

NO.14 NOVEMBER 2010

/GPS

*technology

/success factors in outsourcing

*vision

/Nuon Solar Team

*case

/environmental management

*trends & hypes





/contents

[03] /foreword

*change begins with yourself

Thinking and acting in more environmentally friendly ways.

[04] /technology

*heading in the right direction with GPS

New generation on the way.

[08] /vision

*success factors in outsourcing

Supplier 'takes away worries' from customer.

[10] /case

*travelling together

Cleverly anticipating advances in knowledge.

[12] /customer interview

*Philips Healthcare

Innovation for patient comfort.

[14] /trends & hypes

*environmental management

Just saying you are environmentally friendly doesn't work.

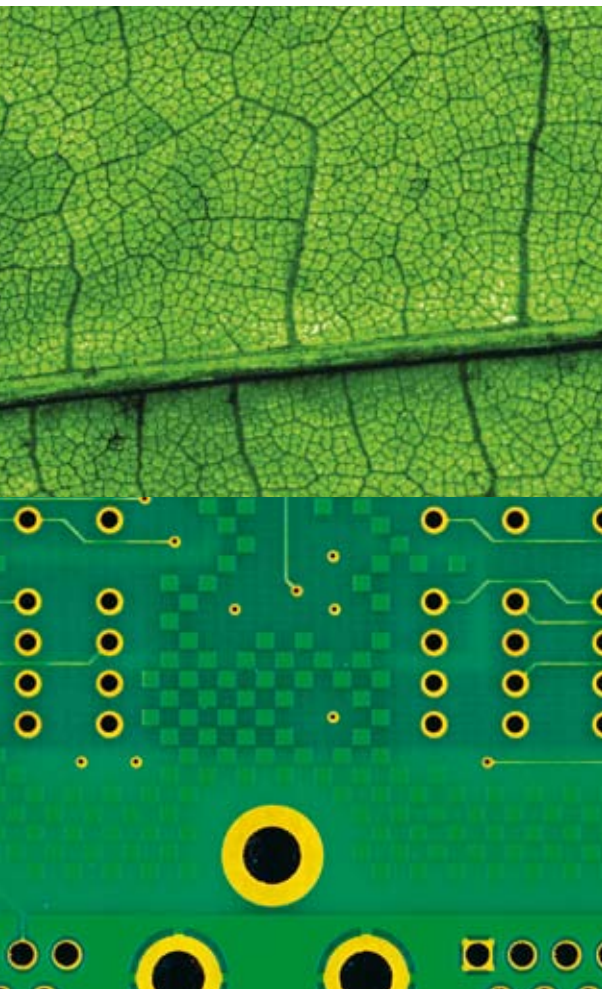
[16] /employee interview

*a conversation with Ronald Bos



Jan van der Wel

CEO



/foreword

We read and hear more and more about the impact of our current human activities on the environment. The fear of climate change is making people think. More and more new initiatives are being conceived to stop climate change. These are both big projects designed to ensure that the environmental effects are reduced through innovation and smaller initiatives between companies.

>>change begins with yourself

The world will have to adjust to a new mentality; thinking and acting in more environmentally friendly ways. On the other hand, we also need new technologies to reduce the impact on the environment. The two go hand in hand. There is no way back to nature as it once existed. Advanced measurement and control technology makes it possible to identify environmental effects and manage our activities to alleviate them. For example, increasing the energy efficiency of vehicles and better mobility management to reduce the number of unnecessary kilometres travelled.

Making an environmental management plan is often the first step companies make towards a greener policy. At Technolution, we view environmental management in two ways. On one hand, we observe our development processes, which we then optimise; on the other, we think about what can be done with our expertise to achieve improvements in our customers' operations. This is one of the reasons why we are supporting the students of the Nuna5 solar-powered car project.

As an organisation, we form part of extensive ecosystems in which we are responsible for the design, construction and integration of products and systems. Every ecosystem has its own environmental aspects and attendant effects on the environment. The challenge is to reflect these effects in the design under the label 'Design for Environment', by means of which we encourage our customers and partners to also think about the environment. I hope we can encourage you to do the same with the articles in this edition of Objective.

Happy reading!

/technology

In the right direction with GPS

Virtually every smartphone has GPS these days and in-car navigation systems have become indispensable. In the space of ten years, satellite positioning has become a mass product and work is already well underway on a new generation of GPS.

