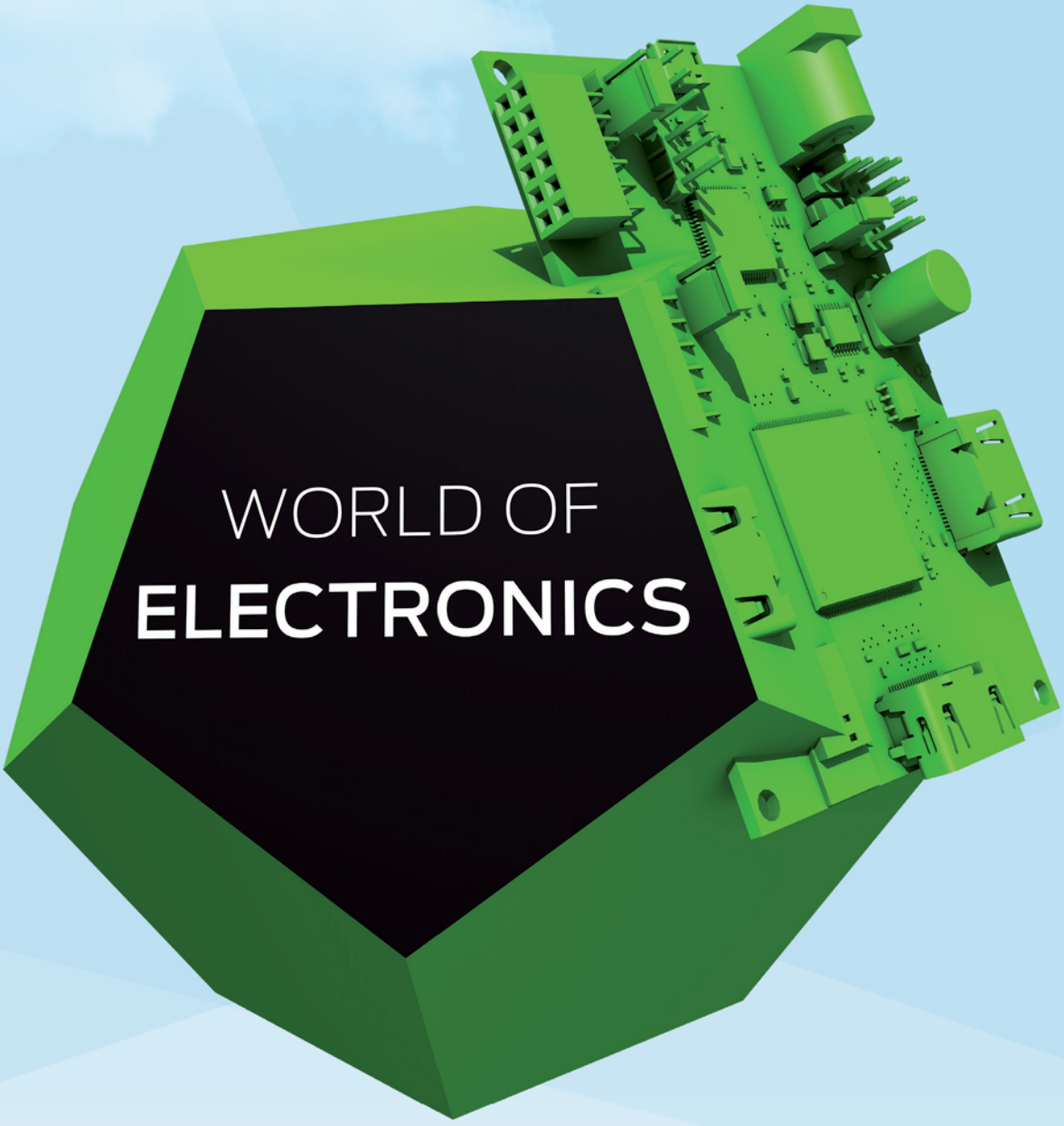


sustainable energy market

Like Kees, Jacob Herrewijnen, IT & risk manager at tbp, is a driven exponent of corporate social responsibility. He is a member of the working group that founded Energie Coöperatie 2.0 on Goeree-Overflakkee. 'The aim is to both supply and purchase self-generated green electricity' explains Jacob. 'Third parties may also participate. As a result, a trading platform has been created whereby green energy generates funds and becomes more attractive.'

The Energie Coöperatie is one of the many local initiatives toward a completely energy-neutral Goeree-Overflakkee in 2020. The local Energy Island, that took place last year, brought all of the sustainable initiatives together. The conference was also the venue for the signature of the 'green' hydrogen covenant by 28 regional partners (see page 4).

Electronics for industrial applications



2-5 October 2018

JAARBEURS UTRECHT

for free entry: go to tbp.nl

data intake ... an art in itself

Design analyses add great value to the quality of pcba's. With our early supplier involvement, we assess the customer's design for aspects such as test accessibility, test coverage and feasibility. Only this way can the best result be achieved at the lowest possible cost. Leen Biesemans requests the initial data as early as during the quotation phase.

