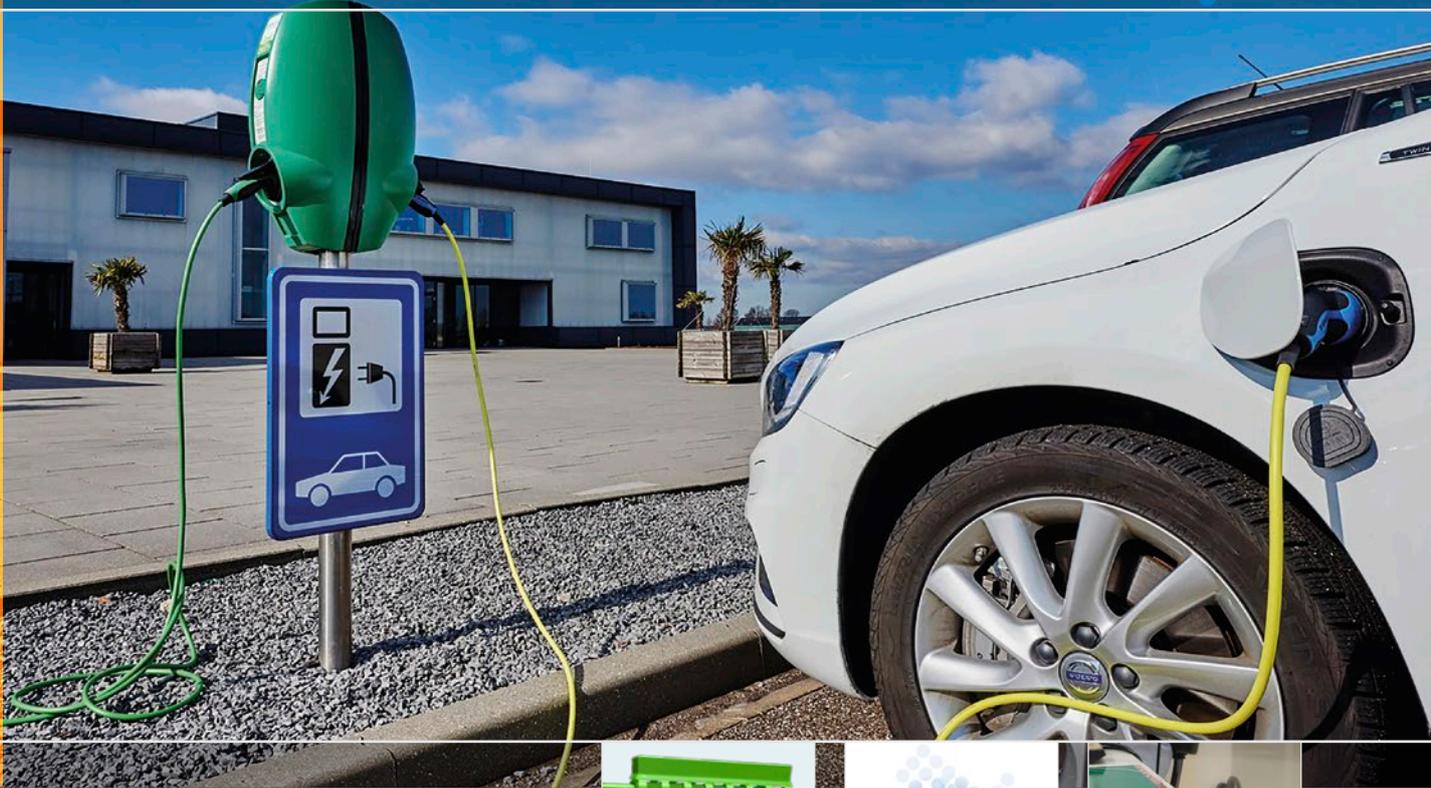




WAY of life

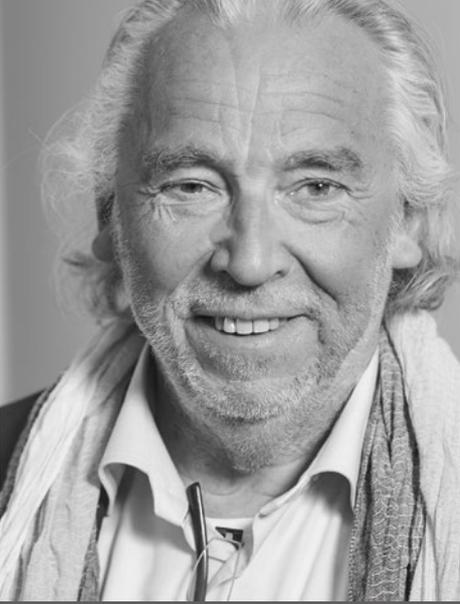


edition

39

Sept 2016





In the past - which no longer exists naturally - it was normal to work a 40 hour week and to follow a training course in the evenings. I (and many others like me) did that: for 5 years, 4 evenings per week at school from 18.00 to 21.30 and then homework on top. Whether you did that on your free evening or at the weekend, you always had to bear your employer in mind. Businesses were stable, you had security and you could develop within the same organisation. Companies did a lot for themselves, and also had their own training schemes. And that's where the professionals of those days came from!

A great deal has changed at very high tempo, especially with the arrival of the internet. These days, as a en employee, you go to a flexible workplace and at the press of a button you are in Korea. Alone with facetime you can still have face-to-face conversations and if you ask how things are going with a project, the answer is invariably 'I've just sent you an email'. The production process contains many virtual

processes however actually getting production up and running still requires pragmatic and physical actions. Or simply 'manufacturing'. I can hear you thinking this is just 'an old man waffling on' but ultimately that is what it's about.

Over the past 40 years, tbp has naturally kept abreast of processes such as ERP, poka-yoke, lean & mean, ISO, Kanban, QRM, risk management through to the current smart industry, industry 4.0 or the internet of things. We have always taken part in the developments which have taken place in industry in order to look after our clients better. In my opinion, Dutch industry has always been quick to improve and accelerate processes. Smart industry has actually been in existence for decades, however it has gained another dimension: the internet. Linking everything to everything else...it will be a long journey. We certainly still have enough to do in the coming 40 years!

Ton Plooy
CEO

40 years

A 40 year anniversary. What an old-school concept! How old-fashioned can you be? Surely an anniversary is a bit unusual these days? I think this is probably due to the fact that businesses almost never continue to exist in their original format. During their existence they usually change ownership several times and also employees these days are happy to hop jobs and build their cvs, as a result of which fewer and fewer employees remain in service with one employer.

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[youtube.com/user/tbpelectronicsEMS](https://www.youtube.com/user/tbpelectronicsEMS)

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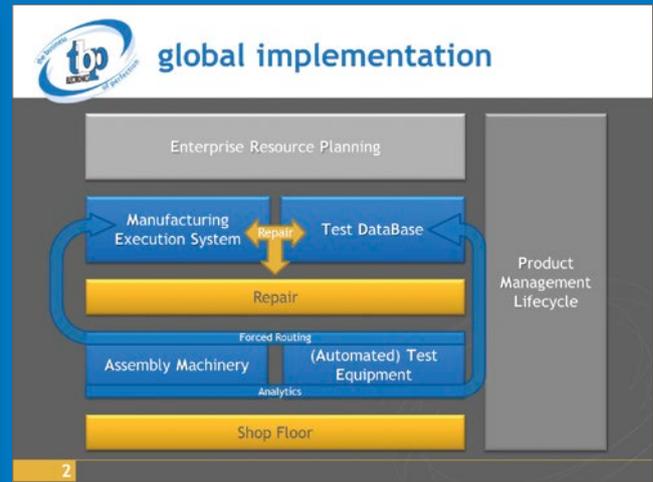
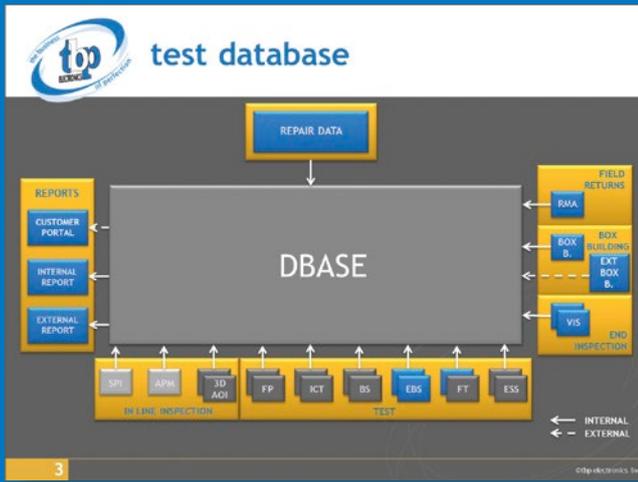
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WATS new in MES