Initial development

We all use the term GPS as a collective name for satellite navigation and positioning. However, GPS is actually a brand name for the American system. There are also systems from other continents such as GLONASS (Russia) and Galileo (Europe). The general term is Global Navigation Satellite System (GNSS). The development of the United States' GPS began in 1967 as a military application. Eleven years later, the first satellite was launched. The 1990 Gulf War was the first conflict in which GPS was used on a large scale. Only in 1995 did GPS become officially available for civilian navigation. However, the army did not release the highest degree of accuracy. They degraded the civilian signal, restricting its accuracy to a hundred metres. In order to avoid dependence on the American GPS, Europe decided to build its own system: Galileo. America watched these developments closely. The frequency bands chosen for Galileo were so close to those of GPS that the US would not be able to interfere with Galileo without paying a price: if they did, they would degrade their own GPS.

Eventually, Europe chose a different frequency band. And the US switched off the jamming signal in 2000 in order to ward off competition from Galileo. Accuracy went from a hundred metres to fifteen metres, making GPS attractive for civilian navigation. Moreover, at that point PDAs were just powerful enough to run navigation software and mapping material was becoming available for PDAs. This conjunction of factors made a personal navigation device feasible. And so TomTom was born.

As at 2010, the future of Galileo is still uncertain. Recent developments have been more political than technical. Even so,

Galileo has already been very important in keeping the Americans on their toes. They keep on dreaming up new things to stay ahead of Galileo. If Galileo never becomes a reality, that need not be a problem, technically-speaking. Strategically it would be risky: Europe would then have no system of its own and would be permanently dependent on other powers such as Russia, China, India and, of course, the USA.

How does satellite navigation work?

A GNSS satellite is not a spy satellite that continuously follows you. It is exactly the other way around; the user tracks the satellites in order to calculate his position. Positioning using satellites works according to a geometric principle; if you know three fixed points in space and you know your distances to those three points, you can calculate where you are. A GNSS receiver can calculate the position of the satellite and its distance to the satellite from a satellite signal. If it knows the positions of three satellites, it can calculate its own position on earth.

A satellite is constantly sending out messages with information about its orbit. A satellite's orbit is roughly elliptical, with several parameters being of interest; the zero point of the orbit (position at time point zero), its velocity and the dimensions of its orbit (which is an ellipse, so the relevant parameters are the short axis and the long axis; a and b). Because the orbit information is not exact, it is corrected every few hours by a ground station. This involves the ground station sending the satellite a new set of parameters to transmit.



The receiver, for example the smartphone or an in-car application, does two things with the satellite signal. It processes the information about the orbit in order to calculate the satellite's position and it very accurately measures the arrival time of the signal. The report states the time that it was sent. The difference between the two times tells the receiver how long the signal has taken to travel; it can use this information to calculate its distance to the satellite.

In order to determine distance in this way, accurate time measurement is essential. Every satellite is therefore equipped with an atomic clock. The clock in a simple GNSS receiver is not accurate enough for this purpose. You therefore need a fourth satellite for accurate time measurement. The clock in the receiver is synchronised with the atomic clocks of the four satellites. That generates four mathematical equations with four unknowns: time + XYZ coordinates, which can be resolved mathematically by the GNSS receiver.

>>the user tracks the satellites, not the other way round

Satellites for navigation do not hang in geostationary orbit. They fly over the earth, each one in its own orbit. So the receiver sees different satellites coming by all the time. The receiver needs to be able to be receiving at least four satellites in order to calculate a position. So the system needs to plan the orbits of the satellites in such a way that there are always at least four of them well above the horizon everywhere in the world..





Ever-improving signal

Although, ten years on, GNSS systems are now completely established, development goes on. The accuracy of fifteen metres can already be increased by a factor of five with a differential GNSS. This makes use of a (purchased) signal from a ground station alongside satellite signals. However, such devices are more expensive and require a subscription to receive the extra signals. Civilian applications currently only use one frequency band, around 1500 MHz. In the future, a lower frequency band will be added (the L5 band), which will allow transmission at greater power. This will carry extra signals, for greater accuracy and other services (at a charge). The basic signal will remain free to use.

More data, more signals and more frequencies will make GNSS systems a lot more accurate. This will enable us to navigate better. And new applications are coming into view, such as indoor reception. However, we will have to wait until there are enough satellites which offer services on the L5 band. Changes to the GNSS system take time. You cannot simply bring down the satellites for modifications. Improvements are always introduced in new satellites. Satellites have a lifespan of ten to fifteen years. They stay in use until they fail; only then is a new one launched and the replacement satellites are ready to go. Only when that stock is used up will a new generation of satellites be built. This means that

rapid modification to the system is impossible. Around 2018, the current American GPS system will have been entirely replaced by modern satellites. The expectation is that the Galileo system will be fully operational by then.

Own R&D

Most companies that want to build GNSS functionality into their applications buy a standard GPS module for the purpose. There are only a few manufacturers in the world that make these positioning chips. These are chips with limited functionality which the user cannot modify. For example, most standard GPS modules transmit their position once every second. But if you are using position for regulation and control purposes, you may want to know your position ten or a hundred times per second. That capability is not sold as standard, except in very expensive systems.