'It is my job to request the correct data when interest is shown in our services. This enables us to make an accurate cost calculation for the design optimisation that we will be able to implement, which we call Design for eXcellence', states Leen, senior test & DfT consultant at tbp. 'Our engineering team in Eindhoven assesses the feasibility (Design for Manufacturing) and test accessibility (Design for Testing) of the technical design. The value of this is often unknown to new customers. We are happy to explain the possibilities for optimisation in a customer-specific presentation.'

required quotation information

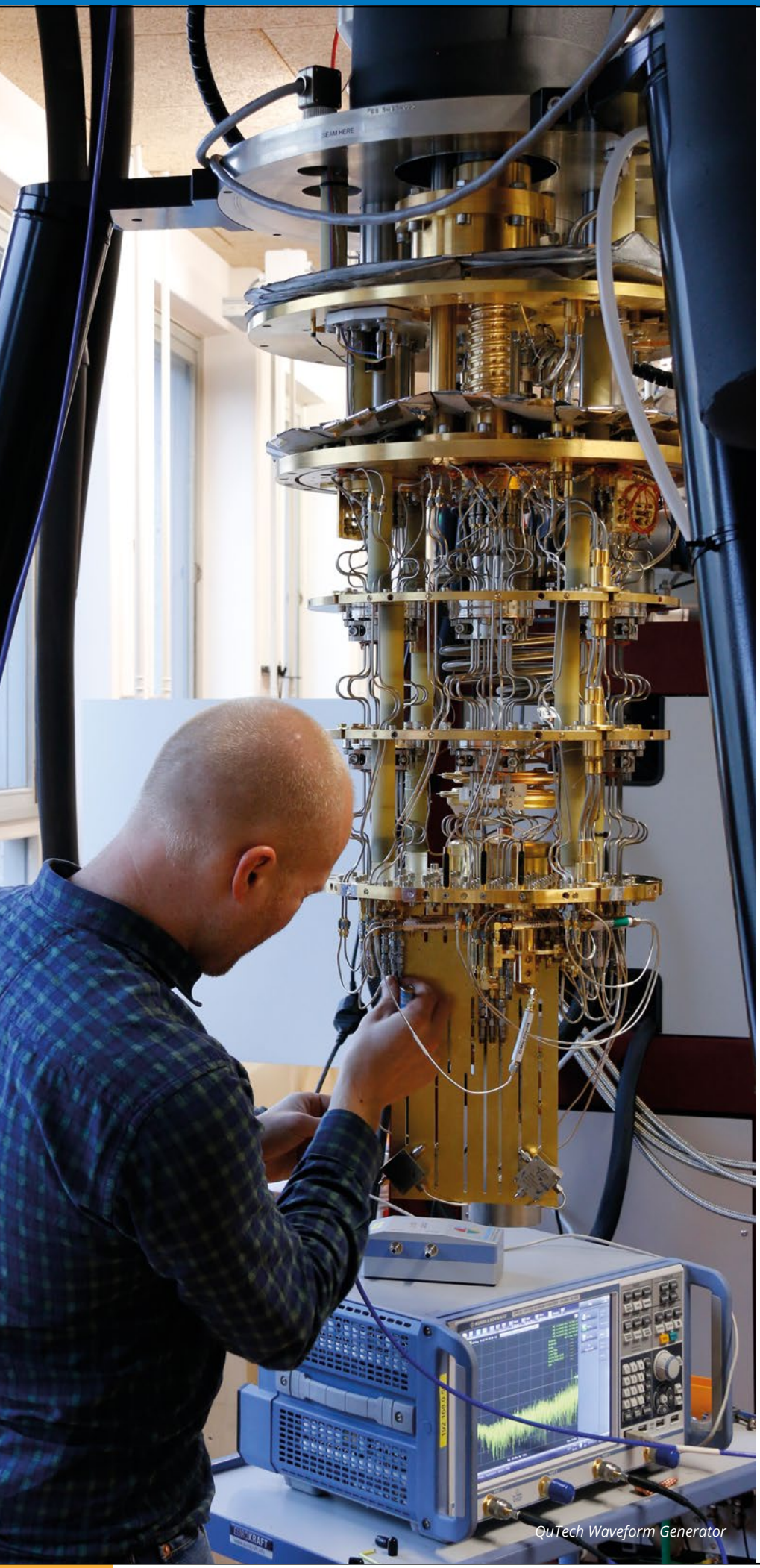
- parts list or Bill Of Materials (BOM) for all components, including Manufacturing Part Numbers (MPN) and manufacturer names
- electronic diagram in searchable pdf format
- CAD-data in ODB++ format
- calibration- and/or programming requirements
- (functional) production test requirements

For the secure transmission of your data we recommend that you make use of Cryptshare (see customer portal button on our website tbp.nl).

want to know more about design optimisation?

We will be happy to inform you! Call or email us for a bespoke presentation. Frans Geerts, business development executive, +316 5025 2708, fgeerts@tbp.nl

