



# WAY of life



issue

# 35

May 2013





## the bank... is your money still safe?

We all still remember very well how things used to be... A bank was a bastion of respectability, standing tall on its pedestal. A long time ago the townspeople would show due deference when the bank manager passed. The contracts were sound, your money was safe and the relationship

was based on trust. As a business, you had to submit your financial documents properly each year to enable the bank to see whether they had adequate security vis-à-vis the capital lent by it. One figure was always crucial in this regard, namely 'equity capital'. This had to be at least 30% of your total balance sheet in order to earn the oh so coveted label 'solvent'. In fact, nobody doubted their money was in good hands at the bank concerned. Nobody felt the need to look into whether the bank's equity capital was adequate, how they were using that money, whether they were engaged in unorthodox sponsorship or investment in art and whether they were sufficiently solvent themselves. Neither was their and their staff's high integrity called into question. Bonuses were regarded as the norm, perhaps also because they were still proportionate. In other words, a bank simply couldn't fail, let alone collapse, end of story. How have things been different over the past five years and how will we be able to look back on this in the future? Time and again it has been thought and said that the end is in sight, an assertion undermined by examples such as DSB, ING, ABN AMRO and more recently SNS and Cyprus. Ultimately you the customer just end up losing your

money, even as a non-business customer. And to what extent does the situation in Cyprus serve as a blueprint for other problem banks? Is it not high time that the industry - and companies in particular - come up with something and create conditions for the banks? Such as a statement of integrity, evidence of equity capital, returns and other securities, so that in the event of disasters it is possible to draw a bank's attention to its responsibility and subsequently hold it liable for its actions and any wrongdoing. After all, in the event of mismanagement a business owner is held jointly and severally liable, whereas in the same situation the directorate of a bank gets off scot-free with a golden handshake. At the end of the day it turns out that a bank is no different to any other risky enterprise. Perhaps it could be a nice challenge for our employers' organisation to have a stab at coming up with a protocol for the banks, including a code of conduct? For instance, could banks fall under a company's terms and conditions of purchase? After all, it's nothing more than a shop where you can buy money!

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# ELECTRONICS & AUTOMATION

28/29/30 MAY 2013  
JAARBEURS UTRECHT

*You're coming to the Electronics & Automation trade show too, are you not? It's not something you can easily avoid if you're active in the world of electronics. After all, it's the perfect place to trade thoughts with friends from the field on what's keeping us occupied in the professional world, to have a chat with companies that could do something for you, to brush up on your technical knowledge or to speak to people and get some welcome advice. All that is possible at this one trade show, making it efficient ('everyone' will be there), and fun to boot. In short, it's one not to be missed.*

*Obvious you'll run into tbp there. We'll be exhibiting on stand 8E036, waiting to welcome you to our Grand Café. In this convivial setting, we will be keen to hear about your wishes and experiences in terms of EMS and will update you on the most recent developments. So much has been happening of late, particularly at tbp. Take a look through this issue of Way of Life. Speaking of convivial, for the beer fans among you - and this seems to have become a tradition - we've once again arranged to have something special on tap. You will be able to choose from unique varieties of beer from Brouwerij Het Anker ([www.hetanker.be](http://www.hetanker.be)). Enjoy! And in the afternoon of Wednesday 29 May we will be putting on a bit of a party again, with live music during the happy hour. Yet another reason to drop by and pay us a visit! Incidentally, it goes without saying that there will be plenty more interesting things at the trade show. We'll be happy to tell you more.*

## at the trade show

Once again organiser FHI has pulled out all the stops to make the trade show as engaging as possible. Besides relevant exhibitors being in attendance (see [www.eabeurs.nl](http://www.eabeurs.nl) or the app available to this end), a wide-ranging programme has been devised with something for everyone. Thus visitors will be able to watch a full production line for electronic products up close, the so-called Live Production Integration Line. This production line will feature machines from a variety of suppliers, which will see to it that a bare printed circuit board (PCB) is assembled to form a fully functioning electronic product. This pertains to the production of a gadget many a trade show visitor has been eagerly looking forward to, as we know from experience and the number of subscriptions. Gadgets have evidently become a success element, and for the purposes of this trade show we did develop something very special. This is the Helios, a device

that measures light and temperature, with it being possible to view the readings on the gadget itself or remotely. The availability of a WiFi module on the gadget enables communication with the outside world, meaning that the readings can also be viewed using an app on a smartphone. The analysis tool is based on the Arduino development platform. This means that the user can, with a modicum of relevant knowledge, use it to develop all kinds of computer applications and apps. It is even possible to connect other sensors to it, as the PCB also contains accessible in and out

ports. KITT Engineering was responsible for the design and some thirty other companies were involved through sponsorship in making it possible to bring the gadget to fruition. Even tbp is doing its bit by offering the DfX services in the Live PIL. In order to get his or her hands on the gadget, each visitor to the trade show is required to state when requesting an entry pass to the trade show that he/she wants a Helios. Don't yet have an entry pass? Then request one at [www.tbp.nl](http://www.tbp.nl). We'll provide you with free entry, and it goes without saying that you can invite your colleagues as well. What's more, this will allow you to simultaneously indicate that you're interested in the Helios. You can then assemble the full gadget at the trade show in a few steps.

## even more activities

Developers primarily looking to familiarise themselves with innovations at the trade show will be able to congregate in the Development Club Pavilion. There, a variety of companies will be presenting their latest inventions to the public.

Eight members of PLOT (Platform OmgevingsTechnologie, or Platform Environment Technology) will be descending upon the PLOT Reliability pavilion. In an open room they will demonstrate their knowledge and expertise in terms of reliability of testing and show the latest stability cabinets. Whilst this Way of Life is being made a reality, hard work is being done on the talks for the conference programme. The programme features six interesting topics: traceability, tomorrow's electronics, wireless, in-house vs. outsourcing, reliability and the developer's range of influence. Full, detailed information can be found on the website and app.

Also intending to come along to happy hour in our Grand Café (8E036) on 29<sup>th</sup> from 4 pm? Either way we look forward to seeing you at the trade show!

Electronics & Automation 2013  
Jaarbeurs Utrecht, 28-30 May  
[www.eabeurs.nl](http://www.eabeurs.nl)

**helios**  
GADGET ELECTRONICS & AUTOMATION 2013



# FHI and Feda: together one trade show

Last November an agreement was signed between the Federatie Het Instrument (FHI) and the Federatie Aandrijven en Automatiseren (FEDA). The upshot of this is that both professional associations will be cooperating closely within the fields of industrial automation, electronics, intelligent motion technology and lab technology. This is encapsulated in (for example) the intention to organise a joint trade show in 2014 that will combine all forces industry-wide. The Het Instrument and Industriële Week trade shows will therefore be subsumed to a single heading. For a great many companies this will mean an expansion of the possibilities, doing away with the need to attend two separate trade shows. Even the trade show visitor will benefit from this.

It was recently announced that an agreement was signed with venue Jaarbeurs Utrecht for a new technology trade show in 2014, 2016, 2018 and 2020.



## and much more

*The next few months will see a variety of congresses, trade shows and events being held once more which might be important for you. Here are a few from the ample selection:*

**14-16 May 2013, Nuremberg, Germany**  
**PCIM EUROPE 2013**  
international trade show and conference for power electronics, intelligent motion and power quality.  
[www.mesago.de](http://www.mesago.de)

**14-16 May 2013, Nuremberg, Germany**  
**SENSOR + TEST 2013**



the trade show for measurement technology  
[www.sensor-test.com](http://www.sensor-test.com)

**21-23 May 2013, Parma, Italy**  
**SPS IPC DRIVES ITALIA 2013**  
trade show and congress for technical automation, systems and components.  
[www.mesago.de](http://www.mesago.de)

**22 & 23 May 2013, NH Conference Centre Koningshof, Veldhoven**  
**VISION, ROBOTICS & MECHATRONICS**  
trade show and congress for (machine) vision, robotics and mechatronics in the high-tech industry.  
[www.vision-robotics.nl](http://www.vision-robotics.nl)

**11 June 2013, Auditorium Eindhoven University of Technology**  
**9<sup>TH</sup> AUTOMOTIVE CONGRESS.NL**  
conference on future automobile technology, organised in collaboration with Eindhoven University of Technology  
[www.automotivecongress.nl](http://www.automotivecongress.nl)

**12 June 2013, 1931 Congrescentrum Brabanthallen, Den Bosch**  
**BITS&CHIPS HARDWARE CONFERENCE 2013**  
trade show and conference for the high-tech industry in the Benelux region  
[www.hardwareconference.nl](http://www.hardwareconference.nl)

**18-20 June 2013, Shanghai (Pudong), China**  
**PCIM ASIA 2013**  
international trade show and conference for power electronics, intelligent motion and power quality.  
[www.mesago.de](http://www.mesago.de)

**20-22 June 2013, Chengdu, China**  
**CHINA ELECTRONICS FAIR 2013 CHENGDU**  
trade show (held three times a year) in the field of electronics and information technology  
[www.mesago.de](http://www.mesago.de)