Technolution wants to have this flexibility, which is why it has built its own GNSS receiver. Not with a view to marketing it as such but to acquire knowledge and experience and to be able to try out the extra possibilities of the new generation of satellites and combine the signals from the different GNSS systems. Our own design receives the basic signals on the L1, L2 and L5 bands used in GLONASS, GPS, EGNOS and Galileo. The receiver can accept several frequencies at once. The signals are digitised and then go



to an FPGA with a built-in GNSS receiver. As a developer, this means you can do what you want: calculate where you are, make measurements and experiment. At any point in the process, you can draw off signals and see what happens. The optimisations you want for a particular application, for example higher reliability, accuracy or speed, you can make yourself. You can combine GNSS with sensors. In this design, we can do that as soon as the signals come in and not, as with the ready-made modules, only when the receiver transmits its position. For example, we are going to use this receiver to investigate the availability of the Wide Area Augmentation System (WAAS) signal of the EGNOS satellite.

>>realising new innovations with GNSS

In other words, our GNSS receiver creates opportunities for realising new innovations with GNSS. For example, it is crucial to current applications such as intelligent speed modification, helping to minimise changes to the intended steady speed and avoid incorrect interventions. In addition, the improved reception in the L5 band makes possible navigation within buildings, more accurate positioning on the road for road pricing and better navigational support for the driver.



Projections: WGS84

In order to accurately determine your position with satellites, you also need a good mapping system. No problem, you might think – after all, maps have been made for centuries. But map-makers were using different systems side by side. This is also linked to how maps used to be made: by means of land surveying, with everyone using their own local mapping systems with their own points of beginning. Land maps used one system and nautical charts another. GPS requires a worldwide standard for map projections (*). This was only established in 1984 with WGS84 (World Geodetic System 1984). Only by using WGS84 can you represent your position unambiguously anywhere in the world with a single mapping system.



(*) A cartographic projection is a way of translating a physical location to a point on a map.

/vision

Success factors in outsourcing

The high-tech industry is outsourcing more and more work – high-value work for technology specialists, which involves the supplier taking on increasing responsibilities and so ‘taking away the worries’ of the customer.

High-tech machine constructors are increasingly focusing on their core competencies. They want to focus on what they are good at and what makes them unique. The rest they outsource to skilled suppliers. For instance, OEM companies like ASML want to focus primarily on the lithographic process. Over time, they have acquired more and more peripheral disciplines: mechatronics, electronics and software. In the race to make things smaller, more accurate and faster, ever higher demands are placed on electronics and software. The peripheral disciplines have become so specific that OEM companies are bringing in external specialists to cover them: design agencies and producers specialising in technological niche markets. In this way, a chain of suppliers is created. Customers put in a lot of effort make this supply chain transparent. They want to know where the costs and risks are and how best to organise them. If everything fits together properly, production is a moving train of companies. The trick is to connect all the carriages together properly and keep them on the track. To achieve that, OEM companies look for strategic partners: professional suppliers who are flexible, technically and financially solid and can offer sharp pricing. High-tech companies compete in a global market and cost reduction is always high on the agenda. So suppliers will always be asked if they can do things even more cheaply.

Application knowledge

In order to meet all these wishes, the supplier needs to have some application knowledge of the OEM partner. He must know and understand the customer's product and market. A supplier for ASML, for example, needs to understand that its market is highly dynamic and can be pretty hectic, which demands the capacity to adjust at lightning speed. If you can't cope with that, you shouldn't be there.

Building up a partnership with an OEM partner costs a company a lot in terms of money and effort. You need to learn the terminology used in the company and understand its culture and mentality. So an initial quotation process for an OEM company is something of a trial-and-error exercise, in which you make a number of quotations until you grasp exactly what the customer wants and you are really on the same page. Since establishing a good relationship with an OEM company is a relatively big investment, the supplier wants to

have long-term relationships. Because when you are used to doing business with each other, communication becomes much easier.

Specifications are the foundation

In order to make a good quotation, it is important as a supplier to get involved in the project at an early stage – preferably already when the specifications are being drawn up. After all, you first need to understand the problem properly before you can explain it to someone else. By taking part in the specification process, the supplier can himself contribute ideas about the actual problem and help decide on fundamental choices to be made. Indeed, a smart OEM party will turn the process on its head and have the supplier draw up the specifications. By drawing up good specifications, the supplier proves his qualities and demonstrates that he can realise the project.

The other extreme is also possible: the OEM presents a concrete plan for what the solution is to look like. In this case, the OEM is outsourcing the solution and not the problem. It means he is not making use of the supplier's creativity and knowledge, so the supplier cannot make the best solution and his added value is limited.