Leen Biesemans



QuTech Waveform Generator

at the wheel

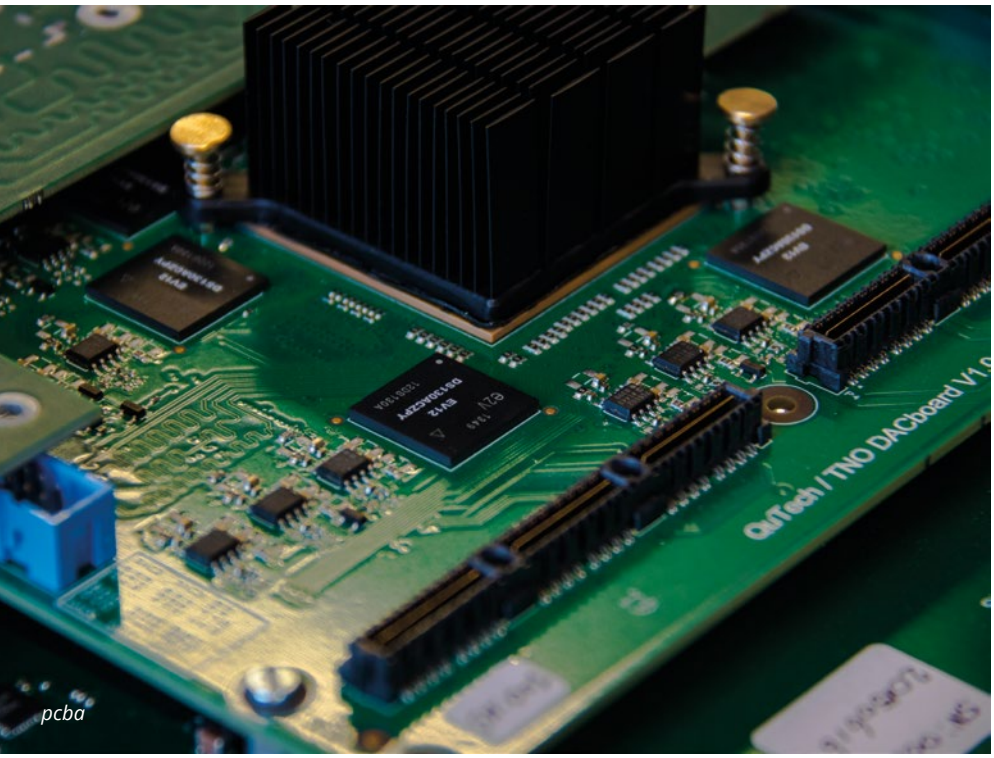
Some 200 professors, students, graduates and scientists work on the development of quantum technology on the campus of the Technical University in Delft. To be precise: equipment built to do quantum computation and quantum communication. They do this under the banner of QuTech, a collaboration between TU Delft and TNO, which has multinationals such as Microsoft and Intel as partners. tbp is also a link in this process that is making great advances.

Especially since QuTech became National Icon in 2014. The Dutch government awarded this status because of the large social and economic impact that is expected. 'Our goal is to build up an ecosystem for quantum technology', says Leonardo DiCarlo, associate professor of applied physics at TU Delft, specialising in superconducting quantum computers. At QuTech he is also roadmap leader. 'You do not have to be a quantum expert to be involved in this technology. The integration and interconnection of electronics are related challenges and there are many more. Quantum technology delivers progress and profit in several sectors.'

quantum bits

In QuTech's laboratory, the prototype quantum computer is evolving steadily. The quantum bits, or qubits function in a cooled environment at a temperature of -273°C, where little disturbances occur. As opposed to classical bits, which can be either 1 or 0, quantum bits (or qubits) can have a superposition of 1 and 0. This property can be used to make certain calculations faster than traditional computers could ever do, which is the power of the quantum computer. 'A major challenge is scaling up the number of qubits', explains Jules van Oven. He is electronics development & multiplication engineer

# of quantum computers



pcba

at QuTech. 'The capacity of the infrastructure to interface with the quantum chip is still limited. We are working on that and specialists such as tbp are also involved.'

QuTech Waveform Generator

tbp's products end up in the Qutech Waveform Generator: a device that controls the qubits by generating analogue waveforms. The generator consists of 12 cassettes, each with 5 types of printed circuit board assembly (pcba's). 'The most important criteria are quality and delivery reliability', continues Van Oven. 'Pcba's are an integrated part of a large and complex system with a long development process and considerable costs. We must be able to rely on the pcba's to function exactly according to our specifications and to be available according to our tight timelines. That is why tbp was involved in the review of the designs. It was not a simple task, because several of our own and external designers had worked on this product.'

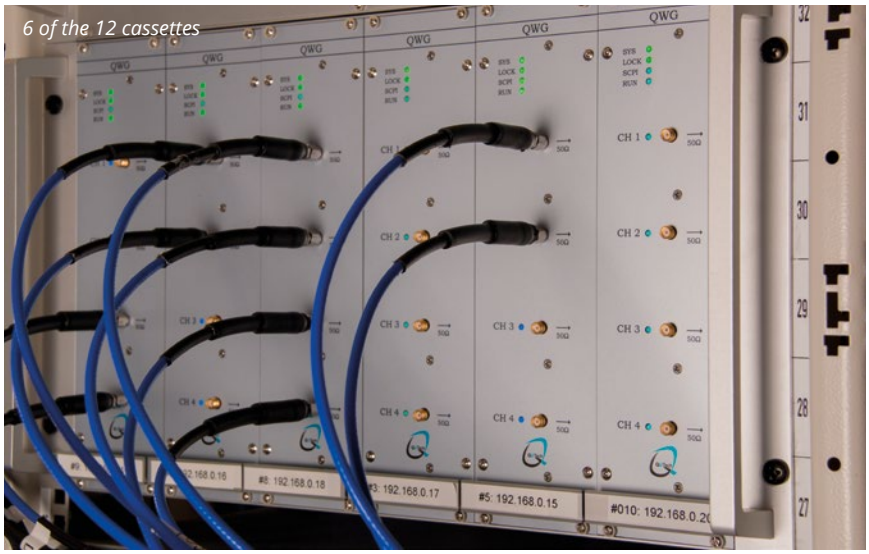
'With Design for Manufacturing (DfM), tbp has analysed our designs and made adjustments that maximise manufacturability and delivery quality. We are very positive about the partnership. During our visit to the production location in Dirksland, we discussed the feedback on our designs in all openness, from both perspectives. And, importantly, our tight schedule was met.'

> *"engineering complexity has increased enormously"*

on the market

'Engineering complexity has increased enormously in recent years. That's why it is important that we cooperate with experts such as tbp', emphasises DiCarlo. 'We want to fully focus on the development of quantum technology and create global standards. In the meantime, we are refining the prototype Waveform Generator. The first series is intended for QuTech, but later series will be put on the market. That moment is not too far away now.'

qutech.nl



6 of the 12 cassettes

knowledge sharing ...