**07 November 2013, 1931 Congrescentrum Brabanthallen, Den Bosch**  
**BITS&CHIPS 2013 EMBEDDED SYSTEMS**  
annual conference and trade show on software and embedded systems  
[www.embedded-systemen.nl](http://www.embedded-systemen.nl)

**12-15 November 2013, Messe Munich, Germany**  
**PRODUCTRONICA**  
20<sup>th</sup> international trade show for electronics production  
[www.productronica.de](http://www.productronica.de)

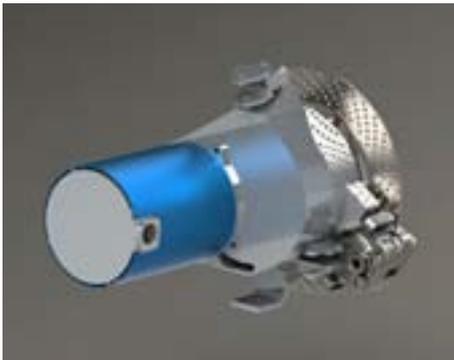
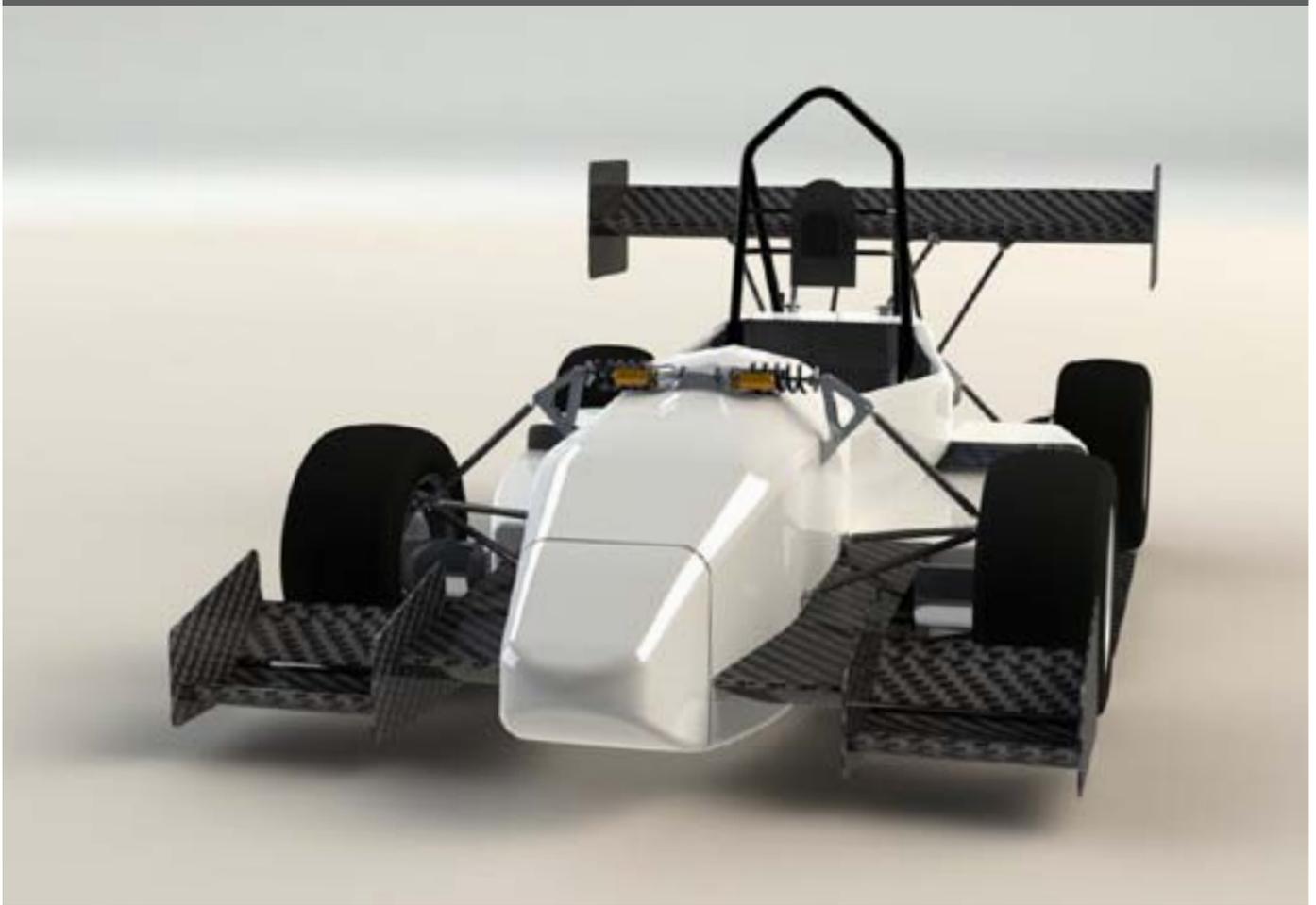
**13-15 November 2013, Shanghai, Pudong, China**  
**CHINA ELECTRONICS FAIR 2013 SHANGHAI**  
trade show (held three times a year) in the field of electronics and information technology  
[www.mesago.de](http://www.mesago.de)

**20-23 November 2013, Messe Düsseldorf, Germany**  
**MEDICA**  
trade show surrounding health and the medical world  
[www.medica.de](http://www.medica.de)

**26-28 November 2013, Nuremberg, Germany**  
**SPS IPC DRIVES 2013**  
trade show and congress for technical automation, systems and components.  
[www.mesago.de](http://www.mesago.de)

**03 & 04 December 2013, NH Conference Centre Koningshof, Veldhoven**  
**PRECISIEBEURS 2013**  
trade show and congress  
[www.precisiebeurs.nl](http://www.precisiebeurs.nl)





# DUT Racing Team heading for success

*"Graduate engineers are proving to have too little practical experience", was the conclusion of American car manufacturers in particular a few decades ago. The companies, united in the SAE (Society of Automotive Engineers), came up with a method to remedy this shortcoming. This resulted in the organisation of a (yearly)*

*competition among students, first held in the USA in 1981. At the end of the 90s the will to participate spread to Europe. Spurred on by the enthusiasm of the British IMechE (Institution of Mechanical Engineers), the competition burgeoned in popularity. Over 400 institutes of higher education scattered across the globe now*

*take part. Delft University of Technology has been doing so since 2001, frequently winning prizes, and will be participating this year as well. As a matter of fact, the team is the defending champion, having won the title in 2012 as well as in 2008, 2010 and 2011.*

### the DUT Racing Team

It is, as we mentioned, a competition for students, with the underlying idea being that the students who participate will acquire a greater understanding of the harmonisation of theory and practice. The competition was set up by a number of key players in the car industry who wished to enhance the practical experience of the graduates. They drew up the rules for the participants, with the competition consisting in students being invited to design a car and build a prototype themselves. The assignment is to design a car for the so-called amateur weekend racer, a non-professional who takes a fast car and hits the racetrack during his leisure time. The designers are free to choose their target group: the business model to be generated will reveal the extent to which the amateur (who may or may not have cash to spare) will enjoy the result. And obviously whether or not an investor or manufacturer can be found to ensure the whole thing is put into production is not insignificant.

The design team plays the role of a virtual company, though it does have to work with real money in order to finance all the parts that together will make up the vehicle.

This money comes partly from Delft University of Technology (DUT), as well as from sponsors who support the project not only financially but also through products or services.

### scoring points

Each participating team can earn itself points. A total of 1,000 points can be earned. The team with the most points is the winner. Basically this is divided into preparing a business plan (anticipated market size, investments, ROI, and suchlike), design and performance. Within the Netherlands, in addition to DUT, Eindhoven University of Technology and several institutes of higher vocational education take part as well.

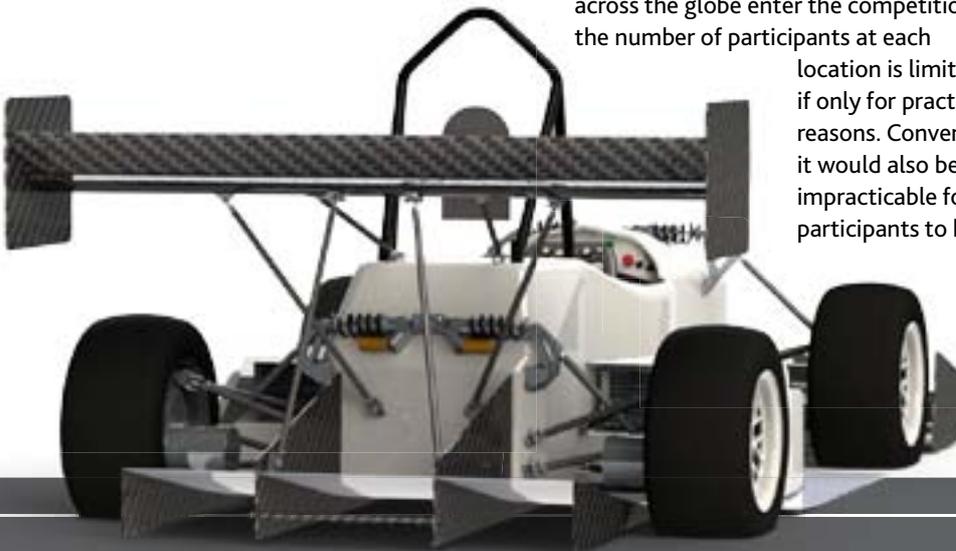
The competition is held in a variety of locations, usually well-known racetracks, where the submissions are judged. Although in excess of 400 teams from across the globe enter the competition, the number of participants at each

location is limited if only for practical reasons. Conversely, it would also be impracticable for all participants to have

to report to all locations. In Europe alone there are six locations, with the DUT team qualifying as the best in Silverstone, Hockenheim and Spielberg. The Delft team will be reporting to all three locations: Silverstone in England on 3 July, Hockenheim in Germany on 30 August, and the Red Bull racetrack in Spielberg in Austria on 26 August.