Politics and communication

A supplier will usually be smaller than the OEM. This has consequences for communication and political sensitivities. However good your contacts with the customer's technical people, they are usually not the final decision-makers. You may be in complete agreement at the technical level, but politics also plays a role. You might have to deal with a director who once had a bad experience with a particular technology and 'so never wants to use that technology again'. Or a purchasing department who have their own ideas about particular technologies or solutions. Within an organisation, there can be all kinds of issues which you as supplier know nothing about, so communication is essential. Likewise, many misunderstandings can arise through mistaken perceptions or interpretations. Good communication can dispel fears, misunderstandings and prejudices. Communication also means being present at important project meetings of the customer. These may address matters connected to your project and it is naturally a



good thing if you hear about them first-hand and are able to contribute to the discussion. Naturally, the supplier also has the responsibility to raise problems or point out when the planning is not achievable.

Focus on core competencies

Suppliers for high-tech companies often have specific, high-value expertise. That is their strength and it is what makes a company unique. Focusing on your own core competencies gives you a high added value for your OEM partner. You know what you are talking about. That is why it is important to do your own R&D; to build up your own expertise and as a calling card which can serve as a way in for joint R&D with the OEM. Conducting joint R&D means working on a long-term relationship with your customer. You are investing in the future together.

Design & production

R&D is interesting, but what the customer is really interested in is the end product. The rest is the responsibility of the supplier, including the contributions of his subcontractors. A 'design house' that does not do its own production is nevertheless responsible for the manufactured product. What they develop must be able to be manufactured to a high standard and affordably. Knowledge of production is therefore indispensable to a designer. Cooperation with the producer is also a critical factor. Ideally, you want to be sitting down with

the manufacturer right at the start. He will be able to give you tips for small adjustments that can save extra work or costs in production. The designer and producer can together work out the test strategy during production, building into the design the option of conducting cost-effective interim tests during production. All of this results in an optimum production process and robust products at the lowest cost.

Synergy

Besides concrete, demonstrable matters there is also a fair degree of psychology involved in a partnership, often referred to as synergy. Does it click between you? Do you look each other in the eye? Do you let each other speak and do you dare to ask critical questions? Do you do what you have promised to do? Are you conscious of the customer's implementation difficulties? Things which are not written down in any project plan but which can make or break a successful collaboration. If both parties communicate honestly and openly, free from politics, you will be making rational choices. In a good, durable relationship you know each others strong and weak points and you can talk about them openly. 'What can we do better, what can you do better?' After all, both parties want a long-term relationship. This is only possible with mutual trust and crystal-clear communication.

Handle alarm

Check alive

SNMP get

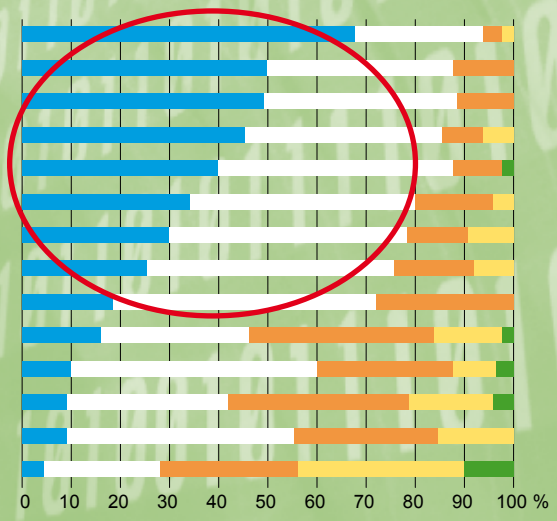
Source: Brainport presentation dated May 28 2008

n up

- very important
- important
- moderate
- hardly important
- not important

OEM market trends

- Increasing product requirements (financial, logistics etc.)
- Flexibility and application knowledge at supplier is essential
- Long lasting relationship
- Pressure on cost reduction through the network chain
- New requirements for system suppliers
- Impact of customer requirements on the supplier process
- Impact of market globalizing
- OEM industry is concentrating on their core business
- System Engineering requires specific specialism
- Competition within the supply chain
- OEM industry will reduce the number of suppliers
- Suppliers are reducing the number of suppliers in their chain
- Suppliers are going back to their core business
- Reduction of capacity in terms of Engineers and Suppliers





/case



Going on a journey together

>>cleverly anticipating advances in knowledge

Students from TU Delft had to contend with faults in their self-built solar-powered car. Together with Technolution, they came up with a temporary solution. They are now working on a completely new design.

Nuon Solar Team

“Build an electric car to cross Australia powered entirely by solar energy.” That is the challenge which fourteen students of TU Delft took on in 2008. A year and a half ago, they set aside their studies to design and build Nuna5, drawing on the experiences of four teams that went before them.

