

De Vonk



Periodical of  E.T.S.V. Scintilla

Main Article

Program design in brief

Internship

Laurie Overbeek

Juni 2015

Edition 3

Year 33



**WHAT THE @#\$%!!#\$@
THIS IS IMPOSSIBRU!**

Do you have one of those dreadful subjects?
More homework than you could ever handle,
horrible teacher?
STRESSSS??



Or simply report to StOEL

<http://www.scintilla.utwente.nl/stoel/>

StOEL is not responsible for potential head injury

A positive note

Author: Mickey Derks

Dear readers,

Another quartile has passed, so it is time for another Vonk. Let me get you in a good mood to read it by highlighting a few nice things that have happened during the past three months

One of the things I was quite busy with for a while was the OPEL: the Educational Prize for Electrical Engineering, or Onderwijsprijs Elektrotechniek in Dutch. (If someone can think of a name that fits the acronym 'Vauxhall', I would love to hear it.)


This was a nice event to organize, because it sheds a refreshing positive light on the education at the University of Twente. Measured by the education given by the three nominees, Michel de Jong, Arjan Meijerink and Raymond Veldhuis, this was well deserved. The jury selected Michel de Jong as the winner, because he managed to get very positive reviews from students for the Fields & Waves – even though it was created mostly from scratch.

But there is more: as most of you have probably noticed, the Scintilla room has received brand new chairs. Some might recognize these as the fancy new chairs in the Westzaal, but I also valued them during early lectures in my first year here; they can be perfectly adjusted for dozing off after a late night. Of course, the tasks of a board member can be done quite a bit more comfortably now, though it is a pity that we had to wait for them for two extra months to get chairs in a color that resembles PMS185C instead of plain black.

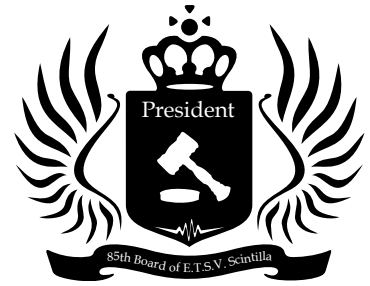
Naturally, there was a lot more going on, but I can only tell you about a limited amount of events. There is one more I would like to tell you about: the theme presentation of

the KIC. After a nice play, they announced the theme for 2015: 'Unlock the Future'. They, and of course our SKIC, still have to do a lot of work, but the end of the academic year already seems quite near, and I am definitely looking forward to the Kick-In (no pun intended with regards to the theme three years ago).

With this being the penultimate Presidential note you will read while I am still president, there is only one way to conclude: 'Dames en heren: Op de Koningin, op Scintilla!'



Mickey Derks,
President



Summercantus + BBQ

Friday 10 July
17:00, Zilverling,

Symposium More Moore

Tuesday, 15th September
8:45, Waaier 4,

Masthead

De Vonk

Periodical of E.T.S.V. Scintilla.
Published four times a year in the amount of 700 copies.

year 33, edition 3
June 2015

Editorial team

Maksym Aleksandrovych, Tim Broenink, Lynn Bruins, Pepijn Ekelmans, Guus Frijters, Mark van Holland, Bas Keet, Vera Nauta, Jippe Rossen, Ewoud Vissers

Cover artist

Robert Fennis

Print

Gildeprint, Enschede

Editorial office

E.T.S.V. Scintilla, University of Twente,
Postbus 217, 7500 AE Enschede,
0031 53 489 2810
0031 53 489 1068
vonk@scintilla.utwente.nl

Material

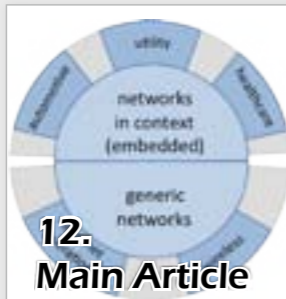
vonkkopij@scintilla.utwente.nl

All members of Scintilla receive De Vonk free of charge by post.

Nothing in this magazine may be duplicated or copied without explicit permission from the editorial team of De Vonk.

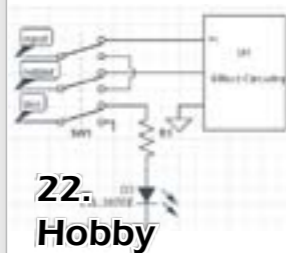
The editorial team reserves the right to change or exclude material provided by third parties, in part or in whole. The opinions expressed in the articles are not necessarily shared by the editorial team.

ISSN 0925-5421



12.
Main Article

DACS focuses on design and analysis of dependable network systems. Techniques based on measurements, modeling and prototyping. This article explains how these techniques are used by DACS.



22.
Hobby

Many electrical engineers have a background in music. So does Jippe, he started playing electrical guitar during high school, and taught himself. When he started studying to become an electrical engineer, he wondered if he could teach himself to build guitar pedals as well. In this article Jippe will explain about effect pedals, and tell you something about his custom built one.

3

Presidential note
A positive note

6

News
News for the Electrical Engineer

8

Internship
Laurie Overbeek - Australia

10

SBZ
How to run a bar

12

Main Article
Program design in brief

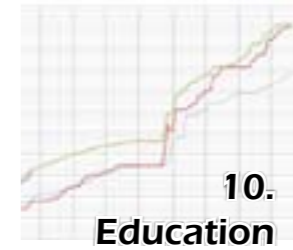
15

Junction
Luuk Spreuwers

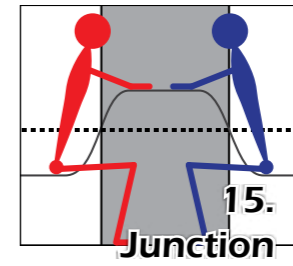
18

Photo pages

This edition's Education article is about something unexpected in this section. It's all about the bars beneath the Scintilla room: AbScInt and MBasement. Roel writes about his duties in the Stichting Borrelbeheer Zilverling. He also has some nice statistics and graphs for you to enjoy.



Luuk Spreuwers teaches one of the first-year modules, so most Vonk readers should know him by now. But do you really? In this edition of de Vonk, the junction is not about one of the students of Scintilla, but about one of the teachers of our study. Read the article to find out about Luuk's life, his time as a student, and about his views on teaching.



Afterlife
Coen Bresser

20

Hobby
Why would you buy your own pedal

22

Greenteam
CANoTA

24

Advertorial
Thales

26

Solarteam
Living your dream

28

Column
What if...

30

Puuzle

31

Editorial

Break-a-leg

As all of you most likely know, break-a-leg is a term which can be used to wish someone good luck with all kind of activities. What turns out, break-a-leg is definitely not a nice thing to say to someone.

Why is this? Perhaps you all know the StAf-Toernooi, the soccer competition at the university for the study associations. This year, I decided to join in this beautiful sport to help Scintilla play. Before the game, one of my housemates told me, that I should not get injured or something, because that would really suck. Well, I did get injured.

So today I am surviving with two nice metal pins through my anklebone, which will completely cure my broken ankle. And as it turns out, with a broken ankle and a cast, there are a lot of things you cannot do normally anymore. The obvious things would be walking and swimming. But showering, as well as going to the toilet are things that are made difficult, because keeping your feet down, does not feel great after ankle surgery.

So here I am, laying on my bed and writing this editorial, feeling useful as ever. Which, after three weeks is a nice change of pace actually, because feeling useful whilst laying in bed is not the most easy task.

So, take my advise, and NEVER break a leg whilst doing some awesome activities.

Guus Frijters

News for the electrical engineer

Author: Maikel Huiskamp

Shooting Mosquitos with a laser system

Some of you may remember the YouTube video in which a laser defense system against mosquitos was shown. Of course the system was fake, but a first step to the commercialization of a real one was taken when Intellectual Ventures announced that it licensed the manufacturing of the system to the Lighting Science Group in Melbourne.

Before a mosquito can be shot down with a laser out of the air two things have to be done. First of all the mosquito must be tracked. The tracking of the mosquito is done by an infrared beam that can track the mosquito in a range of 25 to 100 meters of the system. When the mosquito is located it can then be shot down with a 3-watt 532nm wavelength laser. When the system is using its laser it can not track the mosquito since it will blind itself, so the laser is used in short pulses of 25ms.

This all sounds like a lot of fun, but what is the application for such a device? The point of the system is not to kill a large number of mosquitos, but to just fence them out of a certain area. This way the Malaria can be reduced inside certain areas since the spread of Malaria depends on the biting rate. Stand-alone versions of the system would use batteries to store energy gathered by solar panels. A possible way to save energy would be to count the frequency of the wing beat of a mosquito and tell its gender.



This way only the female mosquitos can be shot by the system.