### the racing car

Prior to this some 75 team members of the DUT Racing Team worked feverishly on the design and completion of the racing car. In doing so, it goes without saying that they drew on the experience they had gained from previous events, though in spite of this each element of the car was the subject of fresh attention. The focus is always on how to do things better. In the case of the car competing this year, new ideas will once again be fleshed out and implemented. Thus the propulsion will be generated by four electric motors, with each wheel having its own traction. These motors will be located right next to the wheel and will be driven by a so-called planetary gearbox. The motor, no bigger than a small biscuit box, is capable of generating 26 kW of electric power, an output comparable to that of an old Mini. In total, then, the output could potentially exceed 100 kW, higher than the rules permit. Depending on the movement performed by the vehicle, the so-called ECU (Electronic Control Unit) will distribute the energy across the four wheels up to the prescribed maximum. A set of lithium polymer cells in the car's so-called side pods (which when stacked will produce a motor voltage of 600 volts!) is



### the judges' verdict

The Formula Student competition features various elements for which it is possible to earn a total of 1,000 points. Broadly speaking the competition entails a dichotomy between a dynamic portion and a static one. Prizes are awarded for each element, but the team with the highest total score will win the overall prize. In view of the fact that it is not possible to quantify every element of the competition in concrete figures, experienced engineers and managers from the car and aviation industries decide on the quality of certain things. They cast a critical (but fair) eye

over the vehicles. Part of this process requires the students to be able to explain how they came up with their design. During the static events, everything centres on convincing the panel of judges. Their verdict is tripartite: the design (150 points), the costs and production (100 points) and business performance (75 points). The latter pertains to the potential for the car to be brought to market profitably. There are several dynamic events in which the car itself (and the racing driver) are tested to the limits. Most of the events are about being the fastest, but the energy issue is increasingly leading to reflection on the efficiency and weight of the batteries.

A variety of tests are performed:

- acceleration (75 points). During this event, the car's ability to accelerate over a distance of 75 metres is tested. In this regard, a great deal of time can be saved by equipping the car with devices such as launch control to limit wheelspin. The top cars cover the 75 metres within 4 seconds;
- skidpad (50 points). The aim of the skidpad event is to test the car's cornering (steady state). The car has to drive a figure of eight, two laps to the right and two to the left. The times achieved allow the sideways acceleration of the car to be calculated. The top cars are capable of achieving acceleration of up to 1.4 g;

responsible for supplying the energy. Furthermore, the car is fitted with sensors in a variety of places. Thus a few of the sensors in the suspension provide information on the lateral forces when taking a corner, enabling the ECU to manage the traction better. This increases stability and prevents skidding. The emphasis is not just on developing and building the car's electrics; matters such as aerodynamics are also given full attention. Thus chassis and coachwork were combined to form a single entity and produced from synthetic resin reinforced using carbon fibres. The underside of this so-called monocoque (*ed: structural approach that supports loads through an object's external skin, similar to an egg shell*) is shaped like an aerodynamic wing. The upshot of this is that additional downward force at high speeds to enhance the tyres' grip on the road surface.

### electronics

The DUT Racing Team and tbp first came into contact with one another at the start of this year. Although the team had all its electrical plans ready and had even put a prototype PCB into production, problems were cropping up. The partner they had asked to do the assembly work for the PCB was not being reliable. So what to do? Stefan van der Kleij, Chief Powertrain, was in a tight situation: "The lack of a reliable partner capable of carrying out our assembly work made it look like our entire project was in jeopardy. If we want points this year, we need to be able to show that our car is complete and fully functional. One of our contacts, a former racing team member, recommended tbp to us as a

supplier. His expectation was that this EMS provider would be capable of taking on precisely this kind of small-scale production work due to its specialist knowledge. What's more, it was his view that tbp excels when it comes to communication with its clients. That prevents a lot of problems." The contracts were swiftly sorted, which had a surprising side effect for the team. Not only were tbp keen to collaborate on making the project a success in the capacity of sponsor, the electronics designers were immediately confronted with things less familiar to them, such as DfT and DfM (see also p. 14). It turns out you can't just come up with a PCB just like that. You can't just hand over a load of components and ask someone whether they'd mind assembling them for you. Stefan: "It's true that we hadn't taken DfT and DfM into consideration. Nevertheless, several PCBs were rapidly produced. As far as possible, design flaws were ironed out by means of such things as using other components. Occasionally this sorts out incorrect dimensions. Other flaws emerged of their own accord during our tests, meaning that the next run for the definitive PCBAs will have to result in perfect products." The car contains a total of 13 PCBAs. A few of these are directly connected up to sensors that carry out all manner of measurements when the car is in motion. The dashboard and the steering wheel buttons are on other PCBs. The electronic heart of the car is the ECU (Electronic Control Unit), which comprises a small card on which is mounted a second card with the micro-processor. The whole unit is linked up



Stefan van der Kleij inspecting the ECU prototype

to the so-called CAN bus, a well-known communication system commonly used in the car industry as well as in industrial settings. A telemetry system has also been provided, ensuring that information is sent and received when the car is in motion. Reading out this real-time data enables settings to be modified immediately, saving a great deal of testing time. Finally, there are a few more PCBAs that monitor the entire voltage and power maintenance within the system, thereby charting energy consumption.

Stefan: "We're now on the right track, and we believe our racing car is going to be a hit with the judges. On paper it all looks great. Maybe we'll be able to add to our trophy collection - we've already got two of them. That's what we're in it for."

Delft University of Technology (DUT)  
www.dutracing.nl

- autocross (150 points). The autocross event (or sprint) corresponds markedly to the qualification system that was used in Formula 1 a couple of years ago. The racing driver is given two chances to set a time on a track unfamiliar to him. This tests the driver's ability to learn a track rapidly, the ease with which the car can be steered and how fast the car drives round the circuit;
- endurance (300 points). The endurance event is the most important dynamic event: the car is required to cover a distance of 22 kilometres. A change of driver takes place at the halfway point, but no repairs are allowed! Only highly

- reliable cars complete the endurance event successfully;
- fuel economy (100 points). The amount of energy used during the endurance event is recorded: the car using the least amount of energy is awarded the most points. There is usually a considerable difference here between the one-cylinder and four-cylinder cars, with the one-cylinder cars always winning. In the case of electric cars it depends on the circuit being driven on. A change to the rules this year means you are allowed to consume more energy on the proviso that this is because you are driving faster.



the 2012 winner

# what are we doing with the BOM?

To be able to provide a quote for the production of electronic goods, a variety of digital files are required. To make the bare board, for installing the components and for carrying out testing procedures. In addition to the so-called CAD (Computer-Aided Design) data, a parts list is also required for all components that need to be on the board. Such a parts list, or BOM (Bill of Materials), is particularly important for logistics and procurement. In practice, such a BOM contains fairly limited information. In general, it will contain a component reference to the electrical design and a few basic electronic figures. It could say  $C_1 = 100 \mu F 25 V$ . Capacitor 1 has a value of  $100 \mu F$  in the case of a desired voltage of 25 volts. What it doesn't state is what physical dimensions this capacitor will need to have in order to serve in the planned place. The component engineer (who sees to the availability) gets this information from the CAD data. Both sources of information are therefore necessary in order to know precisely which components are suitable for the project concerned. Thereafter it will be possible to search in *tbp's* component library (in the ERP system) to see whether these components are available as standard or will have to be bought in for this project. All in all this is a very time-consuming affair.