In October 2009, Nuna5 came second in the World Solar Challenge in Australia. Afterwards, the car was due to stand idle for nearly a year, until work started on Nuna6. The students wanted to put that year to good use. They wanted to use their experiences to improve Nuna5, in order to give the next group of students a better start with Nuna6. For example, the car was troubled with faults in the voltage converter. This component transforms the energy from the solar cells into a usable form for the car’s electric motor. Technolution wanted to support these students who are passionate about technology with its knowledge and experience in electric propulsion

and automotive applications. We could see enough areas where we could make a contribution.

Voltage converter too heavy

The voltage converter is an important link between the solar cells and the motor. It is a Maximum Power Point Tracker, which draws as much energy as possible from the solar cells regardless of the amount of sunlight. In electronic terms it is a perfectly good converter with a good yield. But the mechanical design makes the converter less suitable for use in a car. It is a rectangular PCB which is attached to the car at its four corners. At the centre of the circuit board is the heaviest component; the transformer. When you start moving, the chances of hairline cracks appearing in the printed conductors is high.

As a first step, Technolution and the students thought about ways to improve the suspension. We suggested choosing a heat sink the same size as the PCB and attaching the whole to the car at more points, especially around the transformer. A bigger heat sink also solved a problem with cooling. The original heat sink was not adequate which meant that additional cooling with a ventilator was needed. A waste of energy!

>>Nuna5 achieved third place, with no breakdowns

Suzuka Dream Cup

The modified design was taken to the Suzuka Dream Cup 2010. This is a circuit race which sees forty solar-power cars take to the track at the same time at the Suzuka circuit in Japan – a totally different setting to the endurance race in Australia, where each car individually completes a straight three thousand-kilometre course. Nuna5 came in third, without suffering any faults or breaking down.

Stress & vibration test

We also suggested subjecting the transformer to stress and vibration tests. For an effective vibration test, you first need to know what vibrations the controller is exposed to in the car. To find out, a MobiBoxx was made available. This is a universal in-car platform for telematics applications in vehicles. It has all kinds of connections as standard, including CAN. In addition, it contains a three-axis accelerometer. The MobiBoxx is therefore able to record a vibration profile for the car, which provides the input for a real vibration test. However, in the end, the stress and vibration tests were not carried out. By then, we had acquired so much knowledge together that we were able to skip them. As a first step, we made the transformer stiffer using the large heat sink. Currently, the team is working out the idea of developing an entirely new converter with our support for the World Solar Challenge 2011 in Australia.

Follow-up

The current converter is a heavy component, both in terms of weight and power. But it is essential to the overall energy efficiency of the car. The voltage converter is very efficient, but it can be made much smaller and lighter, so reducing mechanical stress. Building your own converter means you understand everything that is inside it. Which means you can optimally adjust everything at system level in order to squeeze the last drop of performance from the whole car.

MobiBoxx

Because it turned out that there was no need for the relatively expensive vibration tests, the MobiBoxx was not used in Japan. But the platform did gradually come into the picture for other applications. After all, the MobiBoxx was developed as a telematics platform in vehicles. In the Nuna5, the students only used a screen for internal control and data processing. Data transport took place via WiFi to a support car. But support cars are not allowed in some competitions. The MobiBoxx is able to log data itself and communicate it to a computer or back office via GPRS or UMTS. All components in the car are linked with CAN, which means they can be monitored by the MobiBoxx, which also contains GPS. This is handy for positioning, but even more so because GPS can very accurately determine speed. This allows you to record the accelerations of the car. Accelerating costs energy, so you want to drive as steadily and 'evenly' as possible. Of course, braking also costs energy, but by braking with the engines, some of the energy can be recovered as electricity.

Everything you measure you can also log. In this way, you can seek to achieve the greatest possible efficiency for all components. The energy consumption of the MobiBoxx is negligible: less than two Watts at an average load. We are currently looking into the possibility of using the MobiBoxx as the central controller for the Nuna6.

The partnership with the Nuon Solar Team is a typical example of embarking on a journey together. Solving a mechanical problem may lead to a completely new design. And using the MobiBoxx offers entirely new opportunities. This is a collaboration in which everything is not laid down at the outset to be implemented in exactly that way. Embarking on a journey together is all about cleverly anticipating advances in knowledge.

World Solar Challenge

The World Solar

Challenge is a biennial race through Australia for cars powered by solar energy. More than thirty student teams from all over the world take part. The race goes straight across Australia north-south from Darwin to Adelaide over a course of more than 3,000 kilometres.



Suzuka Dream Cup in Japan



/customer interview

Philips Healthcare:

innovation for patient comfort

Philips Healthcare is one of the world leaders in supplying medical systems for hospitals. Magnetic Resonance Imaging (MRI) technology is one of the cornerstones that have given the company a strong position in the market. Through market developments, it has increasingly specialised in its own core competencies and outsources specific technological developments to its partners.