Source: <http://tinyurl.com/vonk3331>

Light emitting fibers

Wearable electronics will become literally possible when light-emitting fibers are reality. Researchers from the university of Shanghai have developed light-emitting fibers of roughly one millimeter thick that could be incorporated into clothing

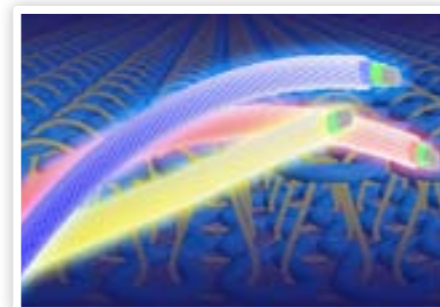
Organic light-emitting diodes are increasingly used in smartphone screens and wearable electronics. OLED offers a bright display with a wide range of colours. Unfortunately, OLED needs cathodes that need relatively low amounts of energy to withdraw the electrons completely from their surfaces. The materials used in these cathodes are sensitive to air, like magnesium

or calcium are, which prevents the use of OLED in clothing.

At the university of Shanghai a different method was developed that makes use of polymer light-emitting electrochemical cells (PLECs). PLECs are normally made of two metal electrodes connected to an electroluminescent organic semiconductor, but they also incorporate salts into the light-emitting layer. This has the advantage that it has a high electron-to-photon conversion efficiency and it also does not require the cathodes of magnesium or calcium.

The designed wires can emit blue or yellow light from their entire surface when a few volts are applied between the inner metal wire and the outer carbon nanotube layer, while other colours might be possible in the future. The designed fibers can be woven into light emitting clothes for the creation of smart fabrics.

Source: <http://tinyurl.com/vonk3332>



Self-folding origami robot

Researchers from MIT have demonstrated a miniature robot that can fold itself, then walk, swim and do cool stuff after which it is able to dissolve itself. The origami robot is the first robot that demonstrates a complete lifecycle, from "self creation", working and eventually dissolving.

The unfolded origami robot is consists of a magnet sandwiched between two PVC layers and weighs just over 300 milligram and measures 1.7cm on each side. The PVC layers have structures laser cut in them and when the PVC is heated the PVC will fold

where the structures were laser cut. The folding process is completed within one minute after which the robot is ready to be used.

A disadvantage of the origami bot is that the motor is not really integrated into the whole self-folding structure. The motor comes in two parts: a cubic neodymium permanent magnet that the robot folds itself around, and then a set of four electromagnetic coils underneath the surface that the robot operates on to provide the magnetic fields that drive it. The movement of the robot is caused by a changing external magnetic field which alternates at about 15Hz.

The alternating magnetic field causes the robot to oscillate back and forth. While the robot is oscillating the front and back legs of the robot also alternately make contact with the ground. Because the robot has a asymmetrical design combined with an intentional off center balance point causes the robot to walk forward.

Once the robot is done performing its tasks the robot can be entirely dissolved into acetone. Only the magnet will remain. In the future it will also be possible to dissolve the entire robot in water.

Source: <http://tinyurl.com/vonk3333>

Japanese scientists transmit wireless energy

Japanese scientists have transmitted energy wirelessly to a very small target by means of microwaves. This technology make solar power generation in space a possibility.

In the experiment microwaves were used to transmit a power of 1.8 kilowatts to a small target 550 meters away. While the distance may not seem great it could still pave the road to technology that makes wireless power transmissions from space a reality according to a spokesman for the Japan Aerospace Exploration Agency (JAXA).

Mitsubishi Heavy (in partnership with JAXA) said that it has succeeded in transmitting 10 kilowatts wirelessly to a receiver 500 meters away, but they used larger antennas than in the other experiment. They hope to find practical applications for the technology within the next five years, such as charging electrical cars or powering warning lights on transmission towers.

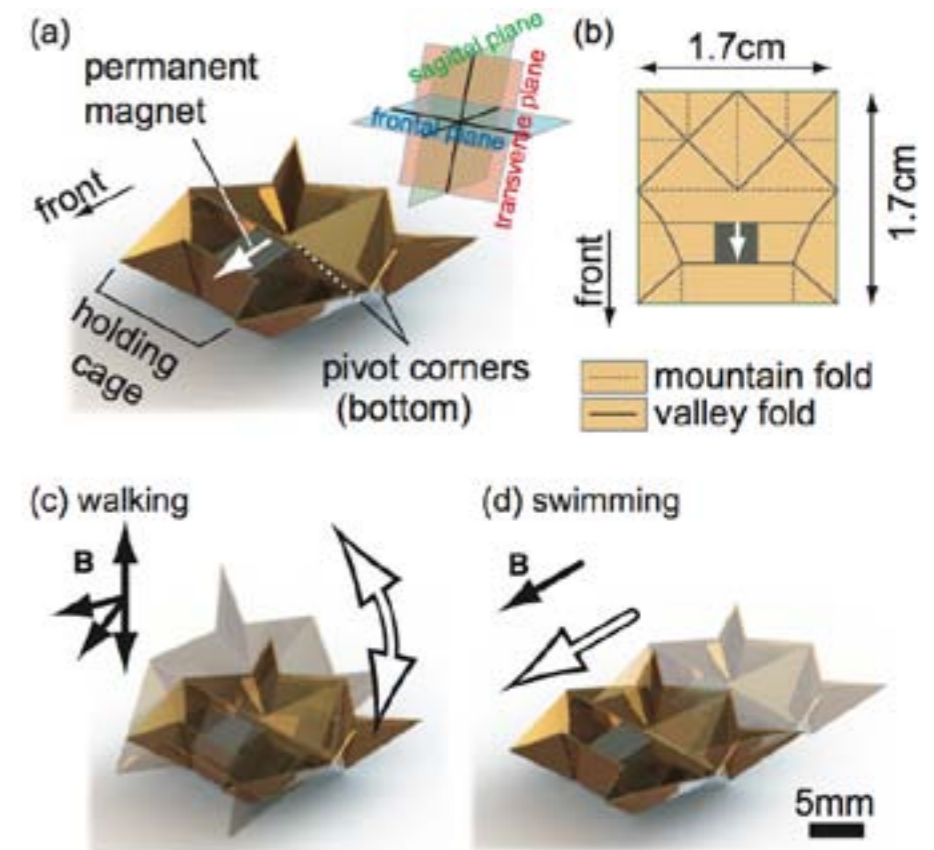


Image: MIT
The origami robot and the actuation methods. (a) Outlook of the system. (b) The crease pattern. (c) Walking mode by torque-based control. (d) Swimming mode by force-based control.

Internship

I always liked to go overseas and explore a new country. That is why I knew I wanted to go abroad for my internship. What better time to go to a new country and experience what it is like to really live in another country than during your internship. I always want to improve my English because I think it is a very useful language to know for a future job. So when I had to make the choice where to go for my internship it was easy: Australia! I had never been there before but heard many great stories about this country and didn't think I would get the another chance in the nearby future to go so far away from home. Now that I knew I wanted to do an internship in Australia I had to find a place to do it.

Preparations

To find an internship I approached the head of my chair (RAM, Stramigioli) to see if he had any contacts in Australia where I could do my internship. Unfortunately, the contacts he had were unable to place me at that time so I continued to ask people if they had any connections in Australia. I was really lucky when I was told that a lot of other people did their internship at Flinders University in Adelaide. So I sent an e-mail to Professor Karl Sammut and got a reply the next day that I was welcome to do my internship at his group.

To be able to go to Australia to do your internship you need a visa. Some people suggested that a working holiday visa would be perfect for me. With this visa I was able to study up to four months and my internship only took 14 weeks so this was a perfect match. I applied for the visa online and it was granted to me at the same day! The only thing left to do was buying my plane ticket and I was good to go!



Figure 1: The structure of the WAM-V

Author: Laurie Overbeek



The internship

For my internship I had to make a model for the 16' Wave adaptive modular vessel (WAM-V). The WAM-V is a catamaran-like unmanned surface vessel. This model was needed so that simulations could be done in the future for controllers etc. The WAM-V has two shock absorbers at the front of the vessel connecting the top platform with the pontoons through a front arch. These shock absorbers are used to lessen the impact of the waves on the top platform so everything placed here is more or less stable.

It was my task to create a model of the WAM-V in SimMechanics, which is a toolbox of Matlab to model multi-body systems. The WAM-V consists of two pontoons which are in direct contact with the water, a front and rear arch, two motors which are located at the end of each pontoon, the top platform and two shock absorbers. These shock absorbers can be modeled as a spring

damper combination and the rest is modeled as a rigid body.