With the Manufacturing Execution System (MES), tbp electronics is able to ensure that all of the required production steps are followed in the correct sequence. This is to identify potential faults, to correct them immediately and to optimise the pcba production process. The software package from supplier Aegis has now been almost completely implemented by tbp electronics. What is new is the addition of WATS: Wide Area Traceability System.

Aegis

The implementation of the MES software from Aegis was very difficult. Paper work instructions have mostly been digitalised, which was a time-consuming task of standardising and ensuring uniformity in a digital template. In the meantime, all project engineers (pre-production) have been trained in the uniform input of work instructions in Aegis and the operators have been shown how to manage their part of the process using Aegis. A huge conversion phase to a completely new digital process is now almost complete.

'MES checks and manages the process based on the route determined by the project engineer in consultation with the client and, where necessary, instructs the operator', explains Gertjan van der Hiele, technical applications manager at tbp. The main advantage is that the pcba runs the process faultlessly. An extra added value is traceability: clients can review the entire process for their pcba.'

The next step is the expansion of the functionality of Aegis. We are still in discussions with supplier Aegis Software

about modifications to the package and investigating the wider possibilities for the new version, called FactoryLogix. I can see process management growing, which I think is great!

WATS

The market package WATS can add extra benefits to the Aegis MES software. 'WATS compiles the results of all test assemblies and analyses them', explains Marcel Swinnen, managing director test & DfX at tbp electronics. 'The reports generated by WATS are online, so they are accessible to us all

over the world at any time. WATS not only detects faults in production, it also illustrates trends. This means we can continue to optimise our production processes, as a result of which production yield (first pass yield) and product quality (lower slip through) increase further.'

As soon as we implemented this modification in MES, we were able to use the analyses to generate detailed test reports for our clients. As a result they are better informed about production results. **The third step in the implementation process is that our clients can view the production results for their products at any time: the so-called client portal.'**



Marcel Swinnen, managing director test & DfX at tbp electronics

The integration of the WATS software into the MES package from Aegis is carried out by tbp electronics itself. The operators will soon have access to the total presentation of relevant data to them via dashboards. Thanks to Aegis and WATS, tbp electronics has taken a step further to the smart industry production of pcba's.

'early involvement that's...
one small step for tbp,

process optimisation thanks to imec guidelines

Thanks to its early involvement services with Design for eXcellence, tbp electronics achieves the best results for its clients. In order to continue to optimise its own processes, tbp utilises the expertise of knowledge institute imec: as a partner of imec's center for Electronics Design and Manufacturing (cEDM).



Imec, situated in Heverlee in Belgium, develops technical solutions for industry in the field of nanoelectronics. The Electronic Assembly Group is part of this with 14 scientists and engineers under the leadership of Geert Willems. Together, they implement the services of the cEDM.

benefit

'Our aim is to support companies in the design and production of pcb's and electronic assemblies (pcba's), resulting in better quality, greater reliability and lower costs, even if these are produced in Europe', according to Geert Willems.

'One of the ways we do this is by issuing guidelines for their design, specifications and production processes, based on scientific models. This is combined with industry experience, also outlined in globally-applied industry standards (IPC, JEDEC and others).

The main benefit is that they are universally applicable as a result, throughout the entire chain, and not just for one specific situation, production environment or supplier.' imec has developed eleven guidelines for Design for eXcellence and three integration guidelines (see table).

practical link

Willems: 'Our research projects are subsidised by the Flemish government or Europe. We work closely with twenty or so partners, including tbp and NEVAT-EMS, who make a substantial contribution to current projects and form the industrial touchstone for the directives. They assess the guidelines for industrial feasibility before we publish them. This is how we keep in touch with everyday practices. Our partners are given access as early as the preparation phase. The guidelines, along with a number of design tools, are available free of charge to all

DfX Guidelines	Title
EDM-D-000	Good Design-for-X Practice
EDM-D-001	PCB Specification
EDM-D-002	Component Specification
EDM-D-003	PBA Assembly Material Specification
EDM-D-004	Design-for-Assembly
EDM-D-005	Rigid PCB Build-Up and Density Classification
EDM-D-006	Layout Solutions
EDM-D-007	Quality and Test Coverage Quantification Design-for-Test
EDM-D-008	Technology and Manufacturing Capability Mapping of PBA Designs
EDM-D-009	Signal Integrity
EDM-D-010	Power Integrity
EDM-I-001	Mechanical Integration
EDM-I-002	Thermal design
EDM-I-003	EMC Interaction

the DfX- and integration guidelines of imec

partners and members (more than 100 European companies). Other interested parties can purchase the guidelines via our website.'

'On the one hand, imec has a collective function by enhancing knowledge in the industry and resolving difficulties', adds imec project manager Boris Leekens. We do this with our projects, from which the guidelines and design tools are generated, using seminars and training. We also provide a consultancy service which focuses on individual businesses. This allows them to acquire specific expertise in-house. We offer a reduced rate to our members and partners. Thanks to simulations and failure

analyses, we can trace the causes of problems in the process and help to resolve them. We also incorporate these experiences into our guidelines. In this way, we develop technological solutions which are relevant to the entire industry.'



cedm.be

one giant leap for manufacturing'

Through early involvement at the design stage of a pcba, tbp electronics achieves the highest product quality and product reliability, full custom work, maximum delivery flexibility and the lowest overall costs. Clients, including Innoseis, know how to utilise this value for their products.

success projects thanks to early involvement services

'With our early involvement services we are already cooperating with designers in the design phase and making them aware of the testability, manufacturability and reliability of supply', according to Marcel Swinnen, managing director test & DfX at tbp. 'We want to do everything right at one attempt and only do what is necessary: 'right first time'. We achieve this thanks to our early involvement services which have been structured according to Design for eXcellence (DfX), consisting of three phases and the components Design for Test (DfT), Design for Manufacturing (DfM) and Design for Logistics (DfL). As the sole EMS supplier, the excellent results we achieve with this, expressed in production yield (first pass yield) and product quality (slip through), are included as results commitments in our proposals.'

Innoseis

Innoseis has developed instruments for the measurement of seismic vibrations which can communicate wirelessly. The pcba's required for this are produced by tbp. 'We assessed the data and the designs and made recommendations which Innoseis (innoseis.com) incorporated in full', relates Geert Gielis, sr. DfM consultant at tbp. 'These mainly related to components and also the manufacturability of the pcba. We always recommend the use of as many category A components as possible, as we always have them on stock, in a conditioned environment. We also have at our disposal all of the production and test details for them. By selecting the right components at an early stage, you prevent faults and the ensuing high costs.'

In the meantime Innoseis has carried out tests with the instruments containing the pcba's from tbp electronics. The results were very positive. Tbp's early

involvement services have led to quality products and a satisfied client.

early involvement services

Early involvement is of great value to clients. 'We meet each other to optimise the design and production of the pcba in every phase of the process. This really benefits the end result', according to Swinnen.