WoTS

... at WoTS: 2 to 5 October 2018

World of Technology & Science (WoTS) and Industrial Processing have been combined this year to form one trade fair for a complete overview of related technologies. Five themes each have their own conference: World of Automation, World of Laboratory, World of Motion & Drives, World of Electronics and Industrial Processing.

On their welcoming stand and in the conference programme, tbp explains how Design for eXcellence (DfX) at the earliest possible design phase results in the achievement of the maximum yield in the supply of pcba's. Right first time: doing only the right things, right first time, thanks to our early supplier involvement. We are also happy to inform you about our Extended Boundary Scan mixed signal test solution and 3D printing.
This year's gadget is the Proximo, with tbp as one of its sponsors.
You assemble the gadget by visiting a number of stands and collecting parts. Would you like to request a Proximo? You can do so when you submit your trade fair registration for free entry (see below).

presentations

- 'Internet of Industrial Things, need or utopia?' That is the presentation by Klaas van Duin, our production technology manager. He presents his case on Wednesday 3 October.
- 'Maximisation of reliability already begins during the design phase' relates Marcel Swinnen, our test & DfX consultant, on the added value of early supplier involvement. This presentation takes place on the afternoon of Thursday 4 October, in partnership with Demcon (demcon.nl).

For more information and timings please go to wots.nl, seminars, seminars world of electronics.

WoTS, wots.nl
tbp stand: hall 11 number F024

Opening times: from 10.00 to 17.30, Friday to 16.00.
Entry is free if you have registered in advance via our website tbp.nl (see news). After registering you will receive a barcode confirmation via email. This allows you entry to WOTS.

Precision Fair

happy hour

Will you be visiting us during our traditional happy hour on Wednesday 3 October? We are organising this in conjunction with our event partner Eurocircuits (eurocircuits.be). From 16.00 there will be tasty snacks, live music from trio The Groovy Gents (thegroovygents.com) and draught Belgian beer from Moortgat brewery (duvelmoortgat.be). It will be pleasantly crowded on our stand F024 (hall 11).

… at the Precision Fair: 14 & 15 November 2018

This trade fair for precision technology attracts 4,000 targeted visitors. The approximately 300 exhibitors are specialist companies and knowledge institutions from the Netherlands, Belgium and Germany. tbp is also represented with its own stand, presenting Design for eXcellence (DfX) and the Extended Boundary Scan test solution.

The DfX specialists at tbp analyse the customer's design from various angles. This achieves the best delivery quality, highest production yield, maximum supply flexibility, customs design and *the best value of ownership* for customers. tbp is the only EMS company to include the percentages calculated during the design phase for production yield and slip through as a results commitment in its quotations.

You can read more about Design for Manufacturing (DfM) and Design for Testing (DfT) to maximise feasibility, test accessibility and test coverage of the pcba design on our website. We will also be happy to explain the value of right first time at the Precision Fair.

Precisiebeurs

Precision Fair, NH Conference Koningshof Centre in Veldhoven
tbp stand: number 216
Opening times: from 9.30 to 17.00, entry is free with advance registration via the website precisionfair.nl.

YIN learns from tbp

YIN members recently visited tbp in Dirksland. Visits to companies are on the annual agenda of this network of young hi-tech professionals. They are affiliated to the industry organisation Holland Instrumentation which promotes networking and knowledge sharing within this target group.

Holland instrumentation Hightech Platform West-NL

Marten Lootsma is a member of the Young Instrumentation Network (YIN) and is also a board member. He works as a senior embedded software engineer at R&D provider TWTG. 'Just like Holland Instrumentation itself, YIN's aim is to learn all about the hi-tech sector in West Netherlands. You become aware of developments in the market that you can use in your work and for your business. We focus on graduates and professionals with up to 5 years experience, although this group is expanding to include 35 year-olds. We have around 150 members, including Ronald de Jong and Frank van Dongen at tbp.'

events

During the visit to tbp, Klaas van Duin, production technology manager, explained the pcba production process, also explaining early supplier involvement. CEO Ton Plooy then gave a company presentation in the auditorium. Klaas van Duin concluded the programme with the presentation, 'Smart Industry, where is it going?'