To determine the spring and damping coefficients of the shock absorber I designed a PCB that could measure the acceleration and orientation of the PCB using a gyroscope and an accelerometer. Using both the accelerometer and the gyroscope to obtain the roll and pitch angle of the PCB the acceleration due to gravity could be determined and subtracted from the accelerometer data. In total eight of these sensor modules were made and four were placed near the joints with the front and rear arch on the pontoons and two near the motor joint with the pontoons and two on the platform. When there is a spring damper combination in between the pontoon and the top platform it is expected that lower accelerations caused by the waves are measured at the platform than on the pontoon. Using different coefficients for the spring damper combination in the simulations, data could be compared with the measured data to identify which combination suits best and is therefore assumed to be the spring and damping coefficient.

The four sensor modules on the pontoon also serve as input for the model. In the model the WAM-V is placed on top on a 4-post rig to simulate the waves. The input from the waves can be obtained by measuring the accelerations during experiments with the WAM-V at sea.

During my internship the WAM-V was unavailable for experiments due to a competition in Singapore. Therefore I was unable to verify my model. I did however learn a lot from my internship, it was not so theoretical as everything I have learned at the university. It really gave me insight in what it was like to not only design something but also to implement the design. I also really liked working with my colleagues who came from all over the world. I definitely have made some new friends.

I think having friends at a new place makes it all much better. The project you can work on can be very nice but without friends it would mean nothing to me. So from the start I engaged in all kind of activities that were organized, like pumpkin carving for

Halloween or go to the bbq that was organized by the university and go on camping trips. I also really enjoyed playing tennis with my colleagues every Friday afternoon. We would go to an abandoned court and just play for a couple of hours until it got too dark to play. So my advice would be when you go on an internship to not only try to do your best for the project but enjoy yourself.

After the project:

On the last day of my internship my boyfriend arrived in Australia for our holiday. Before we could start our trip the university asked me to give a presentation to other students about my project. It also gave me the opportunity to give my boyfriend a tour at the university where I stayed the last 14 weeks and thank everyone for the opportunity and great time we had together. After saying goodbye to everyone we could start

our holiday. I feel like when you are in Australia you have to go and see more than only Adelaide! We visited kangaroo island, the great ocean road, Sydney (where we celebrated new years! and of course took a surf lesson), Cairns to dive in the great barrier reef and then to Darwin to see Kakadu national park with a lot of nice waterfalls and aboriginal art. As you can probably imagine this was a very nice trip! And of course four weeks is much too short to see all of Australia. After our trip we visited my supervisors again, but now in the new building where they moved to. It is a very nice and modern building and I can recommend anyone who thinks about doing an internship in Australia to contact Flinders University! The people are very nice and Australia is a beautiful country and the people are all very welcoming. If you want to know more about my internship or if you want to do your internship at Flinders University don't hesitate to contact me or my supervisor Karl Sammut.



How to run a bar: the Abscint and MBasement explained

Author: Roel Mentink

Many readers will be familiar with both the Abscint and the MBasement. These two bars in the Edu-café are often being used by Scintilla to organize all kinds of fun activities. These bars are being managed by students only and the organizational structure is quite complicated. As a part of my board function this year I am involved in the management of the Abscint and MBasement and in this article I would like to explain what is happening behind the scenes.

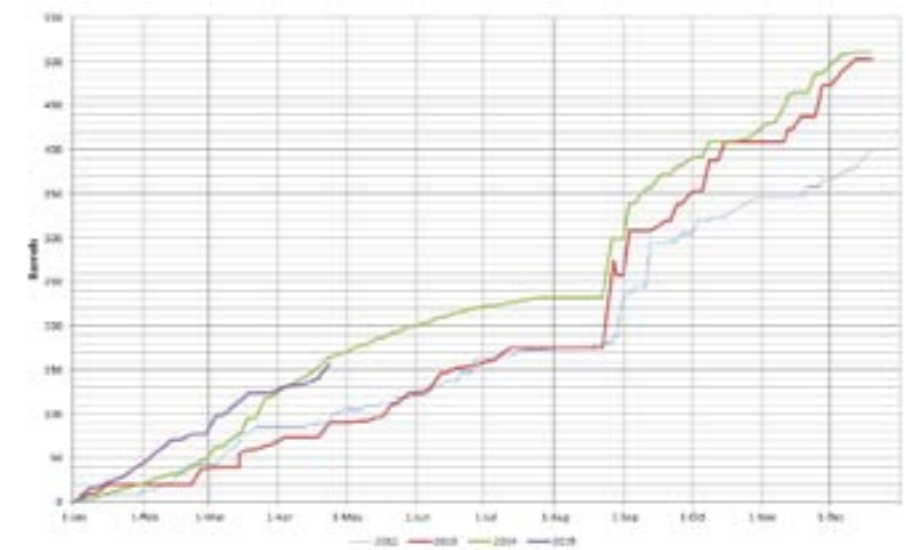
The major challenge of the Abscint and MBasement is that these bars are not solely used by Scintilla, but also by five other study associations: Inter-Actief, Abacus, Proto, Sirius and Stress. In principle, the Abscint is being used by the EWI-associations (Scintilla, Inter-Actief, Abacus and Proto) and the MBasement is being used by the former MB-associations (Sirius and Stress). However the management of these two rooms is being done by all six associations together. SBZ, short for 'Stichting Borrelbeher Zilverling' or 'Association for Bar management Zilverling', an association where one representative from each of the six study-associations is joining the board. The two major responsibilities of this association are to buy drinks in bulk at reduced prices and

to make sure the two bars are being maintained properly. Within SBZ I am currently the representative from Scintilla and together with the other five representatives we have a meeting once every five weeks. Apart from that, all the representatives have some other duties as well. There is for example a chairman that makes agenda's for the meetings and a secretary that mainly makes the minutes. Also there are two treasurers, because this is quite a big responsibility and the turnover of SBZ is quite big. Also tasks like maintenance and purchasing are being divided. My task within SBZ is currently to do the purchasing. SBZ is ordering its drinks at 'de Klok', a big wholesaler specialized in (alcoholic) beverages owned by Grolsch.



We have got contracts with both 'de Klok', Grolsch and Coca-Cola about deliveries and reduced prices. Every Monday morning I count the inventory and make a prognosis of how much I need to order for the upcoming week. After ordering it on Monday morning, the ordered drinks will be delivered on Tuesdays. We buy our beer in barrels of 50 liters and our soft drinks in one liter or 20cl glass bottles. We also have a selection of special beers, but the main turnover comes from our regular Grolsch. The rough estimate of how many barrels I order every week is around ten. That means that we consume around two barrels every day, assuming we are not hosting any events in the weekend. Luckily this is not Scintilla alone, but I am

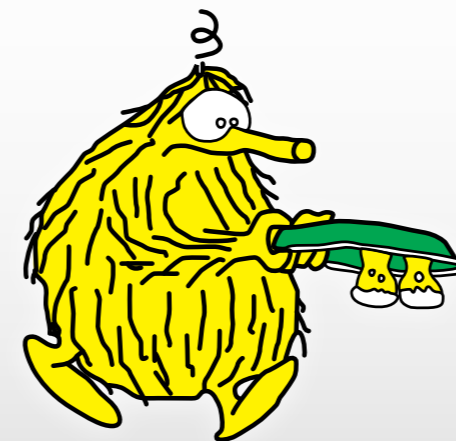
often amazed about the amount of beer we drink in the Abscint and MBasement. There are weeks when we drink over twenty barrels for example. Below you can see a quite interesting graph of the total amount of beer barrels bought over the course of the year. The different lines represent different years, see also the legend. You can for example clearly see a big spike in late August because of the Kick-In camp and an increased consumption in September because of the many constitution drinks. Other people have their task-specific duties as well. For example the treasurers also have quite an important job. One of them is making sure that the study associations receive an invoice for the consumed beverages. Because there are events in the Abscint and MBasement nearly every single day, this is quite a big administration. The other treasurer is mainly paying incoming invoices, for example from 'de Klok', and keeping the financial administration up to date. I hope that I have given an impression about what is happening behind the scenes, however there are many small things that I



have not covered. I hope to see you soon at the bar while enjoying a well served drink.

VriMiBo

Hosted monthly by the Borrel!



Check the scintilla website for the next VriMiBo



DACS: Program design in brief

DACS focuses on the design and analysis of dependable networked systems. A networked system is called dependable, whenever reliance can justifiably be placed on the services it delivers. This means that in the various (and changing) fields in which communication systems are being deployed, these systems have to be designed such that they fulfil the, possibly changing requirements of its end-users. To put it briefly, the DACS group focuses on:

Author: DACS

“dependable networking in a dynamic world”.

Strategy

The focus of DACS is dependable networking. The term “dependable”, as described in the literature, implies that the networks should be secure, maintainable, well performing, energy aware, reliable and available, and robust. DACS focuses on all these aspects, both in the design of new (often embedded) networks, as well as in the analysis of existing (operational) networks. The research challenges in the design of new networks are often related to performance, scalability, energy awareness, reliability or availability, and robustness. For operational networks, i.e., the Internet and public wireless networks like UMTS and LTE, the research challenges are most often related to security and maintainability (manageability).