'Our clients have very high standards: 1,000 ppm or even 700 ppm for specific applications', emphasises Frans Geerts, business development executive at tbp. 'Ppm stands for 'parts per million' and relates to the error percentage for pcba's which are not covered by the selected test strategy. With our high delivery quality we dive well below this standard, even as low as 200 ppm.'

'We analyse the designs for testability and test accessibility, along with other criteria', explains Steven Van Hout. He is the senior test & DfT consultant at tbp. 'We make recommendations, including for the number of test points on the boards. Due to the restricted space, this is often a challenge which we resolve due to our good partnership with the designers. By selecting the correct test strategy, we influence the result positively. With the extended boundary scan test solution we developed, we can also automatically test the pcba's functionally and can therefore validate the operation of the most important



extended boundary scan test

components. This extended boundary scan is a mixed signal solution - analogue and digital - which avoids costly functional test solutions at the client and guarantees high product quality. We are currently testing some 25 types of boards for a number of clients using the extended boundary scan. The partnership is working very well and we are now able to utilise our early involvement services in full. We are very happy with this, as are our clients.'

Want to know more about our early involvement services?

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

<https://nl.linkedin.com/in/fransgeertselectronics>



sales support: at your service!

The sales and sales support teams at tbp electronics support both prospects and existing clients with high levels of expertise and motivation. Although some of you will already be familiar with their faces, we would like to introduce them to you.

**Maike de Vogel,
sales support manager
& account manager**

'As an account manager I am in contact with many of tbp's clients, to ensure that we fulfil their demands as effectively as possible. And as sales support manager, I also coordinate the department's activities and support my colleagues in their roles. I have a huge sense of responsibility and strive for perfection, qualities which are really important in helping my colleagues to achieve the best result for our clients. We assess our results on the basis of performance indicators and feedback from our clients. They can rest assured that everything will be well-organised.'

**Robert Nothdurft,
customer account
manager**

'I maintain contacts with our clients and interpret the information they give us to create accurate proposals. Our aim is to meet or even exceed their expectations. I am a good listener and that is important for that task of interpretation and to be able to offer quality, flexibility and bespoke solutions.'

**Jan Lempers,
customer project
manager**

'It's my responsibility to introduce new products - so-called NPI's - within tbp. These are mainly products which are still under development by our clients and thanks to our early involvement services, in which we become involved at an early stage. I think it's great to see the drive throughout our entire organisation and I personally have a great passion for technology and innovation. I am very able to think outside the box.'

**Frans Geerts,
business development
executive**

'It's my job to generate contacts with new business partners to whom our pcba's and our approach would be of considerable added value. This applies specifically to our early involvement services and other distinctive services which I present during meetings. Our approach is to build up long term relationships with our clients and I'm proud of the diversity of clients with whom we have been able to work with for so long.'

**Conny de Korte,
sales support officer**

'I ensure that orders and forecasts from clients are input carefully, so that we can align our processes with them. My role means I have a lot of contact with our clients, which I think is the nicest part of my job. I also go about my work very thoroughly. Working carefully brings about the best results.'

**Henny Nijssen-de Graaff,
sales support officer**

'Order processing is my main task. Careful processing and a high throughput speed are important if we are to supply pcba's of the highest quality to our clients at the precise moment that they need them. I really like to get things done properly and quickly and I urge my colleagues to do the same.'



Please send your orders and forecasts to orders@tbp.nl
Please send your proposal requests to rfq@tbp.nl

detail: merchant shipping convoy Malta

Art in Dirksland

'the picture tells the story'

Graphic designer and artist Peter Walschots has a clear vision: 'Whatever I design must have visual impact.' An exhibition of his work was held at the premises of tbp electronics in Dirksland as part of tbp's anniversary celebrations.

Walschots designed the first tbp electronics logo and regularly updates it to suit the zeitgeist. 'I have always been allowed a great deal of freedom to come forward with ideas.' A large collection of corporate identity applications have been created by his hand over the last thirty years: prospectuses, brochures, trade fair stands and now the invitation to the anniversary party.

Walschots worked as the art director of Publi Studio in Rotterdam, until Ton Plooy persuaded him to exchange Rotterdam for Ooltgensplaat at Goeree-Overflakkee thirty years ago and to set up there as an independent designer. 'Ton said: "Peet, just go for it, if it doesn't work out you can always solder printed circuit boards for me".'

He has several special projects to his name as a graphic designer. 'For Philips I created 'cutaway' designs showing the inside of the first picture tube and the first CD player. I made



Peter Walschots in his studio



detail: tall ships on the blue ocean

similar colour perspectives of buildings for architects. For tbp I created brochures with the pcba photographed as an aerial photo. These became nice luxury editions which cost almost 15 guilders each! I agree with Ton Plooy that you must always deliver quality and you must radiate quality in everything you do.'

graphic artist

Passion for painting plays a great role in his life.

This all began at the King William Academy in Rotterdam where Peter Walschots passed design and painting with honours. During this anniversary year of tbp electronics, you will be able to familiarise yourself with his captivating work, in which he makes use of various techniques.

'In addition to my painting I have always enjoyed my work as a graphic designer. By immersing myself intensely in the company, I get the best out of myself for my designs. On one occasion my work helped me to avoid a fine when I was driving too fast to the printer: the police thought the design was so nice they let me go - at reduced speed ...'

peterwalschots.nl

partnership; absolutely!

Partnership is self-evident for tbp electronics. 'By being a member of many market-focused partnerships we contribute to knowledge and innovations in our market and we have swift access to valuable partners', according to Ton Plooy, CEO of tbp. A Summary:

Innopool

Innopool is a unique partnership arrangement between SME businesses in South Holland in the instrumentation sector. In this platform high tech companies collaborate intensively with the aim of accelerating product ideas through to the development of market-ready products. Reduced time-to-market and risk-bearing participation are central to this. tbp electronics was one of the first members.

innopool.nl



Energieke Regio is a local-for-local advice project which helps businesses, social organisations and, owner associations and housing corporations to make their buildings more sustainable. The foundation represents partnership, knowledge transfer and the input of positive energy. When Energieke Regio was set up, the pilot study and first energy scan for businesses took place at tbp electronics. The result was a report containing sustainable recommendations for and advice on sustainable energy generation.

energiekeregio.nl



The purpose of the Federation of Entrepreneurs Associations of Goeree-Overflakkee (FOGO) is to represent the interests of all entrepreneurs in Goeree-Overflakkee. Since the municipal reorganisation, the interest of partnership is greater than ever. By forming a federation in which all of the existing entrepreneurs associations can find a place, strong front can be created with relatively few resources.

fo-go.nl



VNO-NCW West works with businesses toward a healthy business climate in North and South Holland. The business owners' network facilitates valuable contacts, provides tailored networks and lobbies on behalf of its members. Current themes are burden reduction, simplification of regulation, better accessibility, quality business premises and the stimulation of innovation.

vno-ncwwest.nl



FME is the industry federation for the technological sector and looks after the interests of its members in The Hague, Brussels and globally. FME also supports its member companies in all aspects of their business operations and works hard for the interests of its eighty affiliated branch organisations. Its mission: the mobilisation and connection of the technological industry to any demand or challenge which the world of today or tomorrow can throw at it in order to enhance the earning power of individual members and the industry as a collective.

fme.nl



Imec carries out research in the field of nanoelectronics which is truly world class and links innovative strength to global partnerships in ICT, healthcare and energy. They use this to develop technological solutions for industry. tbp electronics also utilises the expertise of the knowledge institute, as a partner to the center for Electronics Design and Manufacturing (cEDM). So tbp is involved in projects such as Intelligent Products with a Predictable Lifecycle (InProVoL).

imec.be

Holland Instrumentation is building the network of businesses, knowledge institutions, training courses, investors and local authorities in South Holland which focus on high-tech. The aim is to double sales, export and employment in high-tech in ten years through increased and more intensive partnership and the removal of obstacles to innovation. There exists a huge potential to learn from each other and to apply developments which have proved their worth in one sector in other sectors.