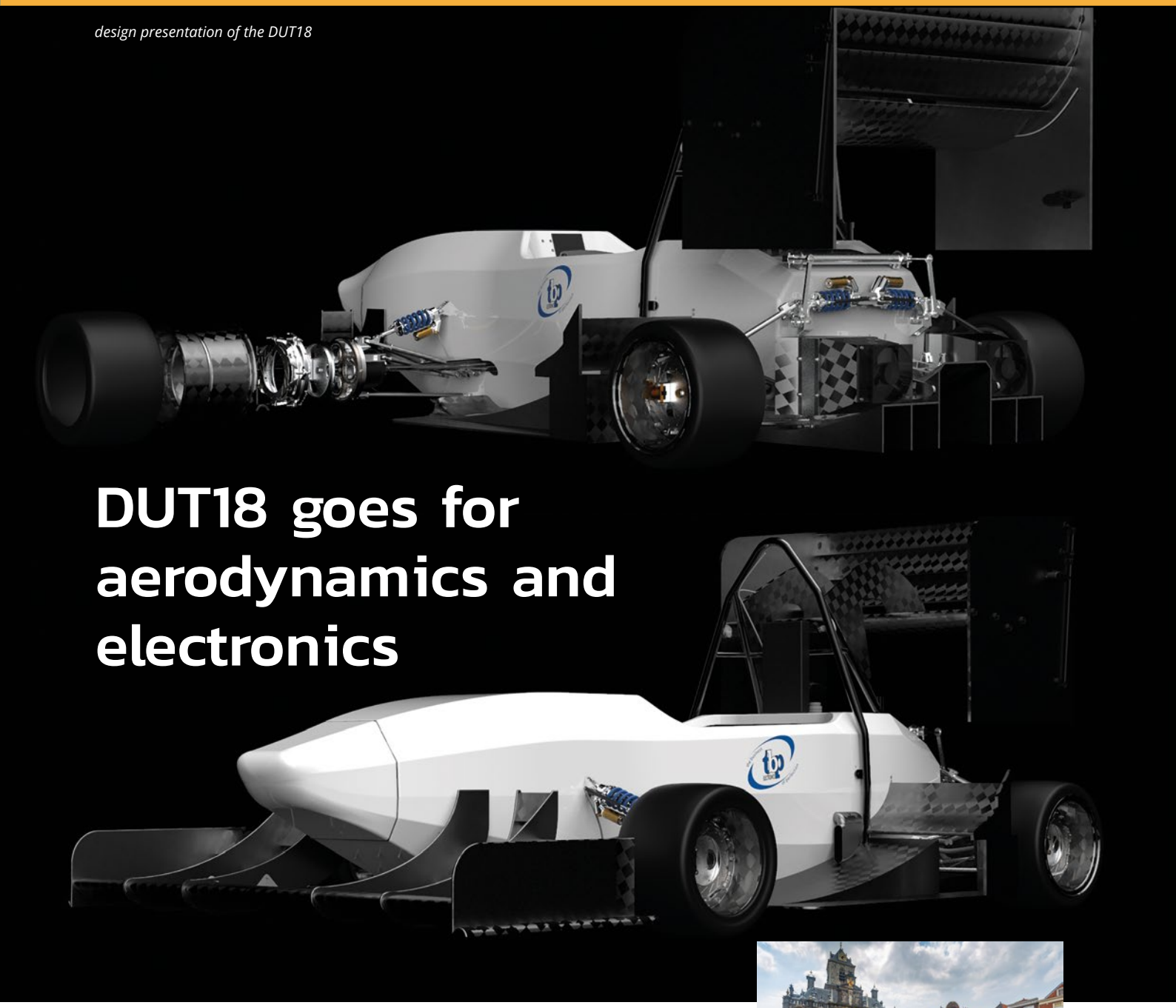
The board also organises the annual new year gathering and summer event, with presentations on technical developments and career perspectives in the sector. 'This went very well and we continued on to ZIE 2018, the annual conference of Holland Instrumentation. YIN had its own room there with its own programme. The event took place on 27 March 2018 at Corpus.'

"YIN members want to learn all about the hi-tech sector in West Netherlands"

hollandinstrumentation.nl/younginstrumentationnetwork

Membership of YIN is free and the company does not have to be a member of Holland Instrumentation.

design presentation of the DUT18



DUT18 goes for aerodynamics and electronics

Team Delft has worked hard on the design of the DUT18 for the Formula Student Competition. The eleven members of the core team have put their studies on hold for a year to gain management and other experiences. Each year, their ambitious goal is to win at the German circuit of Hockenheim with their electric racing car. The engineers at tbp lend them a hand.

The design phase began at the end of last summer and the official presentation was in January. Team Delft then got up to full strength, with 83 full-timers and part-timers under the leadership of Daan Schopmeijer. The strict deadline, the varied characters and the pressure to perform make the competition a perfect testing ground for learning.

TU Delft has taken part in the electric race competition since 2011. This year, extra attention has been paid to aerodynamics. With airflow simulations and advanced calculation models, the underside of the car has been optimised for maximum lateral acceleration. This yields great benefits. The team has also developed the electronics entirely by itself. Thanks to the DfX analysis and pcba's from sponsor tbp, its functionality is excellent. At the end of last year, the key team members – together with other university teams – were given a guided tour and presentation at the headquarters in Dirksland.

DUT18 in action

Daan Schopmeijer, team manager
fourth year student of technical physics

'My study course is completely theoretical. I find technical physics and cars very interesting, but I'm not a specialist. It is very educational to lead and motivate a group made up of 17 nationalities. I even find the decision-making process very interesting. At the start we took a long time for the team objective, to which a culture of mutual trust is very important. Making mistakes is allowed, but not stupid ones. Or: ask for help if you need it. That's why we have the Technical Committee, made up of alumni and our buddies.'

'Personally, I find the time aspect a great challenge: achieving the deadline without having any influence over the time. I have learned not to solve problems on my own, but to make others problem owners.
The manager's role is a fantastic experience for me.'

Alexander Keijzer, chief engineer
fourth year mechanical engineering student

'I took part in this project two years ago, as a part-timer. I have now opted for a full-time management role with greater responsibility. I have learned a lot about electrical engineering and aerodynamics in a very short time. I also feel the pressure to make choices quickly and to work efficiently, within the budget. As chief engineer, I established the broad design of the racing car, but communication with other departments was essential to this.'

'For me personally, the group process is particularly interesting. I have learned to adapt to other team members in order to make progress together. In meetings I use forms of presentation in which text and image complement each other, as for some people a clear structure is important. I have noticed that this gives what you are saying greater effect. These are great management experiences.'