Dependability of networked systems is of crucial importance to our society, where the possibility to immediately obtain and exchange the latest information, irrespective of place or time, has become a fundamental requirement. For some end-users the impact of failures within the (public) network may be limited to being unable to browse the web, send messages or make phone calls. For other end-users, e.g., like those in healthcare applications, utility companies or automotive applications, the impact of failures can be such that important societal services get disrupted, or even lives are put in danger.

To enable the design of dependable communication systems, DACS employs a set of tools and techniques, based on:

- Measurements. For operational systems, such as the Internet, taking measurements is key to understanding the system’s health (performance and security-wise). Key challenge is to find the right balance between accuracy of, and induced overhead by the measurements, thereby avoiding privacy issues.
- Modelling, analysis and simulation. When no operational system is (yet) available, a model-based approach towards exploring the design space is an important alternative. Based on such models, either mathematical analysis, including queuing theory and model checking, as well as simulation techniques can be employed.

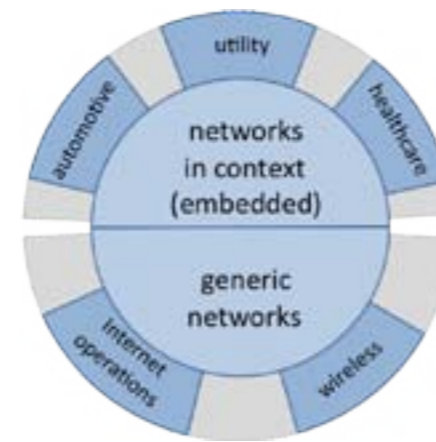


Figure 1: DACS view on communication systems

- Prototyping. As a further step, prototyping of systems allows for real-life testing new designs and algorithms.

Next to the use of existing means towards network measurement (like NetFlow), modelling, analysis and simulation (queuing analysis packages, model checking tools like Uppaal and PRISM, simulation tools like OMNET++ and ns3), also new specialised tools and techniques for model checking and (rare-event) simulation are being developed, tailored to the design questions at hand.

Within DACS, we distinguish two broad classes of network systems: generic networks and networks that are embedded within a certain context or application:

- Examples of generic networks include the Internet and wireless networks such as UMTS and LTE. Many generic networks have already been developed, which means that challenges are related to deploying such networks, and keeping them operational with acceptable performance and availability. For such networks DACS therefore focuses on network and service management issues. Key problems include network security, as well as capacity provisioning. DACS has a strong focus on flow-based analysis of Internet traffic, to detect traffic anomalies and intrusions. To improve the manageability of networks, DACS also develops self-management techniques for automated configuration.

- The research on embedded networks (also often referred to as cyber-physical networked systems) started more recently. For embedded networks, the operating context is crucial for the requirements, e.g., with respect to performance, energy-use or reliability, and therefore plays a key role in the design. Currently there is a focus on specific networks in the automotive, the utility (energy and water), and the healthcare domain. Within the automotive sector DACS performs research in the area of vehicular networking, to improve the effective capacity of highways, to improve traffic safety, and to make transportation more environment-friendly. Within the utility sector DACS performs research on SCADA networks, primarily for the supply of water and energy, as well as on communication systems to support smart grids. Healthcare oriented research has only recently started, with focus on the performance of medical equipment, such as X-ray systems.

“The term “dependable”, as described in the literature, implies that the networks should be secure, maintainable, well performing, energy aware, reliable and available,”

Results

In 2012 DACS has been very successful in the acquisition of new EU projects. The Flamingo Network of Excellence started in November 2012 and is coordinated by DACS. The Mobility 2.0 STREP started in September 2012, and the MobileCloud Integrated Project started in November 2012; this project is one of the core EU projects for the development of 5G (5th generation mobile communications). In addition, the SALUS and E0-Balance STREP projects

were accepted for funding in 2013; SALUS (on next generation networks for public protection and disaster recovery) started September 2013, and E-balance (on energy balancing in smart neighbourhoods) started October 2013. For all these projects, new PhD students and postdocs have been hired throughout 2013.

Work also started in the new STW project on Cyber Physical Systems, in particular on energy-aware data-centres. A new PhD student started in November 2013.

In 2013 as many as five DACS PhD students successfully defended their PhD thesis: two in the field of vehicular networking, two in the field of network operations and management, and one in the field of efficient simulation.

The 2013 IRTF Applied Networking Research Prize (ANRP) was awarded to Idilio Drago for the paper “Inside Dropbox: Understanding Personal Cloud Storage Services”. This paper, which provides a deep characterization of the leading solution in cloud storage (Dropbox), was presented at the ACM Internet Measurement Conference in November 2012. The IRTF received 36 nominations for the 2013 prize. The paper “Measurement Artifacts in NetFlow Data”, authored by Rick Hofstede, Idilio Drago, Anna Sperotto, Ramin Sadre, Aiko Pras and presented at the Passive-Active Monitoring Conference in Hong Kong, won the best paper award. The paper presents an in-depth analysis of artifacts found in flow exporter devices.

Giovane Moreira Moura, who graduated in March 2013 in the DACS group, received the second prize with the KIVI/NIRIA Telecommunications Award for his PhD thesis entitled “Internet Bad Neighbourhoods”. The award is presented annually for the best PhD-theses of the three technical universities.

PhD student Hamed Ghasemich was awarded a second place in the poster competition that took place during the CTIT Symposium 2013 at the University of Twente with a poster entitled “Survivability evaluation of critical infrastructures using hybrid Petri nets”.

Development

The DACS research view has been developed in the fall of 2011 through a number of meetings by the DACS full and associate professors, and will guide our future research.

For generic wired networks like the Internet, DACS focuses on network and service management aspects. Within the Internet speeds increase to tens of Gbps, which implies that traffic measurements should be scalable. Techniques that capture and analyse all individual network packets are getting harder to apply, but flow-based measurement techniques, such as NetFlow and IP-FIX, provide scalable and cost-effective alternatives that can be applied to solve many security and provisioning related problems. To validate the results of our research, ground truth is of key importance. Such ground truth can be obtained from real network traces, which means that the collection and sharing of (anonymous traces) traces, hence, collaboration with operators such as SURFnet and Quarantainenet, will

“Increasingly networks are designed in the context of specific, extremely demanding applications.”

be further pursued. At European level we will collaborate with institutes like INRIA to create a common network security lab. The increased reliance on generic wireless networks makes dependability aspects also more important in that area. The DACS group will especially address the flexible deployment and management of wireless networks, e.g., using concepts from Cloud computing, and the robustness of such networks.

Increasingly networks are designed in the context of specific, extremely demanding applications. Here, the DACS group is extending its current research on vehicular networks to Wireless Networks for

Moving Objects (WiNeMO) in general. These are large systems of moving objects, such as intelligent transportation system, robot swarms, etc., that use their networking capabilities to cooperatively govern their movements. Wireless Networks for Moving Objects are fundamentally different from wireless networks that have been studied up to now, such as wireless LANs, cellular networks and ad-hoc networks. The strict requirements regarding delay and reliability, combined with the high network load coming from frequent communication between a potentially high number of objects, makes the design and application of wireless networks for moving objects extremely challenging. The DACS group will focus its research on the modelling of the fundamental behaviour of such networks and on the design and prototyping of specific applications, e.g., vehicular networking for fully electrical vehicles.

“We will specifically also work on embedding our new developments in “standard” tools, so that they can easily used by non-experts.”

As another class of networks in context, DACS will continue to expand its work on networks for SCADA and smart-grid applications in the utility sector (foremost water and electricity). As a general trend in both these contexts, the employed networks become more open (open standards) as opposed to the proprietary solutions used in the past. Although this opens opportunities for better performance and more efficient operations, it also opens up cyber threats for these networks; both aspects will be worked upon. Furthermore, in SCADA networks the effects of misbehaving or malfunctioning networks and the societal services of the utilities they control (water or power delivery) is enormous; this interplay will also explicitly be addressed. As for techniques and tools, DACS will

continue to use a variety of well-developed open source software packages for measurement (YAF, NFSen), and simulation (OMNET++). However, we will also further develop specific methods and techniques, in the area of simulation, and in the area of analysis. As for discrete-event simulation, we will continue our efforts to deal efficiently with so-called rare-events; these are system events that are of utmost importance to study (like buffer overflows or component failures), however, their rarity makes that traditional simulation methods will just take too long. We will specifically also work on embedding our new developments in “standard” tools, so that they can easily used by non-experts. As for analysis methods, we will continue our work on system of very many interacting but similar objects, like they appear in wireless sensor networks or the Internet. We will continue to develop efficient new analysis methods based on mean-field analysis, and combine this with our previous results on stochastic model checking. To study the effect of malfunctioning SCADA systems on the applications they support, also new hybrid (discrete-continuous) analysis methods will be developed.