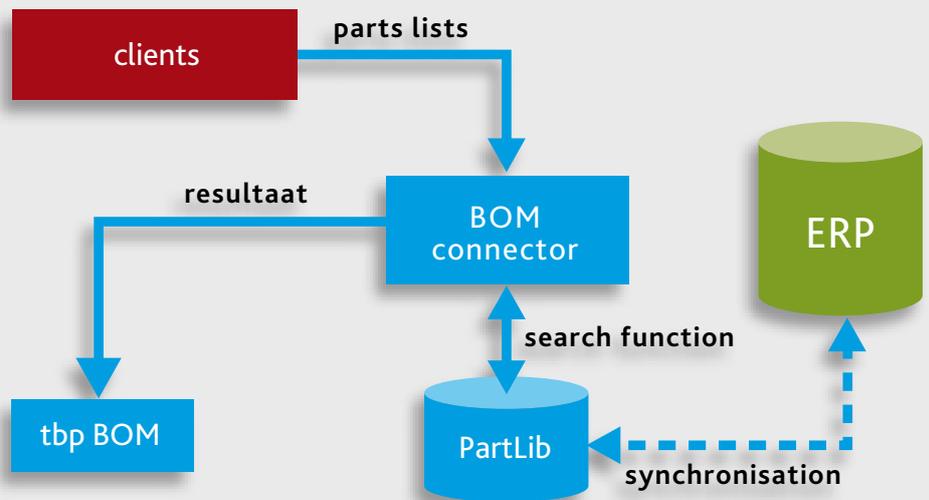


figure 1: the BOM connector constitutes the link between the client's parts list and the component library in the ERP system

## the connection

As we explained in issue 34 of Way of Life, in phase 1 of our early involvement process we ask our clients to provide a parts list to enable us to contribute our thoughts and perform checks on the components selected. This seems straightforward enough, but it still calls for the necessary attention as most of the assessment criteria are stored in our ERP system. This why it is necessary for us to add our internal item number and other relevant data to the parts list. Until recently this was a manual process, one that took a considerable amount of time. An obvious solution was therefore to automate this process. To this end we adopted the "BOM Connector" software module from Router Solutions. A highly simplified overview of this tool is shown in figure 1.

## what does the tool do?

First and foremost, this tool enables us to read in myriad parts list sizes from our clients and to save the content and layout for each client. The benefit of this is that it is a one-off action that makes reading in any subsequent parts list a fair bit quicker. Details that can be saved include the number of columns and the specific content for each column (item number, quantities or description). The window in figure 2 shows that this client usually supplies a parts list with

five columns and that we have sorted and recorded the content for each column. For the purposes of clarification: REFDES is the name of a component, CPN is the item number used by our client, and DESCRIPTION relates to a description of that component and is usually also the field we use when performing a search in our ERP system (figure 2).

Subsequently it is possible to use the client's data that has been read in to initiate a search for possible item number candidates in the BOM Connector Part Library. This Part Library contains a specific selection of information fields from our ERP system and is synchronised when the tool is booted or on demand. The result of the search will be a list of possible candidates from which the component engineer will make a selection based on his experience and then record this allocation, per client, in the database. Subsequent part lists will then already have been partly converted and added to from the ERP (Enterprise Resource Planning). Figure 3 shows a sample result of a SmartSearch search for the combination of the columns Description1 and Description2, these being our internal item number ZZ2850106085750, a  $10 \mu F$  capacitor from Taiyo Yuden. The component engineer will now be able to make the allocation and record the connection between the client's

item number and the ERP item number. It is occasionally the case that the requested component is not found in our ERP system. In such cases, a new item number will be created on the basis of the datasheet supplied by the client, the ERP database will be synchronised with the BOM Connector database, and the correct allocation will be made.

Once all components have finally been given an ERP allocation, an export function can be initiated that will create the standard tbp parts list which always contains the same quantity of information. This tbp parts list will then serve as a basis for all subsequent steps required to ultimately create a product (figure 4).

### minimum requirements

If you're currently thinking that this tool has improved the entire parts list processing process, then you'd be absolutely right.

However, there is one catch: the client's parts list does have to contain certain basic information! A parts list that contains the information  $C_1 = 100 \mu\text{F}$  is clearly inadequate when it comes to enabling a selection to be made from the wide range of possible ERP candidates. As a minimum, therefore, we would like to have a parts list featuring the columns <Ref.Des>, <Description>, <Quantity> and <client's item number>.

By means of this tool, we are expecting to get a clearer impression of the availability and cost price of components, thereby enabling us to issue a quote more swiftly. Here too a degree of automation can make an important contribution. A cooperative client results in quicker service for that client. Something from which all partners in the process will benefit.

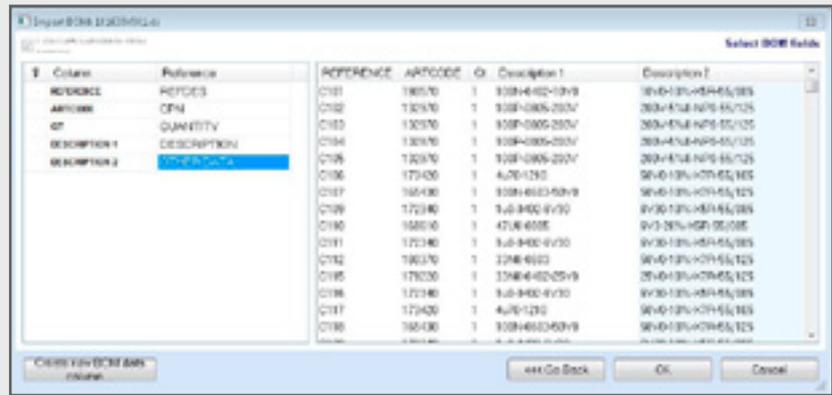


figure 2: the BOM on the import side

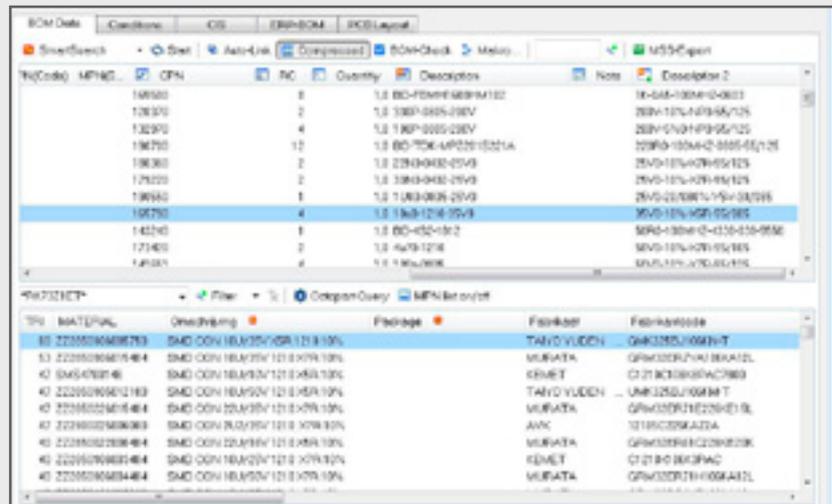
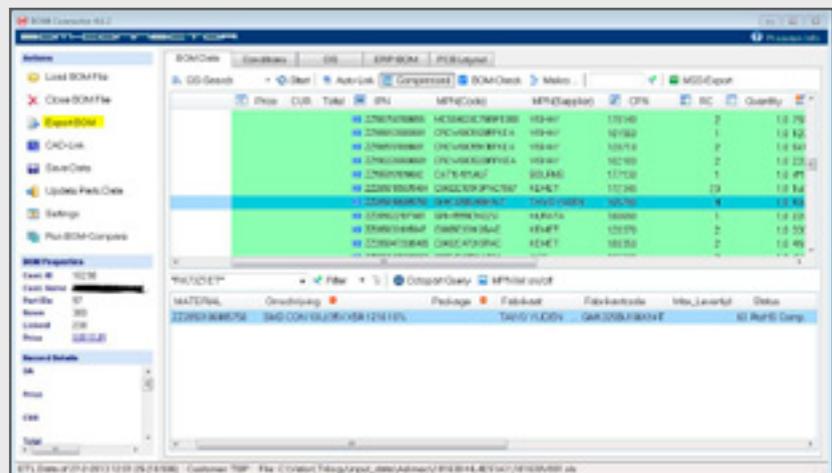


figure 3: possible candidates for use are shown at the bottom of the screen



# BikeParkControl prevents bicycle chaos



the warden can see the status of the parking spaces at a glance



looking for a place to park your bike is unnecessary

Every Dutch person is familiar with the problem of bicycle racks that are full to bursting point at railway stations in the Netherlands. In major cities in particular, passengers are often faced with the problem of parking their bike at the station in an orderly fashion. This is largely caused by the fact that 20% of the bikes could be regarded as orphan bikes, or bikes that are never picked up by their owner and need to be removed. Parking for bikes is particularly a problem in cities with a high student population. Railway network manager ProRail is supporting local authorities in their approach to this mobility problem and has asked Nsecure for a solution. Fred van Els, General Manager at Nsecure:

and ProRail have long been solid partners when it comes to security and safety, our specialism. The problems surrounding the parking of bikes were not a direct focus for Nsecure, but ProRail knew that we would be able to develop an innovative solution." Nsecure came up with BikeParkControl, a registration system that shows cyclists free spaces, notifies wardens of bikes that need to be removed and helps cyclists to find their bike easily upon their return. In conjunction with partner Klaver Fietsparkeersystemen from Hoogeveen, which supplies bicycle racks, they offered BikeParkControl to ProRail.

## intelligent bicycle rack

The bicycle racks at train stations in the Netherlands are usually unmonitored and can be used free of charge. These two factors mean that things quickly become chaotic. The BikeParkControl system provides a straightforward solution, creating a degree of order by enabling the current facilities to be monitored. A sensor in each rack records whether and when a bicycle is parked. Matrix signs keep cyclists informed on the available free spaces. At

the same time the warden is informed of any bikes that have been parked for longer than local by-laws permit. These bikes can be removed and taken to a separate location.