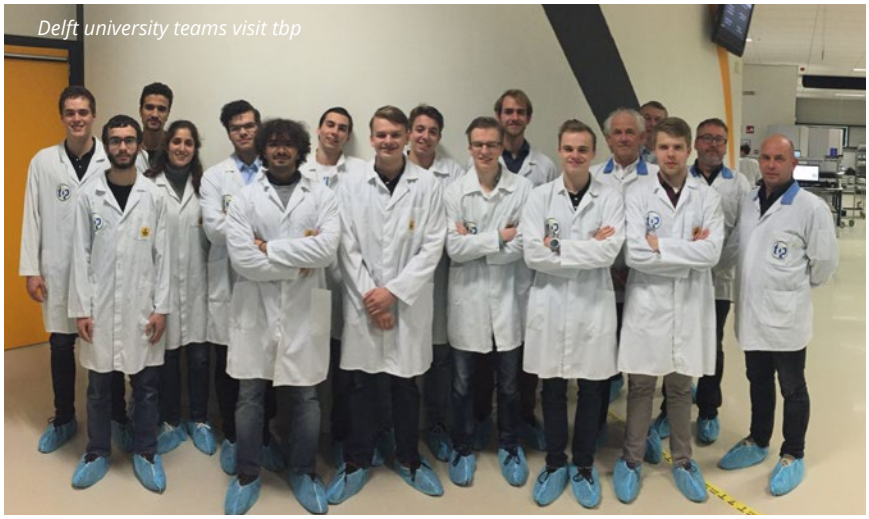
Wouter de Gruijl, chief chassis
fourth year aerospace technology student

'My study course also lacks a practical approach. I wanted to do my own designing and also building. I am now involved in the entire process, including testing. This generates extremely valuable expertise. We are all entirely responsible for ourselves and there is no teacher taking the lead.
As chief chassis engineer, I am responsible for the basis of the racing car.
All of the parts must fit correctly and remain intact, yet at the same time the chassis must be safe and comfortable for the driver.
Production time is long and I have contact with all the departments.'

'As a technical student you learn to deal with challenges yourself, but that doesn't work within such a large project. Other people have their own areas of responsibility and that requires clear expectations. Good communication is very important. I am also very enthusiastic about the management experience.'

DELFT UNIVERSITY OF TECHNOLOGY

fsteamdelft.nl
fb.com/fsteamdelft



Delft university teams visit tbp

In July and August the electric racing car took part in races at circuits in Hungary, Austria and Germany. Check out the updates at fsteamdelft.nl

highlights 2018

- roll-out: 15 June in Delft
- first competition: 18 July – 22 July in Zalaegerszeg, Hungary
- second competition: 29 July – 2 August in Spielberg, Austria
- third competition: 6 August – 12 August in Hockenheim, Germany

the roll-out of the DUT18 at the Market in Delft

measures against online risks

An independent security company conducted an extensive security study in accordance with ISO 27001 and made bespoke recommendations to tackle digital risks. Professional facilities ensure that the online communication between tbp and its customers, suppliers and other external parties is secure.

'We always treat our customers' data very carefully', emphasises Jacob Herrewijnen, IT & risk manager at tbp. 'Nevertheless, we want to take extra measures. We have invested in two very modern firewalls that protect our network against external misuse. A Security Operations Center (SOC) monitors these firewalls 24/7. This gives us the certainty that our company and customer data is secure.

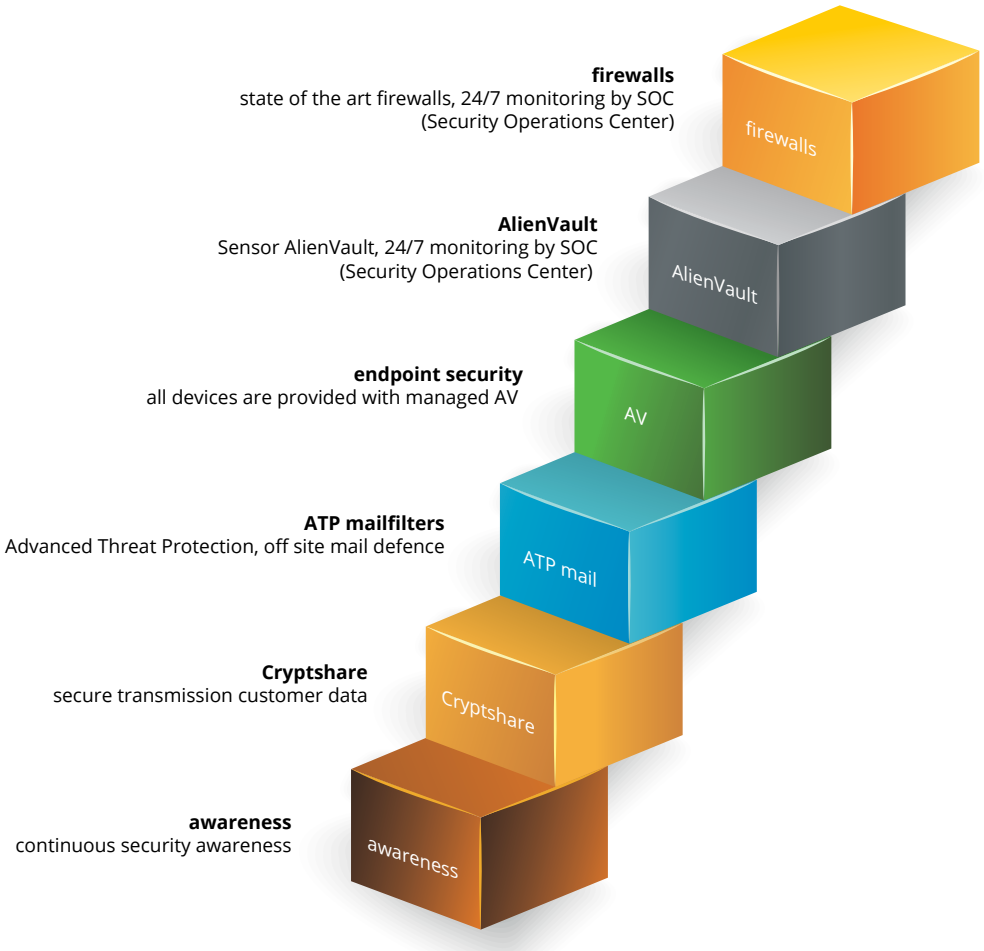
'Monitoring of our connected equipment is done using an internal sensor, called AlienVault, which is also connected to the SOC above. This involves around 350 IP addresses (IP = Internet Protocol), including third party test systems with older operating programmes. We also encrypt the data we exchange with our customers. All of that data traffic takes place via Cryptshare. This secure connection can be found via the customer portal on our website. We also ensure ongoing back-ups at various physical locations, outside the Cloud. This is a benefit not only to security, but also process: our production can continue uninterrupted.'