Junction

Luuk Spreeuwvers

*Authors: Lynn Bruins,
Mark van Holland*

Luuk Spreeuwvers is a teacher at the University of Twente. He teaches Circuit Analysis in M2 and also two Master-subjects. When asked how he would introduce himself he says that it would be difficult, in college it would just be: Hello, I am Luuk Spreeuwvers and I am your teacher for ‘insert subject’. When asked how he would describe himself he says: “I am a researcher in heart and soul. I am a family man and civil.”

What did you study and where?

I studied Electrical Engineering at the University of Twente from 1982 until 1988. I decided to study Electrical Engineering because my father was an electrician at Akzo where he worked on machine maintenance. This was quite the inspiration to start studying in the same field, however in a different direction.

How were you as a student?

Ehmm, well... It had different sides. I was not the most social person. I had few contacts, but the ones I had were quite good. I was really driven to work hard. During my study I had a philosophical dip, which took about 2 or 3 years. This resulted in the end in studying for 6 years in total. Which was nominal, however, when I studied the two-phase-structure started, which meant that all the studies should take 4 years. Since Electrical Engineering was a study which took from 5-7 years, everyone took longer than 4 years.

How about Scintilla in that time?

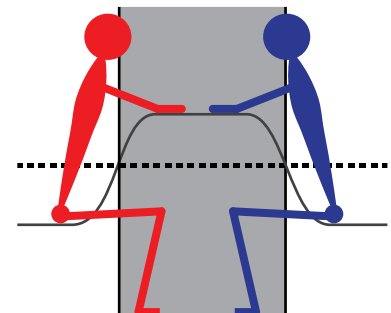
I was a member at Scintilla. But I was not active. I did hobby a lot, all sorts of little projects, so I was a regular at the STORES. Later, during my promotion, I wrote for the Vonk. Also as a teacher I wrote an article.

What did you do besides studying?

I lived in Enschede for one year, and after that I lived in Hengelo. I have not done any boards or committees. I did sport a lot and also spend time on small projects, but this was all done from home.

What subjects do you teach, and how do you feel about teaching?

I currently teach in M2 the subject Circuit Analysis. I am the main teacher of the master subject Advanced Computer Vision & Pattern Recognition (ACVPR) and the assistant teacher in the master course ‘Introduction to Biometrics. Teaching is not my favorite thing to do, but it is part of my job so I try to do it the best I can. What happened when I just worked here is that the University asked me to teach Circuit Analysis,



and I needed to refresh my knowledge in just two weeks with the provided teaching material. The year after that, I created my one program to teach.

What do you think about TOM?

I have mixed feelings about TOM. The good side of TOM is that the student is being pushed to work hard which is an important part of succeeding in your study.

The bad side is that working in modules does not work. For example if you are sick you miss things, and it has consequences. The retakes are fixed, so we can't deviate from these dates. If the module is split in smaller parts, it could work great.

TOM is a very project orientated education. This is not necessarily TOM, but TOM uses it. TOM likes to teach everything using experience, to gain practical knowledge. Telling something in a lecture can be better if you ask me, because searching things yourselves takes longer.

However there are positive sides to TOM, but I think it went to far. I personally like the classical education better, taking notes

yourselves. Dictates that are created by notes of students. Like when I myself was still in college, nowadays the subjects are fixed, and you do not have to make your own notes. I think, this is acceptable for basic subjects, but the bad side is that the students are getting lazy.

“TOM is a very project orientated education. This is not necessarily TOM, but TOM uses it.”

Is there more structure with TOM?

The structure in TOM is that you have to do everything in blocks. I think that structure is very important for everybody, but there has changed a lot. You cannot make your own planning, because there are a lot of tests and you have to plan it in that particular section. For the section Circuit Analyses, I decided to make a planning with a lot of tests about the subjects. All subjects that are being treated, will be tested. We, as teachers, have had a course about how to teach and what subject to use and that every subject had to be tested.

When did you decided to become a teacher at electrical engineering at the UT?

It is mandatory to give lectures, if you work at the UT. When I was going to work here I also had to give lectures. I used to be a teacher at network analysis. I was notified two weeks in advance that I had to give that lecture, so I only had two weeks of preparation time. Teaching is fun, a lot of people at the university are teachers. I have worked for nine years for the UT, and I have been teaching for eight now. The funny thing is, when I was being promoted I worked on floor 8, now I work in the room directly above it.

What is your opinion on teaching electrical engineering at the UT?

In the beginning I did not like it. I had rather put my time in doing research. But now that I have to, I try to do the best I can. My heart is more in the research. Doing research is very important. PhD students are important, because they are doing the research. The PhD students I guide have a lot of contact with the NFI, researching characteristics of autographs, facial recognition, and contact with the authorities from which projects are set up. This are often biomedical subjects highly appreciated by companies. Earlier there were enough PhD students, but lately there are less of them.

What did you do before you started teaching at the UT?

Before I started teaching, I studied from 1982-1988 at the UT. After that I was a PhD till 1992 and during my PhD, I had replacement services at the ITC in Enschede. In 1996 I went to Hungary where I met my wife. In 1999 I started in Utrecht on the university and after that I went to the academic hospital AZU (red. now UMC Utrecht). My then girlfriend from Hungary went with me. In 2006 I started in Enschede, but I started with teaching after a year. I left Utrecht, because all my colleagues went away and I did not like to stay alone.

Do you have many contacts held on your student time and the time after?

No, I do not have many contacts held on my student time. I have still contacts with members of the Musilon (Student Vocal Group). I met them during my PhD. Someone moved to Hungary and I have also still contact with him. I have also sung with him in a choir in Hungary. I also met my wife in that choir.

Would you ever want again to go abroad?

I would really love to, but it is difficult with the children. Especially because they are very young, if they were much older, then it would be better possible. But for now it remains with sometimes a day congress.

What is your home situation?

I am happily married to my Hungarian wife Mariann in 2002. Together we have three children: Endre (11), Robin (7) and Aron (3). We chose names that are easy to pronounce in Hungarian and in Dutch. At home we speak Hungarian as well as Dutch.

What hobbies do you have?

I like to run at the campus. But I did never join the Batavierenrace. Although I have participated with some colleagues in Utrecht with the Verdipusloop, this is a marathon. I also like to read and to research things on my computer, but I do not have much time for these things. I also like it to build things. For example, I build the beds for my children myself. I sing in a close harmony choir which is called Lage Dames, Hoge Heren. In this choir, the voice of some males and females are the same. In this choir I sing the bass voice. Unfortunately we miss some tenor voice. I tried to learn myself to play guitar, but that was not a great idea so I started to learn playing piano by lessons. This worked much better. I try to practice 4 times a week, but most of the times, this happened in the evening

“I also like it to build things. For example, I build the beds for my children myself.”

after 23.00. The thing I like by playing piano is that it is completely different as research and teaching. If you want to play piano you have to understand the things and to perform it. If you are researching or teaching you only have to understand it. My life is very busy with my busy job and the children. I want to have more time for my hobbies, but at this moment I do not have that time. I really liked it to learn a new language, but that costs a lot of time. Practicing the piano is often difficult to plan.



Lieuwe Jan (Luuk) Spreeuwiers

Age

50

Birth place

Emmen

Favorite Color

Spring grass green

Favorite Food

Quiche (with ham)

“I am a researcher in heart and soul. I am a family man and civil.”

What is your perspective for the future?

I would like to ice-skate the ‘elfstedentocht’, the tour through eleven cities. I also would like to run the marathon in 3.5 hours. I have already run some marathons, but not in that time. Writing a fiction book is also high on my list. Until now, I only wrote little stories for my children. I also want to build something. Once I threw myself at vehicle drive mechanisms, but that took too much time. I also spent much time with the development of wind turbines with a vertical axis. But I had a little knowledge about this and this took too much time as well.

Do you have a good lesson in life?