hollandinstrumentation.nl

'Connecting Winners' is the motto with which NEVAT offers a network of ambitious suppliers who wish and need to differentiate themselves (inter) nationally on a strategic level by ongoing innovation. NEVAT lobbies at national government level and, if necessary, at a European level, to achieve maximum influence on legislation and regulation. All of NEVAT's activities focus on the creation of the best possible commercial result for its members, to allow them to enhance their market position.

nevat.nl



NEVAT EMS Group

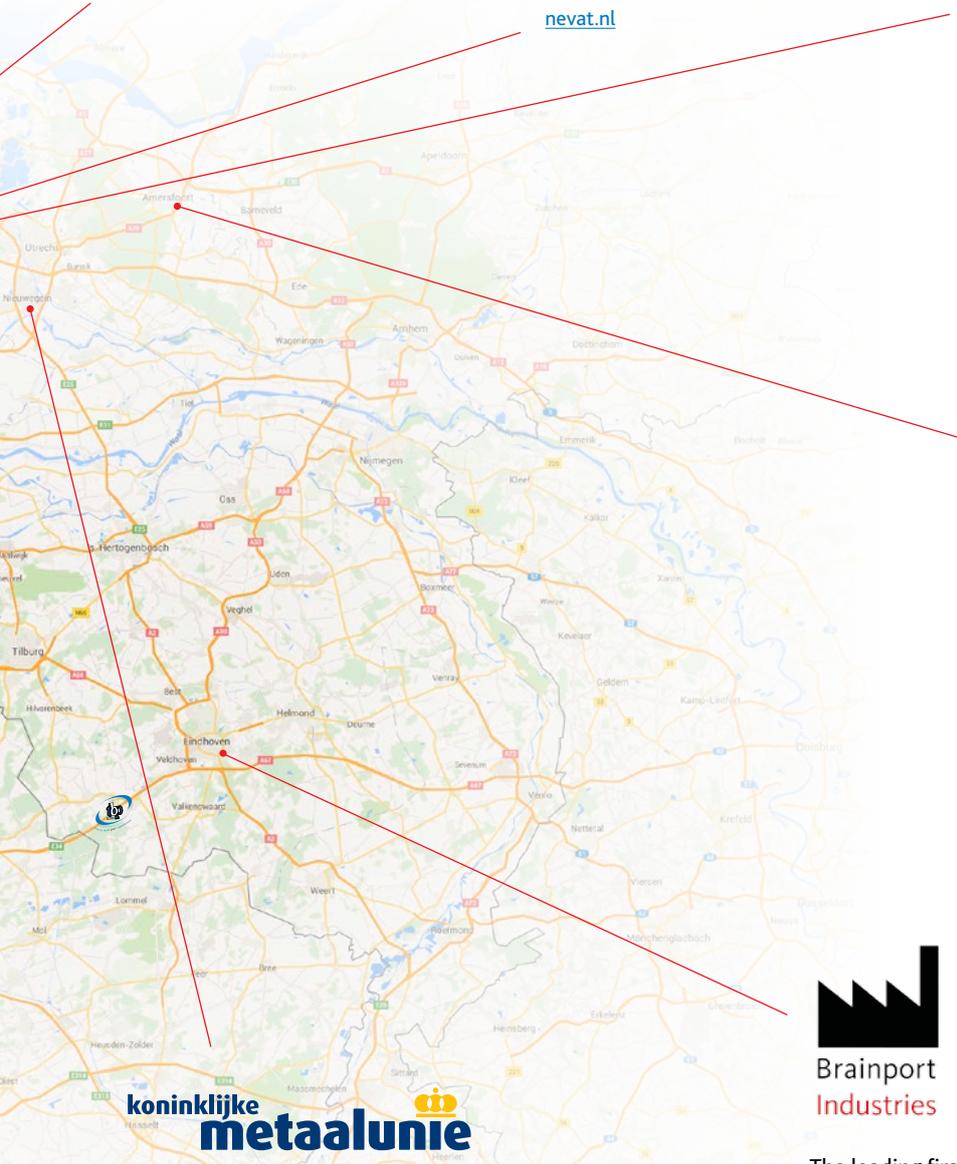
The sector group Electronic Manufacturing Services (EMS) packages the efforts of the companies which specialise in the production of electronics within NEVAT. This sector group wishes to enhance the position of its affiliated on the international market through joint activities. It also wishes to make an active contribution to industry expertise. Technology and innovation are also important priorities.

nevat.nl/nl-NL/sectoren-platforms/sectoren/electronic-manufacturing-services



FHI, Federation of Technology Sectors, the collective organisation for technology companies active in the Dutch market as suppliers of industrial electronics, building automation, laboratory technology and medical technology. It functions as a network and focuses on external parties in business and (semi) governmental institutions. Costs and burdens for the affiliated businesses are restricted and their chances of success in the market enhanced.

federatie.fhi.nl



Metaalunie is the largest industry federation for small and medium sized enterprise (SME) in the metals and technology sector. The organisation ensures broad expertise and knowledge in the sector and provides a tangible, results-orientated approach. Metaalunie organises regional meetings for members with the aim of information provision, promoting networking and contacts between fellow entrepreneurs, policy alignment and participation.