Ostensibly, then, BikeParkControl would appear to be a straightforward system. Nevertheless, sustainability, user-friendliness, affordability and usability within existing racks are ineluctable preconditions for the system to be successful. The fact that Nsecure has

succeeded in this regard is evident from the successful pilots implemented at the railway stations of Utrecht, Groningen and Zutphen.

## wireless sensor technology

One innovative aspect in the system developed by Nsecure is the wireless sensor technology developed in-house. The system features the latest micro-processor from Texas Instruments, which requires very little energy to power it, and



the bicycle stands in the vicinity of Utrecht Centraal

is being used in a European product for the first time. The upshot of this is an internal battery life of 8-10 years, thereby minimizing the sensor's maintenance requirements. Another unique property of the system is the central gathering of data. Thus each rack is linked to the Nsecure data centre in Barendrecht. This allows real-time monitoring in terms of management information. The information garnered on such things as the amount of parking activity and how full the racks are on average over certain periods furnishes the owners of the bicycle racks with information to enable any necessary measures to be taken.

#### from development to production

Besides the collaboration with Klaver Fietsparkeersystemen, the design phase saw Nsecure having to look for a reliable EMS company. Initial communication with tbp was made approximately 2½ years ago, more or less by chance, as Fred van Els recalls: "We knew whilst we were still in the design phase that we'd be needing an EMS company. We approached tbp. As early on as the first discussion I got the impression that this was a company that really listens. Tbp immediately set to work

investigating all the factors that determine the quality of the product and that was something that really struck a chord with me." It soon became evident that they would deliver on their promises. The engineers from tbp scrutinized all aspects of the design and came up with actions to improve it. Fred van Els: "It's precisely that critical mindset that I thought was terrific. In tbp you've got a partner that contributes to your thinking process to ensure the end result is a good-quality product. What's more, the communication channels are streamlined, making working with them efficient and above all enjoyable."

#### Nsecure

Established in 1995, Nsecure specializes in operational and strategic consultancy pertaining to the development, implementation and management of technological solutions in the field of safety & security for large and medium-sized businesses. Nsecure's solutions are developed in-house, with implementation frequently being done in collaboration with partners. Nsecure's customer base encompasses the sectors financial and business services, industry, government and hospitals.



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## pick-and-place at top level

*The big news was announced in the previous issue of Way of Life already: at the start of January the machinery will be revolutionized with the addition of several new pick-and-place machines. A few of the old machines will be taken out of service, and two relatively young machines will be used as stand-alone machines for small-scale production runs and prototyping. The two new lines, both comprising two MY100DXe-14s from Mydata, will ensure the largest volume of production by a long way.*

*In view of future developments, these changes are necessary. The new generation of machines will be more accurate, more efficient and achieve a higher throughput speed. This is due to such factors as the machines being fitted with a double placement unit. Extra quality assurance will be arranged at a later stage by adding AOI systems before and after the reflow oven. This set-up will mean that the lines are better suited to PCBAs with a higher degree of complexity.*



### soon productive

Installing the new machines was no mean feat. The dismantling and assembly work was carried out in accordance with a tight schedule. Fortunately the team of specialists responsible for ensuring the machines were delivered in good working order did not encounter any setbacks. The first line successfully completed the first products earlier than anticipated. The construction of the second line needed a bit more time, as this line was given extra facilities to enable creation of the connection to the new MES platform, Aegis. To this end extra barcode readers were introduced, and because the interconnections with the various machines also entailed the usual work, a longer construction period was allotted. A handheld scanner is used to set the loader, the transport and the unloader. The barcode readers in the transport system are subsequently able to recognize the bare PCBs. This information serves to issue all instructions needed by Aegis and the pick-and-place machine to assemble and follow up on (trace) the board. This process starts with checking whether the board's serial number matches the selected project, as well as with a check of the machinery's software. If everything is in order, then the board will be released to allow the components to be installed on the board. After all, that's what it's about.

This action is possible thanks to the MES (Manufacturing Execution System), which

tbp is currently implementing. We are anticipating being able to say more on this in the next issue of Way of Life.

### investing

The utilization of new machines is a natural corollary of the philosophy of tbp, which sees tbp wishing to be and remain the front runner in the sphere of technology, thereby enabling us to deliver what the client wants at the agreed time and at a competitive rate. And, if at all possible, to contribute to our clients' thinking process in order to produce the best result. Fulfilling all these ambitions requires an up-to-date machinery. We arrived at the decision to go for the pick-and-place machines from Mydata after careful consideration of proposals from a variety of suppliers. Ultimately we opted for Mydata due to positive experiences in the past and their willingness to adapt the machinery to the special requirements set by tbp. These are a few of the many reasons why tbp is investing some two million euros in these new pick-and-place machines.

And this won't be the only investment in machinery this year. Still on the list are several AOI systems (Automatic Optical Inspection) and so-called reflow ovens (for the purposes of soldering the components onto the PCB). This will enable us to continue supplying these products requested by our clients for the next few years.



# what's it actually about?

So what do those specialist terms mean that you come across so often in the world of electronics production? Buzzwords such as DfT, DfM, slip through and just keep going? Jargon that speaks directly to specialists, but is confusing to those a little further removed from the world of technology. Nevertheless, perhaps due to the manifold use of these terms, they do generate an appropriate degree of curiosity among the readers. Obvious but still important to know? That's why we are keen to explain a few terms in straightforward language, i.e. no scholarly definitions. This will enable the uninitiated to get a sense of what these terms are about and why they are important. These terms do have one thing in common: they have an effect on the quality of the product.

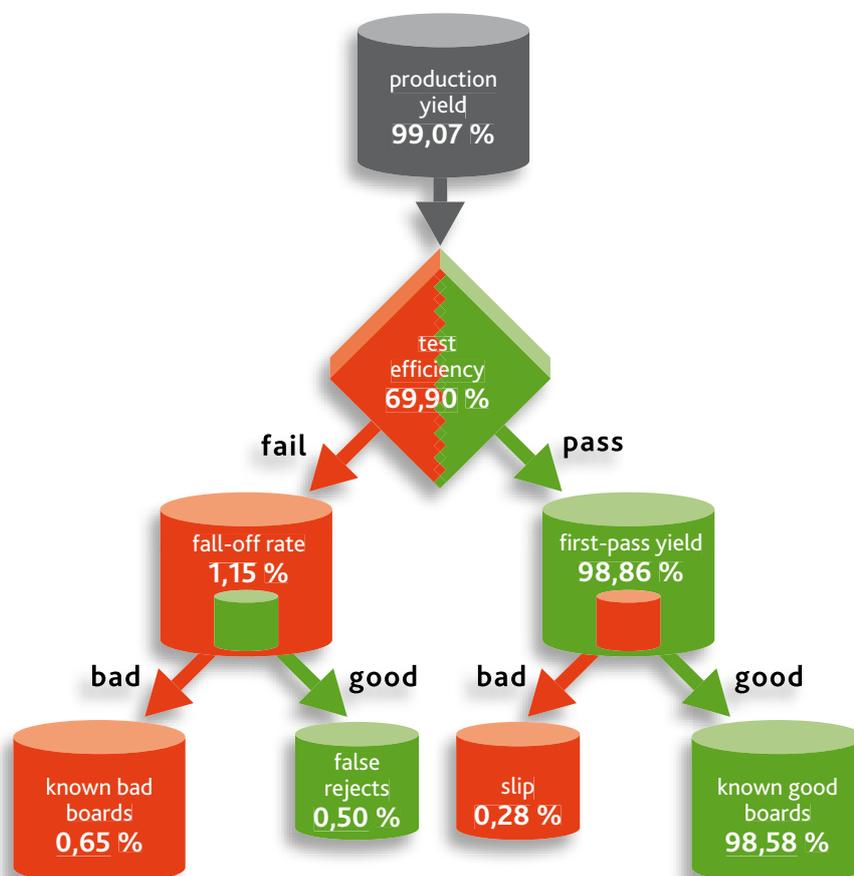
## from idea to product

Explaining electronics in a few words is nigh on impossible. Controlled management of electrical currents or voltage is virtually always the foundation. The execution usually entails assembly of electronic components, which together are to ensure the requested functionality. Concrete products often include PCBAs (printed circuit board assemblies\*), which involve components being installed on so-called bare boards\*\*.

Making such a product starts with designing an electronic circuit. The client makes it clear to the designer what requirements the circuit will need to fulfil. The doorbell presents us with a very simple circuit which we can use for the purposes of illustration. The ingredients? A source of electricity (power, such as a battery or transformer), some wire, a button and a bell (or gong). The circuit is so straightforward that we don't need a designer for it. Things get a little bit more complex when a designer is tasked with designing the electronics for a new piece of equipment. In such cases, the designer has to know step by step what the equipment has to do. In the case of a coffee machine, for example, various processes are run through step by step, all of which need to be checked. Is there water in the coffee machine? Does the water have to be heated? To what temperature? Does coffee need to be ground? How much? And so on. The electronics steer all the facilities in the unit, such as the heating element, the grinding mechanism, etc.