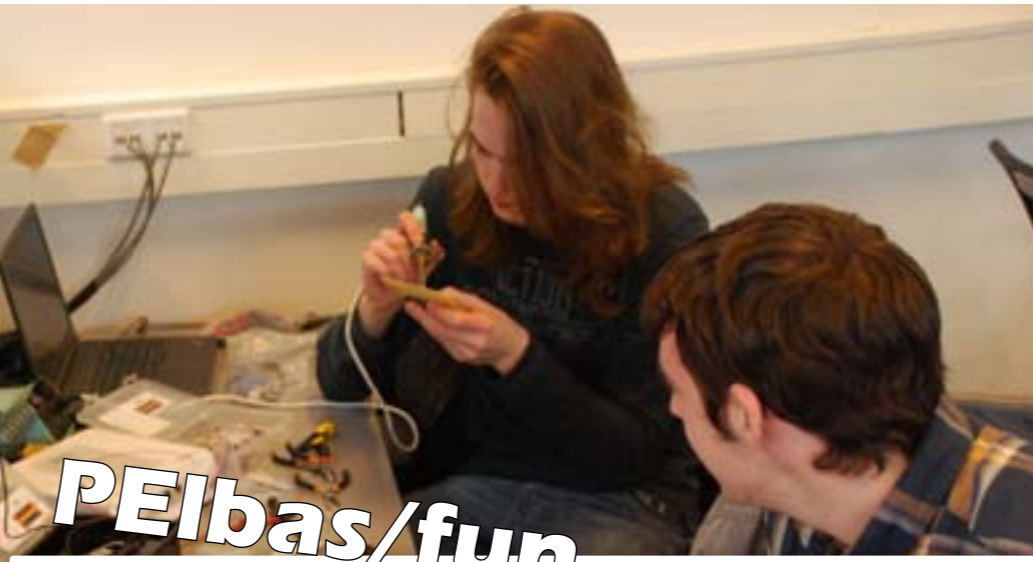
To live a while abroad is good for everybody. You have to leave everything behind and meet with another culture. You learn a lot from this. It is also good if you want much in live. Setting high ambitions to work for. A nice phrase on this subject is: “set the bar for yourself higher than for others.” I am an idealist. I strive to achieve a lot. Also a nice phrase from the Jewish philosopher Emanuel Levinas is: “We are all responsible to all for all, and I am more than others.” I try to live with this setting.

Do you also have a good lesson for the students?

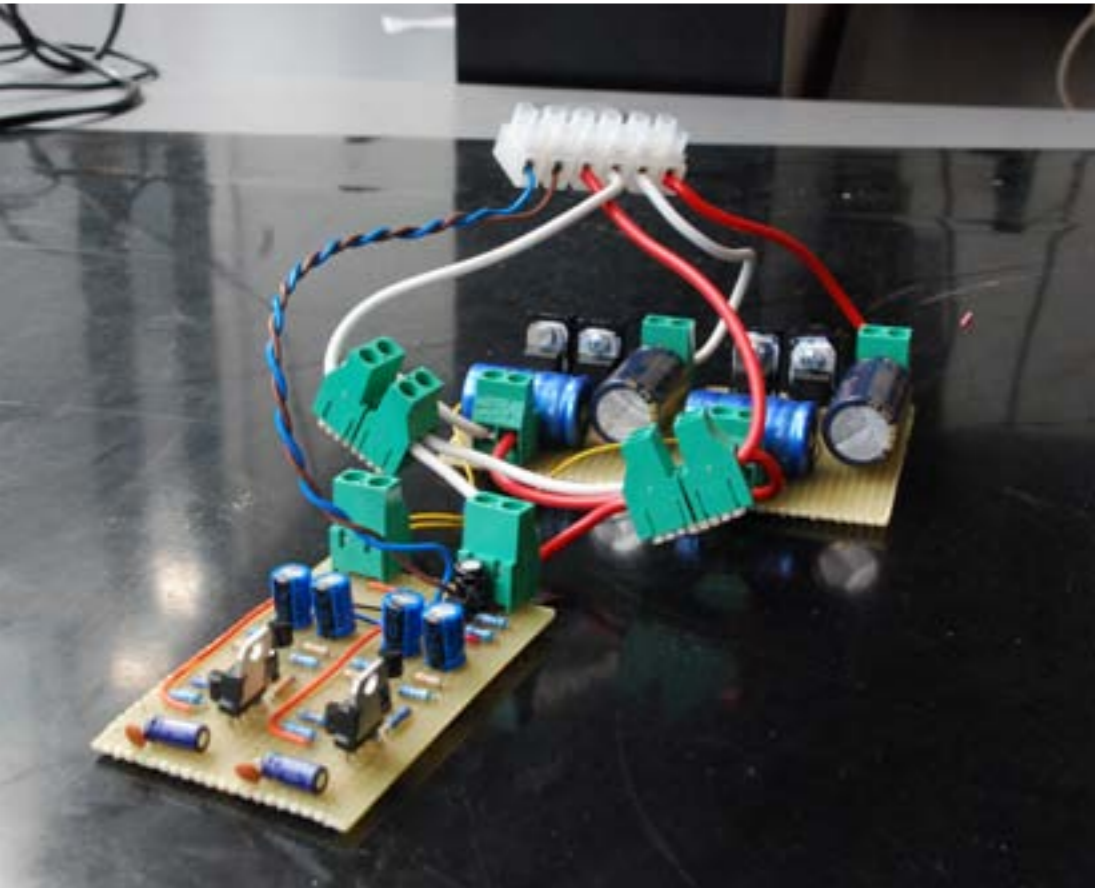
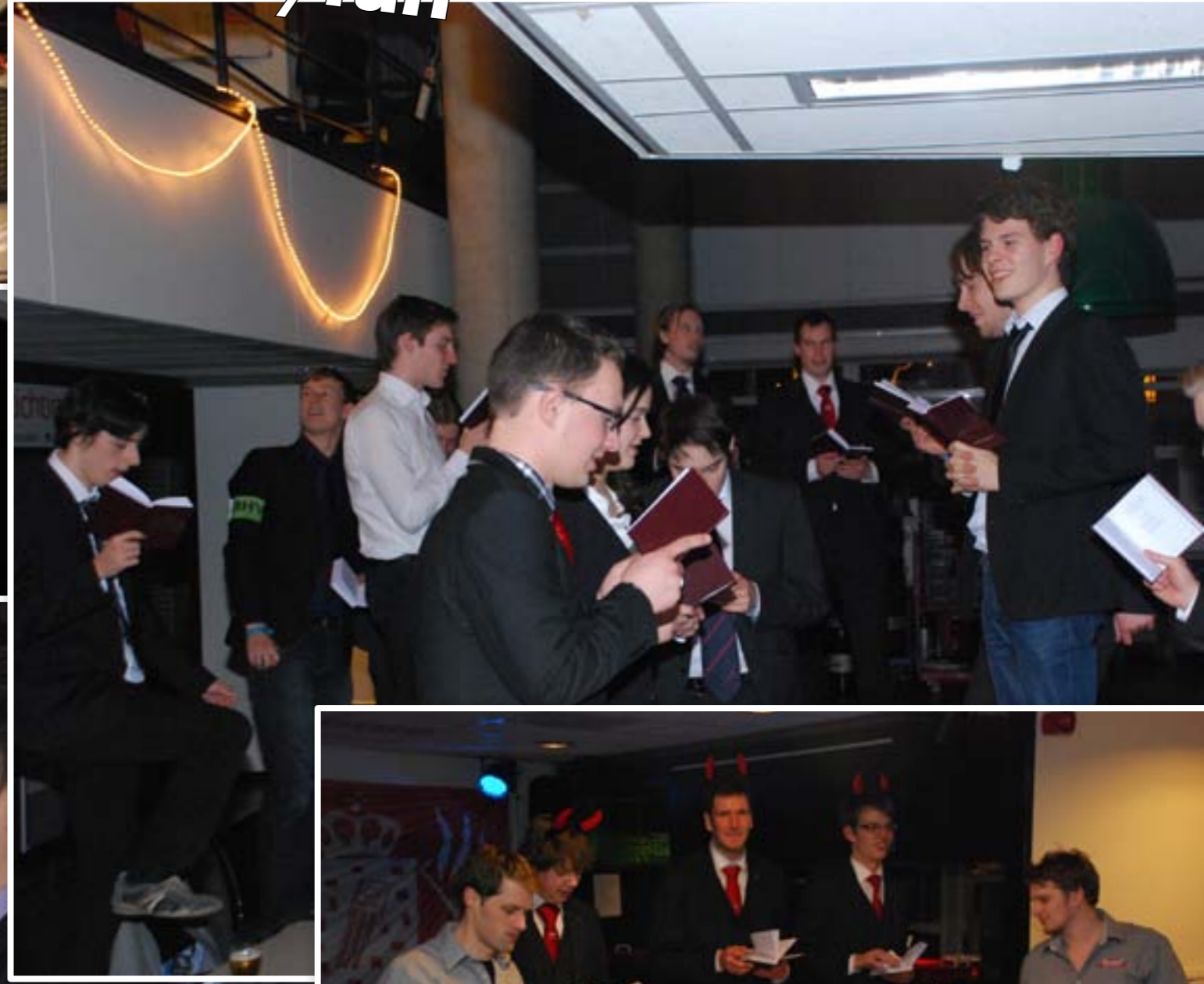
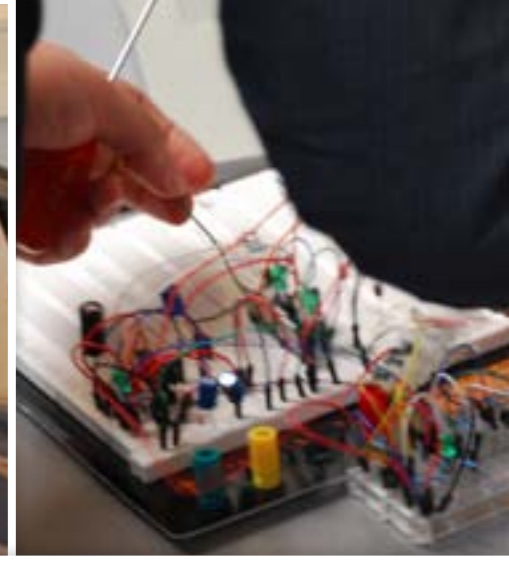
Work regularly and ask if you do not understand something. It is best to try it yourself first and explain something to someone else.