Introduction: what is MR?

MR is a technology that uses an electromagnetic field to look inside the human body, which means there is no harmful radiation. An MRI scanner emits a large number of electromagnetic pulses in a relatively short time. The response to the electromagnetic field is measured after every pulse, in a fraction of a second. The signals measured, which are very small, are turned into 3D images. Different tissues give different responses, which allows details of the anatomy to be perceived. For example, fat can be distinguished from muscle and organ tissue. Compared to X-rays, MR is a relatively new technology at only thirty years old. "In the early years, our primary focus in product development was to extend basic functionality", says Erik Heerkens, group leader for Hardware Development MR at Philips Healthcare. "Every new generation of scanners had something new. That time is more or less over. We are now focusing on other aspects which are also important to a customer: logical to use, good fit for the organisation, reliability, up time, easy to maintain and cost, of course."

Using existing technology

With the coming-of-age of MR, the manner of development has also changed, says Heerkens. "With the first MR systems, we were at the boundaries of what was technologically possible. But we are now in a phase in which we are specifying the subsystems and trying to make use of existing technologies. Our strategy is to use specialised partners to develop those subsystems. We are focusing on defining MR systems and the building blocks within them. In developing subsystems, we expect professionalism, specific expertise and experience in their specialism from our partners."

AIBo

Philips has outsourced the development of two subsystems to Technolution: AIBo and AM3. The AIBo (Auxiliary Interface Box) is a type of box with various connections for linking equipment together. "It allows you to connect different interface formats", explains Heerkens. "And it is a way of dealing with the evolutionary character of development. In this way, new interface standards can be introduced step by step."

AM3

The audio module (AM3) is a lot more challenging, Heerkens believes. It allows the operator and the patient to communicate with each other. During the scan, the patient lies alone inside the MR scanner: a large circular magnet with at its centre an open cylindrical space into which the patient is pushed. Due to the massively strong electromagnetic field which is generated during scanning, all the electronic equipment is in a separate technical room. The operator does everything from a PC in the control room. The AM3 allows the operator to give instructions for the examination, such as "hold your breath" or "bend your knee". It is a type of intercom, in other words. That does not sound like much of a technical feat. However, the challenge lies in making an intercom that will work with an MR scanner. In connection with the very strong electromagnetic fields, the scanner room is a Faraday cage: no radiation can get in or out. Heerkens explains: "We work with a high RF field, but of course we must not interfere with neighbouring electronics. And we don't want any external radiation because ultimately we are measuring tiny radio signals, down to noise level."

>>ontwikkeling deelsystemen AIBo en AM3



**Photo: Erik Heerskens (left),
Group Leader Hardware
Development MR and
Godfried Tosseram,
Commodity Manager
Hardware**



AM2



AM3



Communication

The opportunities for using electronics in the scanner room are very limited. So ordinary headphones for the patient are out. Instead, the patient gets a plastic headset. The sound is transmitted through plastic air tubes from electronics on the underside of the patient table. This is also where the microphone which the patient uses to talk to the operator is located. When it is in operation, the scanner makes so much noise due to the electromagnetic pulses that the patient cannot be heard. So the patient has a button which he/she can press to indicate that they want to talk to the operator. The scan is then halted and the noise stops.

There is a console on the operator's desk containing a speaker and a microphone, along with some buttons. Here, too, audibility is important. During the scan, the patient is able to listen to his own music, explains Godfried Tosseram, Commodity Manager Hardware at Philips Healthcare. "When the scan is running, you can barely hear the music. But a large proportion of the time the scanner is not moving and the patient is lying waiting. Precisely at those moments, it is nice to listen to music you have chosen yourself to put you at ease."

Added value

Good sound quality for operator and patient is therefore far from trivial. As such, Heerkens believes the greatest challenge of this project lies in drawing up the specifications. "This is where I have seen the added value of Technolution. They ask us the critical questions to get those specifications clear. Those detailed questions and the correct interpretation can only come from someone who understands the underlying technology."

Design is also important to Philips, explains Tosseram. "We want an aesthetically pleasing product with good audibility both ways." Technolution is responsible for the design and the New Product Introduction (NPI) at manufacturer Zollner, one of Philips' preferred suppliers. Technolution discusses the test strategy and producibility with Zollner at an early stage in the design process. The central

issue is: can you easily manufacture and test what we devise? In this context, easily means; at the highest production yield and the lowest cost. Zollner can then switch to volume production to deliver the product directly to Philips in accordance with their quality standards.

Another partner is DUNC, which translated the industrial design into an aesthetic and cost-effective design in accordance with the requirements of Philips Corporate Design.