Let's suppose that the designer knows all the functions the equipment will be required to perform. The next job is to decide between various technologies to accomplish the ultimate objective. The designer will also have to take

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an example of reporting test efficiency, first pass yield and slip through

\* printed circuit board assemblies = off-the-shelf assembled print boards

\*\* a bare board is a plastic board on which (and occasionally: in which) copper electrical conductors are installed which effect the electrical connection between the components and the 'outside world'



## TEST ENGINEERING

In view of the fact that the quality of the product tbp is making is entirely dependent on the requirements of DfM and DfT, each and every incoming project is tested (to the extent that this is possible) in terms of these rules. A team of specialists stationed at a separate site in Eersel is working on this on a daily basis. You may well have read the introduction to this team, which is called test engineering, in issue 33 of Way of Life.

Team Leader Marcel Swinnen is in daily contact with clients on the ins and outs of print designs and production and issues reports on these matters. Sometimes he does see things going awry. Marcel: "Not all that long ago a client approached us asking us to take a critical look at a product. Their EMS guy was making the product according to plan, but the result in the functional test was lamentable. He'd been struggling with it for a year already. The cause was soon evident. No attention had been paid to DfT and DfM

during the design process, in which the designers had regularly had to redesign the product to make it suitable for production. Our specialists scrutinized the original design from a year ago and came up with a litany of faults and recommendations for improvement. These broadly corresponded to all the modifications that had been introduced over time. If the design had been subjected critically to the rules straight away, then the product would have fulfilled expectations without all this ado. It was a pity that all that time and money went to waste. Not to mention the fuss and bother!"

Marcel admits that the reporting can be a bit of a slap in the face for the client. "Upon request, our team will come up with a report containing recommendations to improve a design. On the one hand, designers consider that a positive thing, but on the other the client's management team sometimes perceive it as criticism of those designers. As though

they haven't done their work properly. And that may well be the case now and then, but the majority of times it's down to the fact that the designers have too little experience when it comes to the production of electronic goods. In such cases, we usually mention that the board is fine in terms of functionality, but things could be better at the level of testing." After all, the designers' focus is on the desired functionality. The testing strategy gets eclipsed.

*Editor: see also the interview that recently featured in the April edition of Link Magazine ([www.linkmagazine.nl](http://www.linkmagazine.nl)).*

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into account cost price and things like the (requisite) reliability and the ease with which the unit can be produced. And with these last things we're already a fair way into the jargon we are keen to explain within this framework.

### it needs to be possible to produce the product

However beautiful a design might look on paper, at the end of the day it still needs to be possible to produce the thing. The designer may well have devised the ideal solution in functional terms, but if there is no room for certain components (for example), then this will be an issue. The manufacturer will have to go back to the designer asking him to modify the design he has provided. This used to happen quite a lot, but the tide is gradually starting to turn. The designer realizes that his brainchild isn't always feasible. In practice this means that he will take the rules of manufacturing into consideration. In jargon terms: Design for Manufacturing (abbreviated to DfM). Rules that primarily stem from the EMS production companies (EMS = Electronics Manufacturing Services). This means that specialists from the EMS world are looking over the shoulder of the designer and using their knowledge to create a feasible product.

### the product has to be good

Just because the product can be made does not assure you of high quality. This is chiefly down to the fact that faults can occur throughout the production process. Human error, production machinery faults and faults in the materials supplied ensure there is a reasonable chance that a product will not live up to expectations. The chances of a product failing are, of course, dependent on the complexity. It is difficult to predict in advance what kind of failure percentage rate can be expected. Nevertheless, that is a figure of the utmost importance. After all, the customer wants quality, and doesn't want any faulty cards (PCBAs) in his end product. A dilemma crops up here: the EMS operative will only be able to make a prediction as to the chances of a board being unsatisfactory by means of testing it. But you can't test each board to breaking point. What's more, a PCBA

could pass the test procedure and yet still fail once it's with the client. In specialist terms we refer to this as *slip through*. This is the proportion of PCBAs supplied by the EMS company that might contain faults, faults that - for whatever reason - the EMS company is unable to identify (safety diodes and parallel capacities cannot usually be tested in terms of merit). Just for the record, we're talking here about one and the same board from a single batch. Another frequently used term for this is ZHDR (Zero Hour Defect Rate). Products that have been subjected to few tests or none at all during production have a very high ZHDR. Three defective boards out of a hundred is not unfeasible. Without prior testing, any adverse effects will not manifest themselves until the client has installed the PCBA in his end product or - in a slightly more favourable case - until the client has performed a functional test prior to use.

Is there anything that can be done about this poor prospect? The answer to that is yes. Treading the right path is something we manage to do by continuously performing step-by-step testing throughout the production process to ensure everything is in order. The result is a steady fall in slip through.

### the product has to be testable

The question that immediately presents itself is: what kind of tests are appropriate? We then have to look in outline at how the production of a PCBA is effected. As we mentioned, a PCBA is composed of a bare board onto which components are fitted. Whatever kind you like: resistors, capacitors, integrated circuits (ICs), connectors and many more besides. The intention is to fit the right components in the right place and, by means of soldering, make the right connection. And here there is potential for faults to arise. Faults that can only be detected and corrected by testing. To this end, the PCBA must have been made in a way that renders it testable. In jargon, the PCBA must satisfy the rules of DfT, Design for Test.

In effect, DfT has already begun from the moment all the 'ingredients' have been delivered: from the bare PCB to all components. Are they in good working order? Many components are readily

testable. Next the solder paste is applied to the PCB and the components are installed. Did this process go smoothly? We check this by way of a so-called AOI, Automatic Optical Inspection. This entails a photographic analysis of the components on the assembled board using an image from a database. In this regard, no significant differences are permitted in terms of the tested properties. This is followed by the soldering process. Have any faults arisen? During this process, short circuits can occur, components can shift into the wrong position, spontaneously or otherwise. In short, anything can happen and so testing is necessary. We can apply AOI here, but electrical testing is another option. To this end there are various methods, which we won't be examining here due to their specialist nature. We will, however, cite a few testing techniques: flying probe test, in-circuit test and boundary scan test.

In a nutshell, all these structural tests fall under the term DfST, Design for Structural Test. And so the result of good products after the production process is indicated numerically as first pass yield. Ideally this would be 100%. In practice, however, this isn't the case.

If need be, when all is said and done a so-called functional test can still be performed. Does the board do what it's supposed to do? We call this DfFT, Design for Functional Test. For the purposes of this final action, modified testing equipment is needed that has been fine-tuned to the specific product.

Nowadays exceedingly good and affordable solutions are available for this. So, there you have a brief overview of what terms like DfM and DfT mean. And now you'll also understand that these aren't empty buzzwords but subjects that require attention, with the intention being to be able to deliver what the client wants: top quality.

So what's DfX when it's at home? This is the collective term for all possible "designs for ...": DfT, DfM, DfA (Design for Assembly), DfL (Design for Logistics), etc.

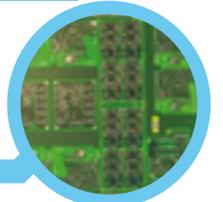
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# Alpe d'HuZes



## fighting cancer by running or cycling

*Fighting cancer by running or cycling. Is that possible? Obviously not in a literal sense, but it won't be long before another few thousand runners and cyclists will be tackling the ascent on Alpe d'Huez once again. Their goal will be to raise a substantial amount of sponsorship money for cancer research. Much needed money! After all, one in three people will develop cancer at some point in their lives. Alpe d'HuZes (as it's*

*called) is raising funds for the Dutch Cancer Society (KWF), which is joining in the fight against this disease. A campaign that revolves around volunteers, with 100% of the proceeds (some €32 million in 2012) going towards research. A campaign, incidentally, that revolves around a huge number of volunteers all labouring to turn the event into a success.*

### preparing properly

In total, some 8,000 people will be taking part in the gruelling cycling or running race on 5 or 6 June 2013. Participants can decide for themselves how many times they would like to do the 15 km ascent and descent, up to a maximum of six times. However, experience shows that the full six times is something best left to the serious athletes.

Paola Steijger (third from right), instructor at a sports academy in Delft, believes she can manage the full six: "Aside from the fact that I'm doing an awful lot of sport as part of my job, I'm extra motivated to do my bit for charity. The devastation that cancer causes is something I have seen in my immediate family. My father can count himself lucky: he got cancer, but thanks to modern therapies he has been given another chance at a healthy life." Paola is part of a team that includes four women and two men, who together will be achieving their goal under the name "Sport = art".

In order to acquire a bit of experience and show up well prepared, she is taking part in a few marathons first. "Although the circuit doesn't feature any mountains, it's good for keeping control of your body. This will come in handy in France".