Bata-BBQ



PEIbas/fun



85e Cantus Scintillae



Afterlife

“If you finish your study your life stops!” That was a very often-heard sentence in my time at Scintilla. “During study you have time and no money, while during work you have money and no time,” was another. Well both of them are wrong. What I have experienced is that the freedom perceived during study can well be extended in the afterlife; you just have to choose this. The only thing that is correct is that my financial situation did improve in comparison to my study time.

First a short list of what I did during my study to give you an idea of from where I started my career. In my second year I created the yearbook (the one with the Michelangelo cover) and after that I became secretary of the board of Scintilla. In the mean time I was part of the well-known Borrel. Together with my fellow Borrelaars I have created the Tombe that unfortunately no longer exists (except the bar on wheels which is for hire). In 2000 I participated in the study trip towards Japan, Taiwan and Singapore. I did a lot of things next to my study and it still took me just 7 years to complete ;-). Because of all these activities alongside my study it was clear to me that I need variation.

When I finished my study I went to Technolution, at the time it was a small to medium sized company just starting to pull on students in the Universities. Because of that Technolution was a very well appreciated sponsor of Scintilla both financial as in activities. The main message was that if you were enthusiastic about technology, you should apply there. Technolution proved to be a very good employer and I got all the chances I needed to grow to where I wanted to be. And the level of technology was impressive.

In my first years I was working on embedded systems for Douwe Egberts and for Rijkswaterstaat. Gradually I moved towards

the IT systems and projects because of the impact these systems have. The knowledge gained during my study proved to be very useful in any domain. The sheer amount of overview and tools to structure complex problems we get during this study is really valuable! Remember that, you're unique amongst a whole set of people!

The knowledge gained during my study proved to be very useful in any domain

Work progressed; I had a lot of parties, a lot of vacation and a lot of fun. The projects were varying in subject but not in technology or impact so at a certain point I was getting bored, I felt enslaved by work and I was looking for new opportunities. This resulted in human resource at my desk because I created an online profile on Monsterboard. The next day I had a wonderful new project in a different domain as a project leader :D. This taught me to always listen to myself no matter what the consequences might be!

The new project has been one of the most rewarding things I have done for Technolution. We have created the very first implementation of MobiMaestro: PaGe (Par-

Author: Coen Bresser

keer Geleiding for the city of Rotterdam). It was the first traffic management system that governments can buy without acquiring a vendor lock-in as well. This was the start of a great journey for Technolution in 2007. Nowadays MobiMaestro is nr. 1 traffic management center (TMC) in the Netherlands. It really makes me proud to have been active at the very start of this journey.

My MobiMaestro days were over after two years because I need variation and change to thrive. So I acted as project lead and cooperating foreman for several other projects. What I noticed is that I am really good at starting projects and less in ending them. So I took a couple of years to refine the art of completion. This was hard for me and eventually I succeeded in doing this in a correct way, but it takes me a lot of effort.

Gradually it became clear that I am really open and approachable and actually like to tell stories in front of big audiences. Apparently this is not common amongst engineers so I was asked more and more to act on the forefront of projects and proposals.

Because of this Technolution let me attend the World ITS congress in Vienna to get to know the ITS market and solutions. And give some presentations and interviews as well. It's wonderful to see how much you can learn and achieve there by just listening and talking to people. The last plenary mee-

ting was a surprise as well. Apparently I was enthusiastic enough to end up in the end presentation with one of the interviews. It was quite a shock to see my face on a 4x4 screen delivering an instant message that I produced when a microphone was stuffed in my face :D. After the congress I knew the relevant people in the Dutch and European ITS domain in better ways than they want (all hail the Bettelalm...).

My new ambition is to create impact on communities on a global scale using my knowledge, experience and capabilities

Next to my work I remained active in other areas as well as I did during my study. I found a really good group of likely minded people in D66 Utrecht where politics is just one of the subjects at hand. The same as with the Borrel all discussions are to improve the world, although at the Borrel we actually solved a lot of the problems in the world, just to forget them again the day after. My extraworkular activities were actually a good hint on where I want to go with my life.

In the meantime I managed to get myself part of the proposal team for the Praktijkproef Amsterdam (PPA). Together with TomTom, Goudappel Coffeng and the ANWB we created a subscription to the contest phase. In this subscription we described the future of traffic management and the way this will interact with individuals. This was a really fun project to do. The jury has received the subscription very well and we won first prize! With these projects you always get a huge card with the prize on it. The main concern was how to fit this card in my MX-5...

The follow up of this project was the actual proposal; this was a very interesting experience as it was the first time I was active in such a big and complex proposal. The idea was golden, the consortium was perfect, we refused to reduce quality and increase risk of accidents and as a result we were too expensive. This was a very hard message to digest. It took me a week to recover from this lost race.

At this moment my ambition lies in a different area than what I can achieve at Technolution so after 11 years of being a loyal employee it is time to say farewell. I have executed a really nice row of interesting projects and I'm really content with the career path Technolution has provided me. But in my heart I know this is not where I must stay. My new ambition is to create impact on communities on a global scale using my knowledge, experience and capabilities. What I learned during my career is my most important message to you all: listen to your heart. If you find yourself discontent, you are in the wrong place. Dare to make a step and trust yourself that you will always find a way to improve yourself and get to where you want to be. And of course do not forget to have fun in doing what you're doing.

Enjoy!
Coen



Why would you buy your own pedal?

To start this article, let me first introduce how I got involved in the world of music. During high school, I hung out with a group of friends who had a band together. Eventually I wanted to play the guitar myself, so I bought one and started practicing until I was satisfied. This approach worked great for me and started to get me thinking, if I could teach myself how to play the guitar, why should I not be able to produce my own guitar effects? I am studying to be an electrical engineer after all. After some of the usual, well known, procrastinating, I finally got around to starting this new project of designing your own effect pedals.

If you play the guitar, or any other electric music instrument, there are many advantages when you build your own effect pedals over buying them. First of all, it is way cheaper. A decent effect pedal costs over €70 and may easily surpass the €200 for a single effect. When building your own pedal, it very much depends on the exact design you want to build. The pedals I created so far usually cost about €30-€50.

A much greater advantage is that you actually design them yourself. By doing this you can get your effect pedals exactly the way you like them. You can increase or decrease the gain of the effect and you have full control over the overall effect. Of course the build quality is probably a little bit less robust, but the good thing is that you can easily patch it up yourself.

Where to start

You probably will not be surprised to hear this, but the first step is to actually think about you want to build. Determine what the function of the pedal has to be, what circuit you want to use and how many control knobs, switches or other actuators you will need.

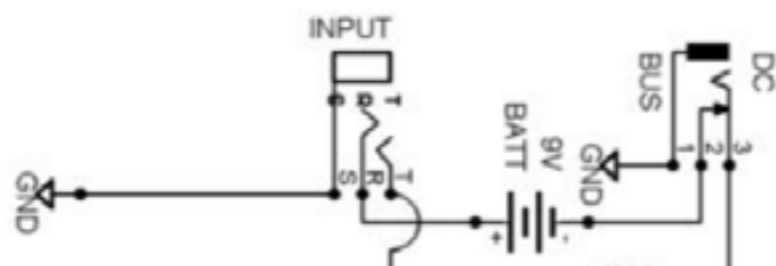


Figure 1: Schematic of the input stage of a common effect pedal.

The chosen circuit could be as simple as some transistors which distort your signal, but could also incorporate multiple IC's for the desired effect, depending on the function or complexity you want your effect to have. Just like almost any other system, it is advised to give every pedal a high input impedance and low output impedance. It is also wise to always put in a volume control knob in your circuit. Most effects significantly alter the amplitude of your signal. Having an additional volume control on your pedal prevents you from having to alter the volume on your guitar while switching from clean sound to the effect. This can be applied easily by applying a simple Op-Amp circuit (which can easily be used to also create a band-pass filter), another advantage is then that the Op-Amp also takes care of the low output impedance.