results

'The human factor plays a significant role in security. Each quarter, I give internal training sessions and I regularly publish reports in our internal newsletter to remind colleagues of the risks associated with intensive online communication. Awareness is increasing noticeably. All of the steps we have taken comply with the General Data Protection Regulation (GDPR) which came into force in May 2018. And even more importantly: we know that all of the measures contribute to the security of our customer and process data.'

"we can say with great certainty that our company and customer data is secure"

layered security measures



roadmap to ambitious certification

*Quality goes without saying for '**t**he **b**usiness of **p**erfection'* **(tbp)**. *Analyses, audits and improvements are always on the agenda and lead to certification in specialised areas. Our most recent recognition: ISO 13485-2016 for the medical sector.*

Using a roadmap as basis, Kees Vis, QA/QC* & facilities manager, and Coert van Eekelen, SHEQ**-coordinator, further refine tbp's processes. Many results have been achieved in recent months:

- ISO 9001 general process management: the 2008 version was recertified in 2017. The transition audit in 2017 indicated that, with a few adjustments, tbp was ready for the more stringent 2015 version, which was successfully achieved in December
- AS 9100 for general process management, including specific criteria for defence, aviation and aerospace: the gap analysis in 2017 showed that tbp is largely ready for this new standard. Certification is on the agenda for 2018/2019
- AQAP 2120 military standard: the existing standard will be superseded when AS 9100 is attained
- ISO 14001 environmental standard: the follow-up audit of the 2015 version took place at the beginning of 2018. This was completed successfully
- ISO 13485 medical standard: tbp has successfully completed the transition from the 2012 version to the 2016 version and is certified to this new standard
- ESA: Gerard de Groot, quality engineer at tbp, once again attained the ESA certification as confirmation that tbp complies with aerospace guidelines.

'The standards are becoming increasingly sophisticated, which I think is a positive development', according to Kees Vis. 'Attention is less focused on a wide variety of procedures, but more on risk management and stakeholder management, it's more about the way of thinking. Risk management is firmly on the agenda of our management team and the software programme NARIS helps us to analyse the risks. We are subsequently taking very focused measures to take our commercial operations to the next level.' This is how tbp is able to achieve top quality, custom designs, delivery flexibility, sustainable products and *value of ownership* for customers.

* *QA/QC = quality assurance/quality control*
** *SHEQ = safety, health, environment & quality*

Kverneland and tbp:
intense cooperation for agriculture

The pcba's from tbp electronics also find their way into precision agriculture. Kverneland Group, one of the global leaders in this sector, installs them in the controls of tractors. The Mechatronics business unit develops the hardware and software and contacted tbp at a very early stage to design and manufacture the right products. The focus is firmly on quality.

The history of the Kverneland Group began in 1879 with the manufacture of agricultural tools. With the arrival of tractors at the beginning of the last century, the company began to manufacture large machinery. These so-called 'implements' are attached to a tractor like a trailer. Growth was swift and there followed many national and international takeovers, including the Dutch Greenland Group in 1998. Vicon, that formed the basis of this Dutch group, remains as a brand name.

Kverneland and Kubota

Following a diversion into wine production, Kverneland continues to concentrate on agricultural implements for pasture and arable farming. It now has many offices and production locations across Europe, China and Russia. In 2012, the company itself was taken over by the Japanese company Kubota in its attempts to become a full-service supplier of agricultural machinery, including tractors. This also generated new sales channels and new product applications for Kverneland.

Kverneland Mechatronics

'In Nieuw-Vennep we develop and manufacture the electronic control systems for our implements and tractors', says Fred Schipper. He is the supply chain manager of Kverneland Group Mechatronics, which is based here. 'In Asia, Kubota mainly focuses on wet agriculture, such as rice fields. This requires lighter machines. The factory at Calais in France has been modernised for heavy tractors, for which Kverneland supplies the implements. Our control systems mostly go to the production locations within the group and also to Kubota's production location.

global standard

Kverneland has had a great deal of influence on global standardisation, so that the control systems of tractors and implements can communicate with each other. 'In 1985 we developed the CAN protocol for data transfer that has been adopted internationally as the CAN BUS standard', according to Fred Schipper. 'Even the cable connector has been standardised as the ISO BUS. This has massively improved convenience of use for farmers. Each implement now fits every tractor, which only requires one computer terminal to operate the interchangeable implements. We continue to optimise our terminals as autonomous operation is the future.