### sponsorship

As we mentioned, winning the battle against cancer is the mission of Alpe d'HuZes. This can only be achieved by raising (plenty of) money. This is why every entrant is required to guarantee that he or she will be donating a minimum amount. It is no wonder, then, that participants pull out all the stops to get people interested in sponsoring them:



family members, friends, companies and organizations are invited to contribute. In addition, they can choose from two options: a fixed sum or an amount per ascent/descent. In the latter case, the final number of ascents made by the participant will determine the amount to be donated. For sponsorship, see the website [opgevenisgeenoptie.nl](http://opgevenisgeenoptie.nl). Paola is confident that she'll achieve the minimum amount: "I'm trying to get everyone enthusiastic about this campaign. My motto is "You're not just supporting our team but also yourself!" After all, you might well find yourself suffering from a horrible disease."

Paola spent part of her life living on the so-called South Holland islands. Back then her parents got to know Ton Plooy and as a child she visited him once in a while. Those visits stuck in her mind, and so it was only natural for her to approach tbp for sponsorship. "Another step closer to my target."

#### 100% dependent on volunteers

In order to maximize the proceeds, all the staff working on making the event a success are also making a financial contribution, whether directly or indirectly. The philosophy is: no costs, not even for organizing the event. This is referred to as the no rake-off policy. A sponsor is sought for anything and everything that is required. Much care has been given to the safety aspect. The regular transport is limited to French cars only. Furthermore, the entire route will be supervised by so-called motards, who will endeavour to prevent accidents. Amongst others, our colleague here at tbp, Frans Geerts, has been volunteering for



this for a few years now, purely altruistically!

The race days are to be broadcast live on the Internet. Webcams have been set up around the course for this. So check out the LiveSite during the week of the event (<http://live.opgevenisgeenoptie.nl>) and see the webcams, read the blogs, experience Alpe d'HuZes 2013 for yourself! This eighth edition of the Alpe d'HuZes promises to be a true spectacle once more.

*Just in case you're thinking you've spotted a typo (which is what we thought too at first): Alpe d'Huez is the place in France where the event - which is called Alpe d'HuZes - is held.*

Want to find out more about Paola and her team members?





# Karim Azaom

## CUSTOMER ACCOUNT MANAGER

### customer account management

Since last autumn the team of customer account managers has been reinforced by the arrival of Karim Azaom. An important task has been assigned to him, as he constitutes the connecting link between the client and the assembly facility. In short, what it boils down to is that he is supervising all projects for a number of clients from the request for a quote to delivery of the products. Karim regards his work as a genuine challenge, partly because every project is different. Karim: "This means that my work begins the moment a request comes in to produce a product. Such a request, usually in the form of a package of digital information including diagrams, print layout and parts list (the Bill of Materials, or BOM), is apportioned among the appropriate people. The test engineers provide their DfX advice, the purchasers can set to work looking into what needs to be bought and the corresponding pricing, the pre-production department (preparatory work) examines the extent to which it is possible to make the product, what production method is required and what the financial consequences will be. All this information together finds its way back to me enabling us to put together a quote."

### it doesn't stop there

Once the client has accepted the quote things get serious. The next step is production, and Karim's job doesn't stop there. After all, unforeseen situations can always present themselves during this phase. Consider in this regard problems related to delivery or quality. Incidentally, these could crop up both within tbp processes and at the client's place of business. "My job is to turn those problems into a challenge to come up with a good solution. Sometimes

that calls for a degree of improvisation, but I'm quite comfortable with that."

In any case, experience shows that problems with tbp's suppliers are relatively thin on the ground. Karim: "In my previous job it wasn't uncommon for us to get late deliveries of components. Evidently tbp's forecasting model and open communication have a beneficial effect. We've made solid agreements with our preferred suppliers, as a result of which we have very little trouble in terms of delivery delays." At any rate, if such problems do arise then the client will be advised in the preliminary stages of the process that they should avoid using components that are not readily available. After all, this prevents a considerable proportion of unreliable deliveries. Obviously this isn't always the case, but if all things go as planned then the result is a product with a more acceptable price and more favourable delivery time.

### future

Karim is confident about the future. Fortunately the market is buzzing, he claims. "These days you'll find electronics in the most unexpected of places. In all kinds of end products. At present I'm working for a limited number of clients all of whom are so-called OEMs (Original Equipment Manufacturers). They're providing me with more than enough work, particularly since I'm still fairly new in the company. I'm hoping that this number will steadily grow, because I'm currently really looking forward to increasing diversity in terms of products. As far as I'm concerned, a board can be really complex. After all, that's precisely where tbp's strength lies." Whether and the extent to which that hope will become a reality remains to be seen. It should do, in view of our investments in the latest software and hardware and our knowledge of PCBAs. It's not without reason that our logo features the words: the business of perfection.



# Pieter-Jan Hagenaaars

## MANAGER PROJECT ENGINEERING

### prep work

Project engineering, pre-production or prep work. What do these entail? Pieter-Jan Hagenaaars, Manager of Project Engineering since the start of this year, provides a brief account: "Prep work involves a transformation of the client's request into a print board (PCBA) to be assembled. Prep work entails amassing all these details and turning them into the data and work instructions required to be able to run the various product machines and test equipment properly." This process does also involve a link to such things as the purchasers, of course. In practice the standard components will be available, but rarer components will obviously have to be ordered. Information on availability and price play a crucial role. After all, all the components need to be on hand at the right time if we are to be able to make a start on an assembly project. In addition to the procurement of components, we seek to get in touch with a number of suppliers of the so-called bare boards, which are produced by an external manufacturer. The quotes issued then provide the client with the requisite information to enable him to make a well-considered decision.

### quote process

Prep work doesn't just play a crucial role in the preparatory phase of a project, but does so in the quote phase too. This phase entails looking at what process (production) steps are needed to produce a specific product. These steps partly determine the price and production time. In conjunction with the results from the test engineers and purchasers, the definitive quote can subsequently be drawn up for the (potential) client.

### collaboration with test engineers

A total of eight people are engaged in prep work, and it is their job to set all projects on the right track. They stay in close contact not only with their colleagues in Dirksland, but also with the test engineers in Eersel.

Pieter-Jan: "You see, using a scan they investigate the possibility of making and testing the PCBAs. Does the design fulfil all requirements with regard to DfM and DfT? We feed their findings straight back to our clients, enabling them to modify their design if there is cause to do so."

There may be a reason to carry out a more in-depth investigation, which could yield advice prior to going ahead with the production process. Thus we could advise replacing a few components with other types, or considering a redesign to increase testability. The objective of all this effort is geared towards reducing slip through. The client will then be able to decide whether he is content with the higher chances of failure of his own design or would like to act on the DfX advice to ensure better results.

### focus on quality

Pieter-Jan originally hails from the world of electrical engineering, and also studied industrial engineering. "I spent about eight years working as a designer, prep work operative and tester of electronics in the aerospace industry. I then switched to the world of railways, where I worked as a project manager maintaining and adapting the HSL. Although that had its attractions too, I found myself drawn increasingly to electronics proper. I soon found my way to tbp! Another thing that struck a chord with me was the good feeling for quality matters. My previous job had entailed a great deal of attention to this too, and it turned out that tbp was equally hot on quality. Unsurprisingly, I'm definitely keen to cooperate on (and, where desirable, head up) improvement programmes (internal or otherwise). We'll benefit from this greatly, particularly in the long run. But naturally my primary duty remains the supervision of colleagues when it comes to prep work."

# learning by working or working by learning?



Jan de Jong, founder of GO College

*Live near tbp electronics, got what it takes to get further qualified in electronics at intermediate vocational level and at the same time have a great job? tbp's doors are wide open to anyone who fits this description. Thanks to the foundation of GO College, students can study, acquire practical experience and work close to home. This is good news for students on Goeree-Overflakkee as well as Hoeks(ch)e Waard, Voorne-Putten and Schouwen-Duiveland. It's also good news for tbp. For years now the company has struggled to find well-qualified staff at various levels. Finding the right man or woman is still problematic, and by attracting people who are capable of combining study and work tbp is expecting to bring in some well-motivated staff.*

## getting started

The GO College is an institute of education still in its infancy. Director Jan de Jong: "Technical education at intermediate vocational level is hard to come by 'on the islands'. I myself spent three decades teaching. It always turned out that the education programme and the demand from the business world were not in harmony. The upshot of this was dissatisfaction among employers. The initiative of founding a school was a natural corollary of this, as it were. It gave me the push I needed to get started on it." Setting up an educational establishment is one thing, but turning it into a success is a whole different kettle of fish. Before Jan took the plunge, he realized the bitter necessity of having a solid business plan. How do you accomplish everything, how do you find classroom space and teaching staff, how many peoples will be