metaalunie.nl

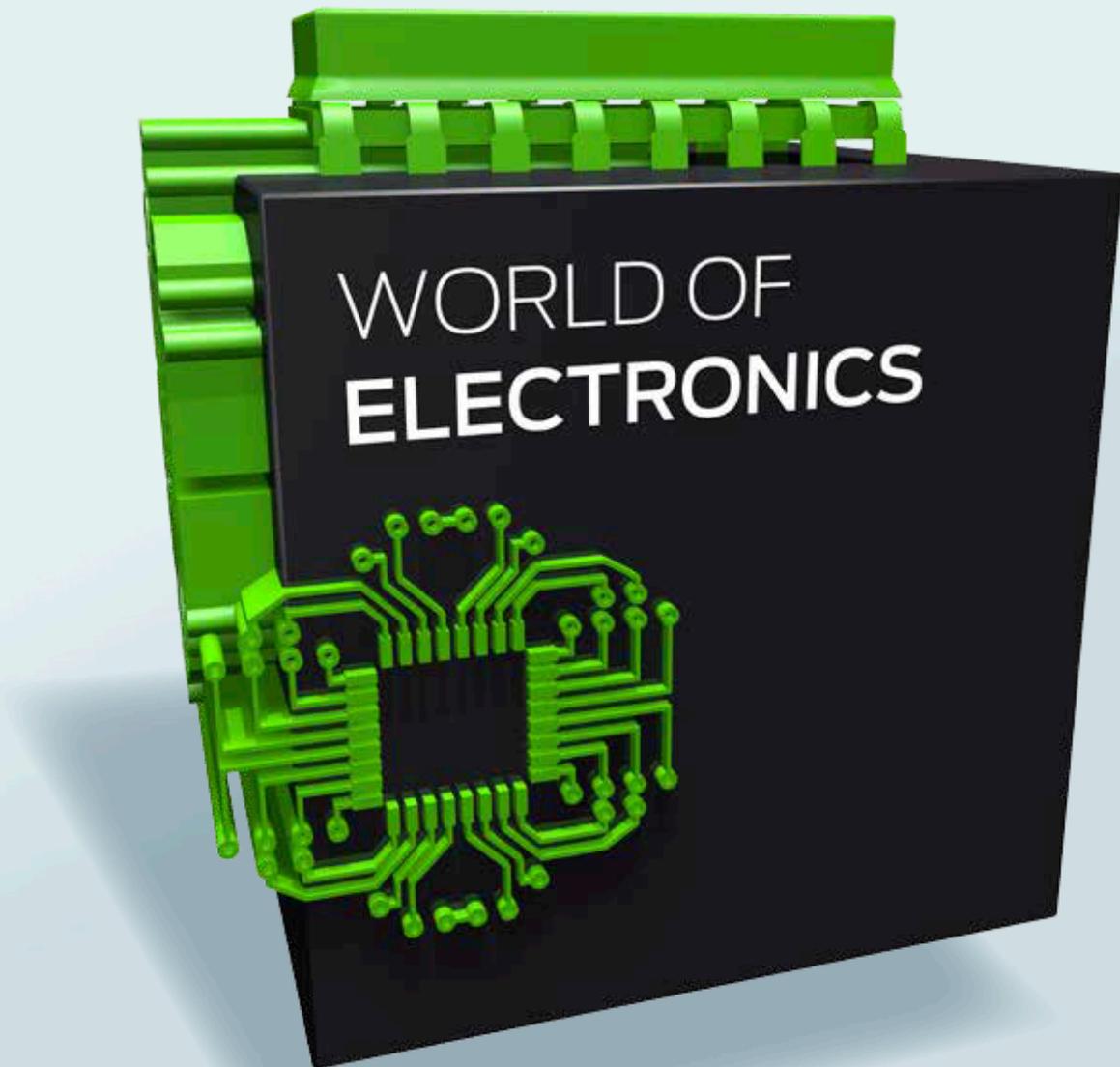


Brainport Industries

The leading first, second and third line high-tech suppliers in the Netherlands combined to form Brainport Industries. The aim is to connect suppliers in these high-tech chains to jointly increase the professionalism of the chain and improve competitive strength. Together, they undertake projects in the field of technology, market and people, to reinforce the innovative strength of its members.

brainportindustries.nl

Electronics for industrial applications



Free entry on
pre-registration

4 - 7 OCTOBER 2016
JAARBEURS UTRECHT

tbp.nl

build up your knowledge

The next few months will see a variety of conferences, trade fairs and events being held which might be important for you. Here are a few of them.

13 - 15 September 2016,
Santa Clara, California, US

PCB West

trade fair and conference for engineers, designers and electronics producers

pcbwest.com

28 September 2016,
1931 Congresscentrum, Den Bosch

BITS&CHIPS SMART SYSTEMS 2016

trade fair and conference on the development and production of smart systems

bits-chips.nl/smartsystems

4 - 7 October 2016,
Jaarbeurs, Utrecht

WoTS

World of Technology & Science (WoTS) comprises four worlds: World of Automation, World of Laboratory, World of Motion & Drives and World of Electronics. The Industrial Processing fair is held at the same time as WoTS

tbp stand number 9A060

wots.nl



11 - 12 October 2016,
1931 Congresscentrum, Den Bosch

TECHNOLOGY FOR HEALTH

trade fair and conference on the development of technological medical devices

technologyforhealth.nl

8 - 11 November 2016,
Munich, Germany

ELECTRONICA

international trade fair and conference on electronic components, systems and applications

electronica.de

15 - 18 November 2016,
Frankfurt, Germany

FORMNEXT

international trade fair and conference on the next generation of production technologies

mesago.de/de/formnext/home.htm



Precisiebeurs 2016

16 - 17 November 2016,
NH Conference Centre Koningshof,
Veldhoven

PRECISION FAIR 2016

trade fair and conference for components and systems supplies, engineering bureaus, machinery and equipment suppliers, research institutes and universities in the high-tech systems-sector

tbp stand number 210

precisiebeurs.nl

22 - 24 November 2016,
Nuremberg, Germany

SPS IPC DRIVES

trade fair and conference on electrical automation, systems and components

mesago.de/de/SPS/home.htm

30 November - 1 December 2016,
Nuremberg, Germany

E | DPC

trade fair and conference on the production of electric propulsion systems

edpc.eu/home/home.html

1 - 3 March 2017,
Guangzhou, China

SPS - INDUSTRIAL AUTOMATION FAIR

trade fair and conference on industrial automation technology

spsinchina.com

8 - 9 March 2017,
Cork, Ireland

SMART SYSTEMS INTEGRATION

international trade fair and conference on the integration of smart systems

mesago.de/de/SSI/home.htm

spring 2017, Van der Valk, Eindhoven

HIGH-TECH SYSTEMS

trade fair and conference on high-tech systems and key enabling technologies

hightechsystems.nl

6 - 8 April 2017,
Mumbai, India

SPS AUTOMATION INDIA

trade fair and conference for manufacturers of process automation technology

tradefairdates.com/SPS-Automation-India-M12724/Mumbai.html

16 - 18 May 2017,
Nuremberg, Germany

PCIM EUROPE 2017

trade fair and conference on power electronics, intelligent propulsion systems, renewable energy and energy management

mesago.de/en/PCIM/For_Visitors/Welcome/index.htm

30 May - 1 June 2017,
Nuremberg, Germany

SENSOR+TEST 2017

trade fair and conference on sensors and metering and testing technology

tradefairs.com

30 May - 1 June 2017,
Jaarbeurs, Utrecht

ELECTRONICS & APPLICATIONS 2017

trade fair and conference on electronics and industrial automation

tbp is also a stand holder

eabeurs.nl

Summer 2017,
NH Conference Centre Koningshof,
Veldhoven

VISION, ROBOTICS & MECHATRONICS

trade fair and conference on vision systems, robotics, motion control, sensors and machine automation

vision-robotics.nl

see you soon at WoTS

the world of technology and science

The World of Technology & Science (WoTS) is being held once more to inform visitors about new developments. The fair, with its conference programme, is being held from Tuesday 4 to Friday 7 October 2016 in the Jaarbeurs in Utrecht. Naturally, tbp will be attending, with a stand next to the Test and Measurement Pavilion (Hall 9), stand number 9A060.

WoTS was created by the merger of the HET Instrument and Industrial Automation & Drives trade fairs and comprises four worlds: World of Automation, World of Laboratory, World of Motion & Drives and World of Electronics, each of which organise their own conference. Industrial Processing has also been organised to take place at the same time in the Jaarbeurs. As a result, visitors from industry, laboratories, care and science, can gain a complete overview of technologies.

presentation

We look forward to meeting you on our stand so we can inform you about our fully integrated Electronics Manufacturing Services (EMS) in accordance with smart industry and Design for eXcellence (DfX). We will also be giving demonstrations of our 'track 'n trace' app on a giant iPhone. Using this app, clients can monitor the status of their assignments and products live. On Wednesday 5 October, during the

happy hour

On Wednesday 5 October we are organising a happy hour on our stand from 15.30 with live music from De Swingers (deswingers.nl). We are organising this in conjunction with our event partner Eurocircuits (eurocircuits.be). Belgian draught beer, provided by Eurocircuits, will be served on our stand every afternoon. Brewery De Koninck (dekoninck.be) will supply the Belgian beer De Koninck and will also serve Duvel and La Chouffe. We will provide tasty snacks!

gadget

Thanks to various event projects there will be direct interaction with target groups in the market. Within World of Electronics there is also the WoTS badge which is available free to 1,500 visitors.

The badge is programmable with a specially-developed free app for any smartphone. Texts can be entered and images drawn via the telephone's screen. The badge makes contact with the screen to display the programmed message. tbp is one of the sponsors of the WoTS badge. You can request the badge when registering via our website.



seminar 'Electronics Production Process, design determines TCO', we will be giving definitive tips on optimising the production process. Marcel Swinnen, managing director test & DfX at tbp, will give the presentation 'How do Design for eXcellence and big data lead to the most ideal production process?' from 11.25 to 11.50. For more information go to the website (wots.nl, conference programme, World of Electronics, electronics production process).

More information about the fair, conferences and event projects: wots.nl. You can sign up for this seminar when registering for admission.

Please also refer to page 5 in this letter: 'success projects thanks to early involvement services.'

wots.nl
industrialprocessing.nl

admission

For free admission to the fair you can register in advance via our website (tbp.nl, news, message of 6 April). After registering you will receive a barcode confirmation via email. At the entrance to WoTS a scan of the barcode will generate your personal badge which gives you access across all days.