>>taking responsibility for the work

Responsibility

Tosseram adds: "If you hire in a design house, you want them to take responsibility for their work. So if a mistake comes to light down the line, I expect them to solve it. Technolution does that."

Heerkens sees the partnership as a close interaction. "I think that is always important the first time. Technolution has done business with Philips Healthcare before, but this is the first time with the MR department. You need to understand each other's culture, learn to speak each other's language. You can't do that from a document."

Open and honest

Heerkens explains that this is the first time his group has been involved in an outsourcing process for standard technology. "So for me it is important that this is successful, not only in business terms but also for motivating our employees. At the start of the outsourcing process, there was a certain amount of suspicion among some designers. But the people involved can see that Technolution really do add professionalism to the development process. Which is why we are outsourcing in the first place. I consider it important to have an open and honest relationship with my design partner. That is the only way to achieve optimum results."

/trends & hypes

Environmental management

>>just saying you are environmentally friendly doesn't work

The environment is at the centre of attention. Companies see business opportunities in this green trend. But serious environmental management is more than just adding a green sticker. It means taking a critical look at all activities and their effects.

The environment is hot, literally and metaphorically. Climate change as a result of human intervention appears to be fact. The words 'green', 'eco', 'sustainability' and 'environment' are all over the media and more and more companies are latching onto the fact. They all want to finish as high as possible in the rankings of green companies. But it is not always clear to what extent these fine words also translate into truly greener production and actions. Take the phenomenon of 'greenwashing', where things are presented more positively than they really are. Does a 140 cm TV deserve a green sticker just because it has an 'energy-efficient' LED backlight? Is electricity generated by burning waste green energy?

Structural

Doing business in a truly environmentally conscious way means more than having a green sticker. It requires structural attention for the environment in all branches of operational management. It means looking at what you can improve in your company, your product and your sector: from switching off the lights and copying

on two sides to a responsible choice of materials in product design. More and more companies are setting standards for their environmental policy, such as ISO14000. By also asking customers and suppliers to work in accordance with this standard, you are setting a good example.

Balance

In designing a system, certain environmental issues must be included as a matter of course. For example, what is the best battery for a given problem? Effectively, you are looking for a balance between lifespan, ease of maintenance, waste, energy consumption, cost, etc. Environmental management makes that way of working explicitly visible; you are also including the consequences and costs to the environment in your design choices. That calls for chain thinking; an awareness of all consequences, intended and unintended. For example, a decision at the design stage can lead to more waste for the producer. By involving the manufacturer in the design early on, the product can



be optimally adapted to the manufacturing processes.

Healthy profit

Environmental management is part of a larger whole; Corporate Social Responsibility. The aim is healthy profits which do not come at the expense of people and the environment. Green manufacturing does not have to be expensive, indeed it often yields extra money. A small investment can lead to big savings. This benefits the environment and the company. Moreover, environmental management contributes to innovation. You need to think creatively and provide new solutions. That is not an impediment but an opportunity to set yourself apart. To come up with a new product, or a new application for an existing product.

Electric car

A technical example of this is the electric car. Good measurement and control technology is essential to make optimum use of an electric car. That starts in the development phase. How do you use batteries in a smart way? You need the algorithms that will keep getting the best out of the battery in practice. That way you get more kilometres from one battery charge, with the bonus of energy savings and lower emissions of harmful substances. And because the use of the battery is optimised, it lasts longer.

Influencing driving behaviour

Human behaviour is not always good for the environment but technology can give us a helping hand. Measurement and control technology can positively influence the behaviour of drivers. The 'Belonitor' is a device which gives drivers feedback about their driving style and rewards them for good behaviour. It encourages a calm driving style, which reduces fuel consumption and CO2 emissions and is safer too. Car manufacturers could integrate something like it into their cars in the future.

In Rotterdam, the parking management system directs cars to the nearest free parking space. It has indeed cut the number of car kilometres driven in the city. Besides the obvious savings, that also means a more pleasant city with fewer cars driving around.