"the standards bar for pcba's has been set high"

Fred Schipper on the assembly line of the control systems for the implements

Our latest version can be split into two screens: one for the implement data and one for other data such as weather conditions.

early partnership

'Naturally, the control systems have to withstand vibrations, variations in temperature, moisture and chemicals. This places major demands on the pcba's we need for this. The standards bar has been set high. They must be resistant to extreme conditions, so we subject them to very thorough testing. Naturally, tbp also carries out many tests to ensure the pcba's it supplies are fit for this purpose. Our partnership is intensive and begins at a very early stage. Electronics development companies also play a role in this. Our R&D department consults with them as early as the development phase, so that design and production are completely aligned. We aim for high quality and we know how to find each other.'

new application

tbp's pcba's find their way into the operating terminals sold by Kverneland on the international market. The partners have been collaborating on one type for several years already. The second type, that was recently developed jointly, is now manufactured on a large scale. These pcba's are to be found in the tractors which roll of the conveyor belt in the new factory in Calais.

nl.kvernelandgroup.com

read more about the history on Kverneland's website

investments in speed and quality

With its new machines, tbp is continuing to invest in efficient and effective production lines. Customers are demanding even quicker delivery and more specific printed circuit board assemblies (pcba's) in smaller production runs. This equates to custom designs. The functionality of the modern equipment makes this possible.

Communication between the machines is an important condition for an optimum production process. That's why tbp is currently investing in the software link. Klaas van Duin, production technology manager, is looking at robotisation and cobotisation with great interest. The latter involves robotisation in close cooperation with humans. 'I have attended a number of presentations by Robotics students at The Hague University of Applied Sciences. In five weeks, they formulate their ideas in project form, in some cases on behalf of companies. I am very impressed by the results they achieve. I envisage opportunities for the robotisation of our Extended Boundary Scan test solution.'

feeders

In recent months there has been a great deal of investment in the smt production process with the purchase of almost 300 new feeders, various bins and warehouses. The aim of this is both replacement and expansion. As a result, production workers can now prepare components and materials for several projects simultaneously, as a result of which the assembly of pcba's can continue without delay. The preparation process is therefore aligned with the new generation Mycronic smt machines in which tbp is expecting to invest in the near future.

read more about other new machines on our website

cleaning

With its new NC25 cleaning machine from MBtech, tbp is investing in the quality of pcba's. The cleaning process ensures that flux residues after soldering are completely removed.
The new machine measures the concentration of the liquid and tops up the baths automatically, which improves control over the entire process. The NC25 also records all of the data, in the interest of traceability of the production process.

tbp has also purchased a metering tool to enable even better monitoring of the process. After cleaning, measurements are displayed on the reference boards, better indicating the fact that they are clean before they are delivered to the customer.

inspection

tbp has incorporated two 3D automatic optical inspection machines (AOI) and two 3D solder paste inspection machines (SPI) in both main production lines as inspection tools. The smaller lines are also equipped with a stand-alone AOI and SPI unit. Production inspection is increased even further with the purchase of the new 3D AOI. The new equipment has been installed immediately after the pick & place machine and in front of the reflow oven, so that any irregularities can immediately be recorded and corrected. The minimum number of irregular pcba's has therefore decreased even further as a result.

In order to control all communication between the SPIs and AOIs, Koh Young provides the software tool K-SMART, but connectivity with other equipment in the line is still restricted. Communication between the production and inspection equipment is an important condition for an optimum production process. That's why tbp is increasingly developing the software required for this itself.

the next step in intelligent data processing

An intensive training course on business intelligence and data warehouses taught Gertjan van der Hiele how to organise and link business data. This data management is important to the further refinement of internal processes at tbp. As technical application manager, Gertjan's task is to utilise business data as efficiently as possible.

It begins with the collection and organisation of data. What digital information do we have and what do we need? What do we want to use it for? How do we arrange the 'data warehouse'? What links do we establish? How are we going to present the data? Who needs the processed information?

'Our financial, commercial, purchasing and production information is entirely digital and comes from sources such as our ERP and MES systems. I'm involved in linking relevant data, so that we can obtain more insight into particular trends. Together with Ronald de Jong, I have already developed several dashboards for production. Microsoft's SQL tool is a tool for multi-dimensional data exchange. This enables us to further refine our business processes and production process.

Ronald (l) and Gertjan (r)

Thanks to this intelligent information, we can inform our customers of the calculated and achieved results of an order and its exact delivery date. Data management provides clear insight, enhanced quality and reduced costs.

"the business intelligence presentation by Gertjan allows us to look more smartly at data"

EDI platform for efficient process

Thanks to EDI we have created a secure link with the systems of customers and suppliers with whom we cooperate intensively. Following a meticulous preparation process, this Electronic Data Interchange was commissioned. The benefit is that order processing and administrative processes have become more efficient for all concerned.

Customers send orders to us via EDI. Checks that we previously carried out for each purchase order are now validated and loaded into our ERP system by this platform. As soon as an order is completed, financial processing takes place automatically.

suppliers

Our permanent suppliers are also connected to EDI. Our orders and the subsequent order confirmations are all generated via this platform. EDI checks that all orders are delivered on time and that purchase prices and manufacturer codes correspond. As soon as the supplier delivers the orders, their electronic invoice is despatched immediately. Following a system check, the invoice is loaded into our ERP system and forwarded to our financial software for processing.

Last year, we received half of all supplier invoices via EDI, 85% of which were sent directly to our financial package. It is our goal to further expand our financial and administrative partnership with customers and suppliers. The automated process via the EDI platform increases efficiency for all of us.

our EDI expert: Sander Buth, senior it application manager