The fair is open from 10.00 to 17.30 on Tuesday, Wednesday and Thursday and from 10.00 to 16.00 on Friday.

welcome to the Precision Fair!

On 16 and 17 November 2016, visitors can familiarise themselves with all of the developments in the field of precise technology during the Precision Fair. With more than 300 exhibitors, around sixty lectures and the international Meet & Match Event, this fair is an interesting meeting place which tbp electronics utilises to present the major added value of EMS and Design for eXcellence (DfX).

On stand number 201, tbp electronics will be demonstrating the steps in the process, from early involvement services with DfX, including Design for Manufacturing (DfM) and Design for Test (DfT). An extended boundary scan test solution is also present whereby the operation of the core components are automatically tested during the production phase. This function is both analogue and digital. This most important test method avoids costly functional test solutions for the client and positively affects production yield and product quality. Steven Van Hout, senior test & DfT consultant at tbp electronics, will be giving the presentation 'early involvement services: a significant requirement for smart industry' as part of the conference programme.

Brainport Industries

Since the end of last year, tbp electronics has been a member of Brainport Industries (please also refer to page 9 of this newsletter). Almost all of the members of this cooperative are attending the Precision Fair and are recognisable by the black logo on the stand framework. By their joint presence at the fair, exhibitors, including tbp electronics, offer a complete solution for clients.

Precision Fair • NH Conference Centre Koningshof, Veldhoven
Wednesday 16 & 17 November 2016 • from 9.30 to 17.00
stand tbp electronics: number 210 • free access • precisiebeurs.nl

The Precision Fair focuses on components and system suppliers, engineering bureaus, machine and device manufacturers, research institutes and universities in the high-tech systems sector. The fair is being organised by Mikrocentrum for the 16th time.

a look back at High-Tech Systems

On 24 March 2016, the High-Tech Systems trade fair and conference took place in Eindhoven, focusing on high end system development. Marcel Swinnen, managing director test & DfX at tbp electronics, held a presentation on tbp's early involvement services, a significant requirement for smart industry.

'Our aim is a totally dark factory, without human input', explains Swinnen. 'In a smart industry factory, the production process is fully automated, in which communication between the machines takes place faultlessly. Various suppliers now offer 'stand-alone' products, with which we assemble a production line. For smart industry it is necessary to supply a complete process, in which the

required machines and software are optimally aligned with each other. We're not quite there yet. It requires greater responsibility and a proactive attitude on the part of suppliers. We select our suppliers using this criteria.'

In his presentation, Swinnen emphasised that the entire chain is necessary for smart industry, with profit for all of those involved. A hundred or so interested attendees listened to his story. The next High-Tech Systems takes place in the spring of 2017.

hightechsystems.nl



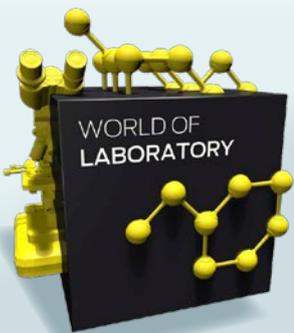
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a look back at the ESEF Industry debate

The Industry debate on 15 March, in the fringe programme of the ESEF trade fair, tackled a current question: 'Are we ready for smart industry?'. CEO Ton Plooy and other representatives of high-tech suppliers arrived at the same conclusion in the debate: it's all about cooperation and communication.

ESEF, which took place from 15 to 18 March 2016 in the Jaarbeurs in Utrecht, focuses on supply, outsourcing, product development and engineering. The four day fair was combined with the TechniShow trade fair, with shared themes, including smart industry. In optimum form, production is totally automated with smart industry. The technology is there for this, but what about practice?

early involvement services

Prior to the Industry Debate, William Smit of DBSC Consulting presented the results of a study into the effects of smart industry on the processes of OEM's contracted to ABN AMRO. The most significant conclusion: suppliers are often trapped between their clients and their own suppliers. Plooy: 'If clients involve us at the earliest stage of the design, we can take the manufacturability, testability and supply reliability of the pcba into account immediately when making the component choice. We call this our early involvement services.' Cooperation at the earliest possible stage, is therefore an important aspect. But smart industry requires more than this.



connectivity

Communication between machines is not yet in line with expectations. 'We have assembled production lines using machines from various suppliers and we are being held back because those machines cannot yet communicate properly with each other. Our most important decision criterion when purchasing machines is: which have the best connectivity?'

Participants in the Industry Debate:

- Ton Plooy, tpb electronics
- Sytse Oreel, Oreel
- Hans Willemsen, WILA
- Wim Simons, Timmerije
- Erik Spikmans, MCB Nederland
- Frans Verhaegh, Mevo Precision Technology

The standardisation which is required for data communication is not yet available. We have now expanded our IT department to work on allowing machines to communicate with each other.'

collaboration

To better align all of the processes across the entire chain, it is not only technological developments which are of critical importance. For smart industry to work, the human factor also plays a part: collaboration. This requires employees to have different competencies. 'This transformation is not easy, but it is necessary', emphasises Plooy. 'We have already taken steps, but we can't do it alone. For smart industry we need the entire chain.'



Ton Plooy

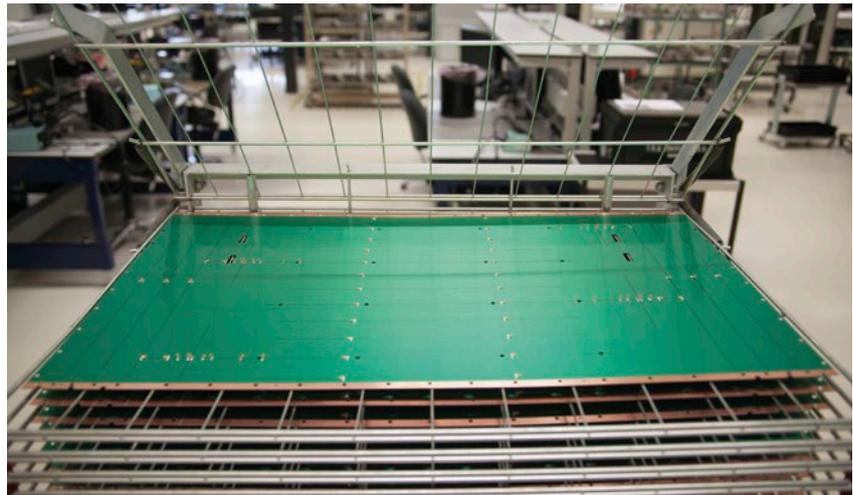
eseef.nl

RF screens for PHILIPS



The 40th anniversary of tpb electronics and its partnership with Philips are not separate from each other. Philips was the very first client and tpb still supplies various pcba's for numerous applications. It was at the instruction of the Healthcare division that RF screens for MRI scanners were produced. Quality is a given requirement for such an important medical application.

Ton Schellekens, MRI buyer at Philips Healthcare, explains the function of the RF screens: 'An MRI-scanner (Magnetic Resonance Imaging) is a magnet containing a 'body coil' in which the patient lies. This body coil is a cylinder containing electronics and antennae which send RF signals to the patient and receive RF signals from the patient. RF screens ensure that these signals are not disrupted. RF stands for Radio Frequency. The signals received by the antennae are processed to generate an MRI image, from which medical conclusions are drawn. The RF screen is important for a clear MRI photo.'



reliable

The RF screens are supplied by tpb electronics in sets of four and assembled by Philips into a plastic frame onto a cylinder. It is absolutely crucial that the RF screens operate reliably, therefore tpb ensures that they are produced and delivered in completely clean conditions. 'Furthermore, the RF screens must be able to withstand the heavy vibrations which the continuously oscillating magnetic field produces', according to Schellekens. 'The vulnerable condensers must not vibrate loose.' For this reason, tpb electronics carries out the soldering manually and performs various reliability tests during production.