Fair rules

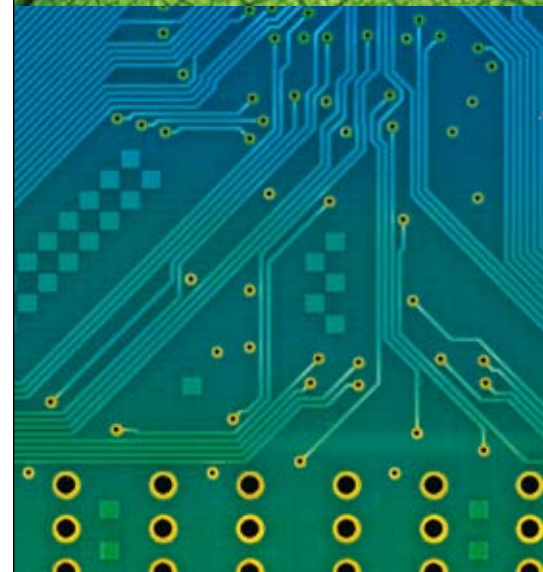
Some innovations seem so obvious that you wonder why nobody takes them up. For example, a heat exchanger to cool data centres and recover energy from the heat. Perhaps subsidies would help. Currently, the government mainly leaves innovation to the market, apart from a covenant here and there. Europe has issued a few important guidelines for electronic waste (WEEE) and banning dangerous substances (RoHS and REACH). And 'Netherlands BV' has its own roadmap for sustainable purchasing. But the government is still doing little to regulate or stimulate environmental management between companies. There could be a role for it here. We live in a competitive world and ultimately it is a problem of rules. Without fair rules, the manufacturer who goes cheap survives while another goes under. Because ultimately the merchant wins out over the preacher. No company is going to throw in the towel on grounds of principle. And you do not help society by just giving up either.

A good example

Whether in relationships between people or between companies, it is difficult to change others. A company only has a limited influence on its environment. It can only control how it responds to it. Thus a company can set a good example and expect others to follow it, for example by pointing out the consequences of a particular choice to a customer. But ultimately the customer will decide for himself and so it remains his responsibility.

Sense of reality

A responsible approach to the environment calls for a sense of reality. Take measures which are relevant. Taking steps that seem small can get you a long way when you add them all up. For example, a more efficient battery or better mobility management to reduce the number of unnecessary kilometres travelled. There is a clear trend towards using natural resources more consciously. If we all continue to take small steps, we will get a long way together.





/employee interview

Ronald Bos

*seeing technology come to life

Ronald Bos started out as a pure software man. The heart of his work is getting to the bottom of the problem. This involves regular consultation with colleagues and customers. The combination of technology and contact with people appeals to him. "That's when you see technology come to life."

Reducing the question to its essence

As a system designer, I design embedded software and system software. That might be for a coffee machine or a lithography system, for example. The heart of my work is understanding the problem properly and reducing it to its essence. The question from the customer or project leader is just the start. I then go away and think about it, and ask more questions. What is behind the request? I try to establish the basic underlying need of the person who is doing the asking. Only when you know that can you achieve a good solution.

Contact with people

In my previous job, I had already realised that the combination of technology and contact with people suited me. I would not like to work in a pure research organisation. I want to work on concrete projects and I get plenty of those here. I consult with customers and estimate how much time a thing is going to cost. I'm talking about the more project-type things – that's what I love.

When you go and see a customer, you experience how he sees things; he will probably have a different perspective than you do.

I am currently working on a project for MAPPER Lithography. The challenge lies in understanding a rather complex system on one hand and how the customer wants to use it on the other. I am a real spider in the web there. At the end of the day, it is fascinating to stand in the customer's cleanroom and see how my work plays a part in a bigger whole. That's when technology really comes to life.

Using skills

One side of my work is very technical, but other times I will sit down with the customer or be drawing up documentation. It's that combination that I like. It is varied and it calls on all my skills. I always try to bring out the main outlines. Technology can sometimes come across as very complex. If you can't find a connecting thread, you can end up not seeing the wood for the trees. You need to understand consequences: if I choose this direction now, I am already ruling out this and this; alternatively, it might actually give me the opportunity to make adjustments later on. And you need to be able to communicate clearly, to translate from abstract concepts to the customer's world. That also depends on the customer. At Mapper, I communicate at a very high technical level. With another customer, you may be talking to a project manager who communicates at a more practical level. He trusts you to solve it technically, but wants to know the consequences for his time planning. You need to be able to switch gears.

Secondment versus permanent job

I worked for a multinational for four years. My work was quite varied, but it always came down to the same things. I did have opportunities to vary it within that, but they were limited. When I was looking for more variety, Technolution struck me as the ideal company: varied projects, yes, but also a sense of belonging and having a fixed place of work. I also worked on secondment for a while, but I wouldn't like to do that again. As a temporary member of staff you don't quite belong. You don't get to take part in the most interesting discussions.

Fortunately, my impression of Technolution has been completely borne out. I get satisfaction from my work every day, the sense that I have achieved something. That is the advantage of a project agency: everything you do is relevant and desired.

Objective is a publication of Technolution B.V. All previous editions of Objective are available for download from www.technolution.eu/objective

Distribution

Controlled circulation for connections of Technolution

Technolution B.V.

Zuidelijk Halfroond 1
P.O. Box 2013
2800 BD GOUDA
The Netherlands

T +31(0)182 59 40 00

E info@technolution.eu

I www.technolution.eu