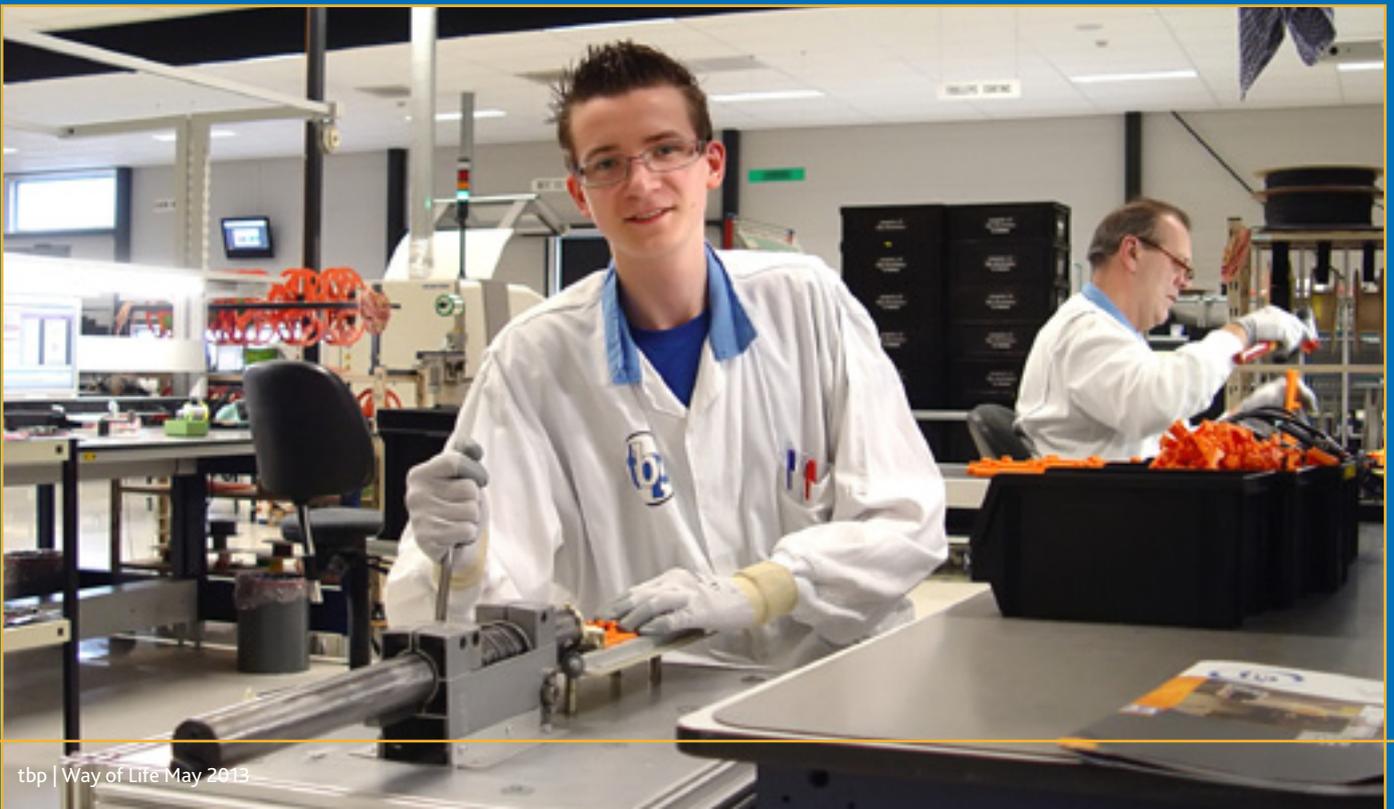
interested, how much money is required and many more questions needed an answer. Jan also realized that banks are not currently keen on investing in private technical education at intermediate vocational level. Jan: "My experience is that banks are treading water. Whereas the business world is at full pelt. I quickly managed to convince three companies that GO College could be a viable institute of education. The companies - Aquality, Van Rennes Elektrotechniek and tbp electronics - could see that the plans were solid and so an investment contract was signed with these partners."

## why GO College?

GO College signals new study opportunities for (potential) students. The meaning of GO is obvious, but there's also a nod to the abbreviation for the region of Goeree-Overflakkee. GO College distinguishes

itself by way of three important characteristics: the school is close to home; the degree of attention given to the students is much greater owing to the favourable teacher-to-student ratio; and the lesson material ties in much better with the practical realities of the business world. In order to be able to satisfy the latter condition, the students are regularly given lessons by specialists from the industry or professional bodies who teach them the very latest knowledge. Obviously there is a cost attached to this way of studying, and this cost is approximately three times higher than that of the regional education centres. But on the other hand, there are the aforementioned benefits, the students are awarded a recognized diploma once they have passed the exam, and they immediately put themselves in a favourable position on the job market.

Richard Goudswaard is combining study and work in electronics production





# Art in Dirksland

## various specialist pathways

Students can come to GO College to get qualified in three specialist pathways: structural engineering, mechanical engineering and electrical engineering. Strangely, you can't study electronics. For that reason it has been agreed with research centre Kenteq that the course aimed at this subject is included in the "Middle Management Engineering" course.

## gradual growth

The summer of 2012 saw a start made on recruiting students, and two candidates applied. The forecast is that there will be another ten students next academic year and a further ten the year after that. It goes without saying that nobody has a crystal ball, but an even greater increase is expected to follow. Jan: "Obviously we're taking into account the fact that the first few years we'll make a loss. That's not a disaster, as long as we achieve our (ideological) goals. Once the results are good, then the good news will spread of its own accord and more students will be knocking on the door of GO College."

## student setting to work

In April this year Richard Goudswaard (17 years old) started working as a BBL (vocational training) student at tbp. As a holder of the diploma he earned at his intermediate vocational school in Middelharnis, he was keen to get further qualified in the world of electrical engineering. During his course in mechanical engineering his interest in electronics grew. He was very keen on pursuing a follow-up course at intermediate vocational level and thought he'd have to go to Rotterdam for that. This didn't appeal to him due to the long commute, and when his parents heard about GO College, his decision was soon made. Working and studying at the same time - now that appealed. And things went well. He is now working as a production worker in the department which does a great deal of manual work with the print boards. He loves it. In the future he is hoping to become a test engineer. Who knows? First he'll have to see to it that he completes his intermediate vocational diploma.

[www.gocollege.nl](http://www.gocollege.nl)



Once again there is plenty of new work in evidence in our gallery wall in Dirksland. The gallery is set to look a little more bright and colourful once more with a variety of screen printing from two visual artists. The works in question will come from Ad Verstijnen and Jos Verwiël. An exhibition to lift your spirits.

Ad Verstijnen (born in Arnhem in 1946) was educated at the Academy for Visual and Architectural Arts in Tilburg, and over time has developed his own technique. This sees him use painting or produce collages, screen prints and watercolours. Central to this is experimentation, with space being given to fanciful improvisation with splashes of colour. Most of all his experimentation revolves around the search for his own fervent primal strength. He's not interested in limitations. He also puts the rules he learned about at the academy out of his mind. He does so by means of such things as children's drawings. Verstijnen uses informal materials, expressively painted and interlarded with humour. All this is - to use his own words - calmed to form a "skeleton key behind a pane of glass".

Jos Verwiël (born in Vught in 1954) attended the Academy for Graphic Design in Tilburg and the Royal Academy for Art and Design in Den Bosch. His technique is geared towards producing sculptures and paintings. In his work he shows a sense of romance and is among those individualists who follow their own heart rather than trends.

The motifs in his work are inspired by water and the maritime environment, such as shipping, sailing, navigation and cartography. Instruments necessary for navigation, for astronomy, are sometimes literally cast in bronze to be combined as a "discovery" with other objects to form a new object.

He lets his imagination run riot within the compass of the usual rules or order, rhythm and structure, but he also takes to the liberty of playing with these rules. Moderation and order are in evidence in the rust-coloured images he started producing in the early 1990s. They exhibit a high on graphic transcription of thinly depicted structures. He enjoys working in an eclectic style, does not allow himself to get caught up in a simple style, which would impose too many obligations on him. At present he is primarily working in two dimensions, creating large paintings with a documentary atmosphere. Transparent branches and images from the world of science, lighthouses, shipping and suchlike create a layered feel that is evocative of sculpture.

Will you be in Dirksland in the near future? If so, come and see all these fine works on the first floor.

The art as seen is also available to buy. For further information (including on borrowing artworks in general) please get in touch with: Business Art Service Benelux (BAS) | [www.kunst.nl](http://www.kunst.nl) They can also be contacted by e-mail: [mieke@kunst.nl](mailto:mieke@kunst.nl)

# app for Way of Life

Our Way of Life newsletter is now also available electronically for your iPad. Wherever you are in the world - assuming you have a signal on your mobile - you will be able to view the very latest and recent issues of our newsletter straight on your screen. This could be handy if (for example) you suddenly need to reread an article on a certain subject.

Downloading it is simple: just visit the app store, search for tbp and you'll have it in no time. As easy as can be. It goes without saying that we will still be sending the Dutch-language hard-copy versions by post for the time being, as for some people there is nothing better than the good old-fashioned paper copy.



*tbp's Marketing Assistant Ielya van Dam has the privilege of being the first to read the electronic version of the Way of Life newsletter. This app was also created in collaboration with appstudio.nl.*

## summer closure

Summer's on its way. This means that our branches in Dirksland and Eersel will be closed for a fortnight. The DfX services in Eersel and the production work in Dirksland will be halted in weeks 31 and 32, or from Monday 29 July to Friday 9 August 2013 inclusive. Please therefore ensure that your orders and requests for a quote are submitted to us in timely fashion so as not to jeopardize your own production.

Our sites might be closed during that fortnight period, but Mr Frans Geerts is still contactable in emergencies:

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