'We are continually developing the MRI scanner', continues Schellekens. The magnet for the smaller 1.5T MRI systems has not changed much and also the RF screens have been roughly the same for years. For a long time tpb has delivered hundreds of sets per year for these MRI's with a magnetic strength of 1.5 tesla which we deliver worldwide. The audit of the production location in Dirksland at the end of 2014 yielded a positive assessment. We are very satisfied with tpb electronics and its products.'



philips.nl

contract management: in the interest of all those involved

Contracts establish the mutual obligations between two or more parties. Once it's been signed, a contract usually goes in the filing cabinet and is extended tacitly. However, attention is increasingly being paid to contract management to restrict the risks for all of the involved parties. This is also the case for tbp electronics, for example in its collaborations with suppliers.

tbp operates in a market segment with swift technological developments. To be able to respond to these changes quickly and to deliver the required quality and services at the lowest possible cost, it is necessary to protect purchasing. This is where contract and supplier management comes in.

Conny van der Jagt is purchasing & quality coordinator in the purchasing department at tbp. She is responsible for analysing supplier performance, risk management, monitoring quality procedures in the purchasing department, obsolescence management and the management of logistics contracts. 'In order to develop myself in my role, I became interested in the contract and supplier management training provided by NEVI. I followed this training course and it appeared to link very well with my daily work activities. Writing an improvement plan to complete the study course motivated me to take a systematic, critical look at our (purchasing) organisation. The cohesion between the business objectives, departmental objectives and purchasing practice. Contract and supplier



Contract management prevents the 'leakage' of value from a contract and consists of a number of steps:

1. determination of purchase value (finding the value);
2. implementation and management of the contract (getting what is agreed);
3. development of suppliers (improving what you already have).

Contract and supplier management consists of five important elements:

- I. organisation of contract management;
- II. contract administration;
- III. performance management;
- IV. supplier management;
- V. management of the complex web of stakeholders.

management plays a significant role in the achievement of our objectives.'

Good communication also improves collaboration and prevents risks. With a clear consultation structure, everyone has access to the correct and relevant (contract) information and there are clear

contact points for the escalation of a contract. With effective communication between all of the stakeholders, it is possible to identify problems early and to resolve them, as a result of which mutual trust and understanding increase.

(re)certification of ISO standards fully underway

Process management is crucial to tbp electronics. Only an optimum process can ensure top quality, custom design, supply flexibility and the lowest total costs for clients. The certifications for ISO 9001, 14001, 13485 and other standards are an important confirmation of this.

'This autumn the audits for (re)certification of these ISO standards will take place', according to Kees Vis, QA/QC manager at tbp electronics. 'We are signing up for the new 2015/2016 versions of the standards, which focus

more on risk management.

ISO 9001 covers the basic processes for the entire organisation, ISO 14001 focuses specifically on environmental issues and ISO 13485 relates specifically to the medical sector. We also have the AQAP 2120 certificate with extra standards for the military sector. Process management and risk management are so self-evident to us that we expect to obtain ISO 9001, 14001 and 13485 certificates very shortly in accordance with the most recent standards.'

sustainable measures

The island of Goeree-Overflakkee is actively involved in energy saving and the generation of sustainable energy. Under the management of the local authority, the island will be completely energy neutral by 2020. Local businesses are actively contributing to this objective by setting up a sustainable energy cooperative, one of the aims of which is to distribute the sustainably generated energy between the affiliated companies. Around thirty companies have shown interest, including tbp electronics. tbp itself has already undertaken various energy measures, managed by the very motivated Jacob Herrewijnen.

Herrewijnen is not only the it & risk manager, out of personal interest he is also the motivator for Corporate Social Responsibility (CSR) at tbp. In this capacity he is a member of the working group which is preparing for the foundation of the energy cooperation. The local authority is supporting and facilitating this initiative, which focuses on commercial members, enthusiastically.

CSR has been on the agenda at tbp electronics for a long time already. When the local advisory body Energieke Regio

(energiekeregio.nl) began the project, the pilot study and the first energy scan for businesses and sporting associations took place at tbp in Dirksland. 'The result was a report containing sustainable recommendations. We got to work on this very actively', says Herrewijnen.

energy saving

'Our building is not yet ten years old and well-insulated in accordance with the standards applicable at that time. Modifications to the shell of the building are investments which we will not see any return on, however we have installed

insulating retention walls which are made of transparent plastic, on the inside of all of the facade sections. As a result, most of the building shell now complies with current standards. Our heating and cooling installations do not lend themselves well to energy saving measures. Nevertheless, modifications have ensured that (residual) heat above the machines (ovens) is now transported to other, cooler areas in our building. We could however implement the required savings in terms of lighting. Trainees critically inventoried the lighting in each room and we incorporated their findings in our energy reduction plan. So we set the timings for light switching and installed motion sensors, all of which greatly reduced energy usage for lighting. As part of this plan, we are also replacing our lease vehicles with hybrid or fully electric cars, including charging points in our car park. Naturally, our visitors are able to make use of these.'

sustainable energy

Energieke Regio also investigated the options for sustainable energy. The flat roof of the tbp electronics building, 150 by 53 metres in size, is very suitable for solar panels. Due to the high cost of investment, up to now, tbp has restricted itself to 42 panels which can generate energy for around five households. This energy is used directly for production. 'We expect to be able to fulfil the rest of our energy requirements with sustainable energy from other cooperative members. Together, we will ensure that Goeree-Overflakkee becomes completely energy neutral, which is a wonderful objective. I think CSR is fantastic!'

digital: very natural!

For environmental reasons, we send as much as possible digitally. Way of Life is printed on a small scale on chlorine-free bleached paper and also appears on our website. We would also like to receive as much as possible from you digitally. Thank you very much for your cooperation!



the solar panels on the roof



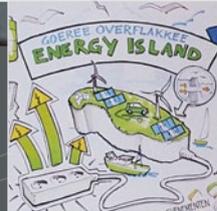
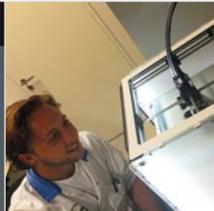
the electric charging points in the car park



WAY of life



edition
40
Sept 2016



40

anniversary edition



For 40 years already, tpb has successfully attracted clients both at home and abroad. In 1976, CEO Ton Plooy founded the business, now located in Dirksland (production site) and Eersel (test engineering). A historical glance at the photo archive...





The anniversary party was held on 8 July 2016, attended by around 400 invited guests, including colleagues, clients, suppliers, friends and family. Involved in the celebrations were: singer Albertina, FrameWave with the lighting effects, Peter Walschots with his art exhibition and Hutten Exclusive Catering who were responsible for the catering and decoration of the venue, photos: Dick van der Veer



Goeree-Overflakkee energy neutral by 2020



gemeente
Goeree-Overflakkee

The risks of climate change are well known and require the transition to a sustainable society. The new council of mayor and councillors of the borough of Goeree-Overflakkee have taken up the original plan and fine-tuned it to become the ambitious Energy Neutral 2020. There is also a socio-economic motivation at the basis of this objective: the opportunities this new sustainable economy offers the island and its residents.

Sustainable developments are moving really fast. The borough is working intensively with businesses, fellow government authorities, social organisations, educational establishments, residents and specialists to remain on board. 'As a public authority, our profile is that of a promising and suitable location for sustainable, innovative techniques in the form of a 'living lab'. By facilitating organisations and businesses and by cooperating in pilot projects, we can make a distinctive contribution to the energy transition in the Netherlands', according to councillor Arend-Jan van der Vlugt.

collaboration

'We can work with residents and local businesses in various ways, for example for the Energy Festival, the Sustainability Conference, during the recent National Championship cycle races and with the Sustainability Alliance', adds Lennard Serie, Sustainability policy worker. 'This alliance is a network of companies, local authorities, schools and social organisations which initiate joint sustainable projects. A special partner is the Deltawind cooperative, in which more than 2,000 residents of Goeree-Overflakkee are joint owners of wind

turbines and a solar park. We also work with basic and higher education to promote sustainable education. Together with local businesses we research the opportunities for innovation in the region. The enthusiasm for sustainability on the island continues to increase.'

challenges and benefits

'Any change creates uncertainty for various reasons', according to councillor Van der Vlugt. 'It requires time, open communication and sometimes determination to remove this uncertainty.' The benefits are great however. 'Working on sustainability means investing in the future of the earth. Sustainability also means welfare in a broad sense for Goeree-Overflakkee: new roads and considerable investment in projects on the island. These then result in income from projects and developments, for both the local authority and the community. By setting a good example and particularly by taking the lead, Goeree-Overflakkee is investing in its image. And that also contributes positively to new investments, activity, visitors and projects which will enhance the vitality of the island for decades to come. Energy neutral 2020 delivers a great deal.

For Energy Neutral 2020, Goeree-Overflakkee is applying itself to energy saving and the generation of sustainable energy.

Energy saving:

- energy saving office WoonWijzerWinkel, woonwijzerwinkel.nl;
- project 'Working together for energy efficient living' for energy advice on a small scale;
- project 'Energieke Regio' in partnership with the ministry of Infrastructure and the Environment, Rabobank Het Haringvliet and architects bureau Casa Ratsma, focuses on energy saving and energy generation on business premises. Also, tbp electronics has participated in this project;
- investment in public charging points for electric vehicles;
- website openbaarladen.nl to request a free charging point;
- sustainable loans for homeowners in Goeree-Overflakkee;
- energy scans for sporting associations;
- energy saving measures in public buildings or for public lighting (LED).

Generation of sustainable energy:

- wind turbines;
- large solar panels;
- new forms, including the production of biogas from cattle manure (Ras family in Den Bommel);
- Brouwersdam tidal power generator;
- solar panels on public buildings;
- investment by businesses and residents in solar energy.

And with almost forty percent achieved, we are definitely going to achieve our goal.'

goeree-overflakkee.nl



Arend-Jan van der Vlugt, councillor on innovation, agriculture, fisheries and regional marketing

now is the time to innovate!

3D-printing can provide a huge stimulus to the opportunities for the design and production of pcba's and other electronics. And yet the machine manufacturers have still not taken the necessary steps to utilise this 'new' technology. Richard Bruins of design bureau 3T and Klaas van Duin of tbp electronics are challenging the market. They know each other from the EMS Technology Group, which is part of sector organisation NEVAT, in which technological developments are discussed.

history

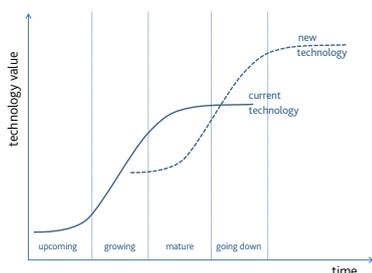
The design and production of electronics revolves around making electrical connections between components to create a function. This requires a functional design, components, an insulating material, electrically conductive material and a process. Components used to be connected directly with wiring (WireWrap, 3D). In 1925, Charles Ducas took out a patent on the creation of an electric path, directly on insulating material. The printed circuit board (pcb) was born (2D). Over ninety years later, we are still tinkering with the same technology.

technology

These days, the board is very complex, with a 16 layer multi-layer. For each layer to be used most effectively we use complex processes in order to install so-called 'buried' and 'blind' via's. Perhaps a pair of micro vias, and yes, we want to have fifty micrometre tracks.

The life cycle of technology is often described as an S-curve. You can subdivide this into three phases:

- phase 1: a large amount must be initially invested in a technology to render it viable
- phase 2: this is the phase in which a return on investment is made. The improvements are greater, the investments accordingly lower
- phase 3: every technology reaches its limits. In this phase, investments are seen to increase greatly in return for relatively small improvements. This phase often stagnates until it is no longer economically viable. Investments for a small improvement then cost a disproportionate amount of money



Quadcopter
the 3D-printed Quadcopter communicates with an existing embedded pcb; magnetic connections provide contact between the pcb and the printed silver interconnections



embedded watch
a 3D-printed watch containing a microcontroller, led's and a changeable battery cell



Voxel8 printer

Otherwise you can't get away from the fan-out of a 1,250 ball-counting micro bga. In brief, a board that is unaffordable and/or impossible to produce with current production technologies. The challenge is over time to switch to a new technology, without investing (too) much in a technology which is slowly reaching the end of its life (see box). At component level a great deal is being invested to achieve this miniaturisation. At pcb level this progress continues to falter, which has resulted in an undesirable gap in technology.

opportunities

3D technology is on the increase due to the opportunities offered by 3D printing of more and more materials. This also provides opportunities for the electronics manufacturing industry. We only print material that we need. We can get rid of connections across the entire volume of the product, whereas with current technology we have to create all of the connections in a restricted number of layers, using complex production processes. Thanks to the printing of the connections and the insulator we can make the same connections with much fewer process steps, for example in 1,000 layers. The production process is simplified and design freedom is increased. Being able

to print everything in one go has an additional benefit in that we can achieve more complex designs and can produce small batch runs more simply.

challenge

We are seeing some movement in the market, but not enough for us. Take the Dragonfly 2020 for example: an industrial printer that can print a complete multilayer pcb, without complicated chemical processes. The Voxel8 goes a step further and also installs (possibly manually) the components during the printing process. This somewhat hobby-style looking printer gives perfect substance to our ideas. The restrictions of the current production technology belong in the past. We challenge the market to come up with more solutions!

Richard Bruins • consulting engineer at design bureau 3T • 3t.nl
Klaas van Duin • manager production technology at tbp electronics



'tbp keeps going'

Our meet and greet days will be taking place once more in the spring of 2017 with clients and suppliers: the tbp customer day on **Wednesday 5 April** and the tbp supplier day on **Thursday 6 April**. The afternoon programme is interactive this time, in which our chairmen for the day, Arjan van Weele and Maarten Steinbuch, together with host CEO Ton Plooy, will 'challenge' guests to work together. Afterwards there will be a sumptuous buffet. Invitations to both days will be sent out early next year.



In the same week we are holding an open day at De Watertoren business park, namely **Saturday 8 April 2017** from 10.00 to 16.00. The Mayor of Goeree-Overflakkee, Mrs Ada Grootenboer-Dubbelman, will carry out the official opening. You can visit tbp electronics, along with other companies and there are various activities for visitors of all ages. Anyone who is interested is welcome.

open day



The programme is still taking shape, so please follow us on facebook for more information (facebook.com/tbpelectronics/).

thinking differently about 3D printing



Frank van Dongen



With the Ultimaker 2 and the Solidworks software package, tbp electronics has taken an important first step toward additive manufacturing. The manufacturing industry is buzzing with the sound of doing something with 3D printing technology, so it's absolutely the right time to build up some experience in it. 'In the beginning we used the printer mainly for the manufacture of production tools, but we now also use it for research and development', says Frank van Dongen, mechanical engineer at tbp. In the past, we always needed external parties for mechanical solutions, which means costly and time-consuming. Now, various 'prototypes' of tools can be made quickly which can be applied immediately and possibly even modified at a later stage. As a result you begin to look very differently at the production process and begin to 'think around' solutions. From an idea to a functioning prototype in less than an hour is now achievable!

'The flexibility and quality of components is increasing, but there are still restrictions in terms of format, speed and materials options. In the meantime we are considering printers which can print using several materials at the same time and which can work at higher temperatures. Better quality 3D prints will be possible as a result. So we will continue to follow developments', concludes Frank. In the future, the 3D printer will play a significant role in the world of electronics, but we're not there yet. For more information, please also read the article on page 5.