Author: Jippe Rossen

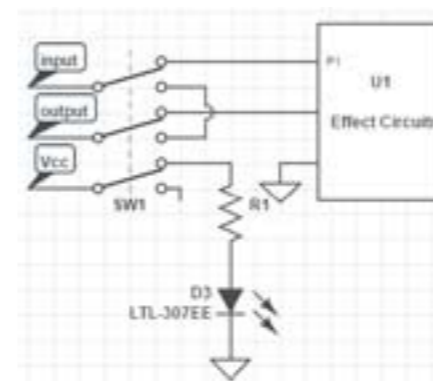


Figure 2: Schematic of the implementation of a 3-dpt switch.

Standard circuitry

Almost all pedals out there contain the same input stage. Even though guitars only produce mono sound, stereo audio sockets are used for the guitar plugs. The reason for this is that guitar effects usually have two options for the supply power: an auxiliary power supply by a DC barrel jack and a 9V battery that is built into the pedal. When the mono jack is inserted into the socket, pins R and S (see figure 1) will be shorted. This rudimentary switch is used to disconnect the power supply by physically disabling the ground, when the pedal is not connected to a guitar.

A same sort of method is used to select which power supply is used. Lots of guitar



Figure 3: Picture of the resulting delay pedal.

pedals use standard 2.2mm or 2.5mm barrel jacks. The sockets of these also have 3 connectors. When a barrel jack is connected, the applied adapter (pins 1 and 3 in figure 1) is used as a power source; otherwise the 9V battery is connected (pins 2 and 3). Another thing every guitar pedal uses is a 3PDT switch (three pin double toggle), the big thing you can stomp you feet on to (de) activate your pedal. This component is also the reason why these kinds of effects are sometimes called stomp boxes. As the name already suggests it is a triple parallel toggle switch. Two of these switches are used to switch signal path of the pedal, see figure 2 for how this is done. The last one is used to switch on the LED indicator light when the pedal is turned on.

The implementation

With these building blocks a fully functional guitar effect can be made. The actual result of the effect is determined by the circuit that is built inside the effect circuitry box of figure 2. One of the effects I have built myself is a delay pedal. The delay pedal I built was constructed around a PT2399 chip. This is a simple echo audio processor IC, which is used in electronics such as audio players or karaoke machines. It has a built in ADC and DAC and is also equipped with 44kB RAM. A simple application circuit is already given in the datasheet of the PT2399. When applying the blocks described earlier, a fully functional effect

pedal can already be constructed. Sadly I cannot show you my exact schematic (I kept modifying it and eventually gave up keeping track of the changes I made). I may have added or changed some components, but it should still be quite similar to the one of the echo bender from Casper Electronics. When comparing both circuits you can see the slightly modified PT2399 datasheet circuit implemented between an input and an output Op-Amp, which are used to take care of the required impedances and to create a band-pass filter of 20-20kHz.

The final result

The final result of this project of mine is shown in figure 3. In this figure you can see the input and output jack sockets on the bottom, the 3-dpt switch and the circuit in the middle and 5 control potentiometers on the top which are used to alter the volume for the direct signal and the delayed signal, the amount of delay, the delay time and concluding the know that sets the delay time.

I am very satisfied with the result and I am using this pedal frequently, but as printing audio is still troublesome, I will finish this article with a measurement which I performed in the W-Zaal. In figure 4 we can see that the described circuit indeed works as a delay effect, in this case set to repeat the input signal about 6 times with a delay of about 120ms.

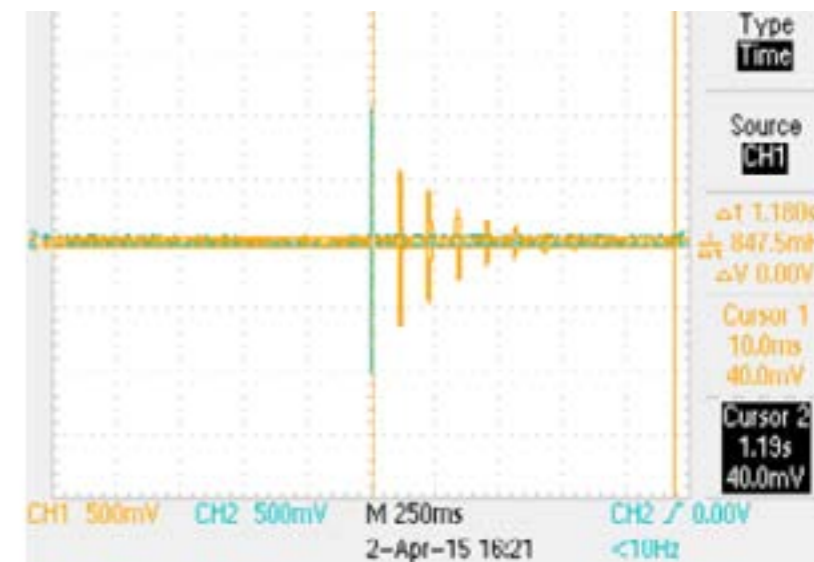


Figure 4: Measurement of the time delay of the resulting effect pedal.

CANotA

Author: Ewoud Vissers



The H2Zero hydrogen car contains a lot of electronics. The final car contains 17 electronic modules, all containing a microcontroller. This year we are using both the LPC11C24 and LPC11C14 microcontrollers. We chose these controllers because they contain an integrated CAN controller. CAN is an acronym for Controller Area Network. It is used in all modern cars for the communication between different modules. Using this technology, which is tried and proven, we can be almost certain the communication between our electronic modules won't fail. An extra benefit of the system is that we can easily implement live monitoring of all important data in the car. For this we developed a solution with the awesome name "CANotA", which stands for CAN over the Air.

CAN is a protocol which defines the way in which modules are electrically connected to each other, and defines the way data packets are sent. The system is so reliable because it relies on acknowledge bits. At a certain part during the transmission the transmitter will shut up, and will listen to the bus. If no module acknowledges by asserting the bus, the transmitting module will try transmitting again.

The data aspect of the Green Team Car has improved every year until now. The first year the entire team consisted of mechanical engineers. All electrical systems were connected with individual wires, creating a huge mess, with high chance of cables breaking. Debugging such issues was a serious hell. The second year Electrical Engineering students joined the team. They implemented CAN for the first time that year. The CAN system consisted of a standard module which would hook up to individual modules. This decreased the cable mess substantially, and made communications practically flawless. That year it was tried to implement live data monitoring using this system, but it couldn't be finished in time.

Last year a lot of time was spent on building the system for live monitoring. An XBee

module was chosen for this purpose, because it seemed like the exact application this module was designed for. During testing moments this system worked like a charm. Only during the Shell Eco Marathon itself this system failed. This was caused by the race circuit. It was laid out around Ahoy in Rotterdam. It's the worst imaginable building for radio transmissions. This caused the XBee to lose connection when there was no direct line of sight between the car and the receiver.

For this year we had to rethink this idea. An RF amplifier was one of the ideas that came across the table, just like getting an amateur radio license and using different frequencies. In the end we came up with a solution catering to the positive points of the location at Ahoy: Perfect 3G/4G reception, because it's built for large masses of smartphones. We have bought a Ublox 3G module. This is a module with a 3G/2G radio, GPS module, USB interface, CAN interface and Ethernet Controller, tied together using yet another LPC microcontroller: the LPC1768.

The microcontroller on this module will receive all data packets coming over the CAN line. It will then filter the packets and send

it over the 3G network to a server located at the Green Team Headquarters. This will read out all packets, and show them on a simple webinterface. This means every device you can think of will be able to access the data of our car. When you have a password as well, you'll also be able to send packets to the car. For example, we can switch lights on the car, or press a digital emergency stop button. The most fun will be the coupling between this web interface and the extremely versatile horn system, which means we can play every sound we want from the pit.

The most use we'll get out of this device will be all the data that is stored in the database. Other years have proven as well that data farming is extremely useful, almost necessary, for making sure the car can be optimized to the highest efficiency. This will certainly prove useful at the Shell Eco Marathon this year. If time permits, which it most likely won't, the most fun device in this module will be used: The GPS receiver. If this works, we can generate some awesome data, or stream our races real-time over the internet. It might be that this will work next year. Would you like to help with that?

Want to join Greenteam?

Who are we?

The Green Team Twente is a student initiative that begun at the University of Twente whose goal is to build an ultra efficient car that runs on hydrogen. Every year a team of 20 students join this challenge either taking on part-time or full-time roles. The team encompasses disciplines spanning the educational system at the University of Twente and the Saxion. This includes Electrical Engineers, Mechanical Engineers, Industrial Designers, Chemical Engineers, and International Business Administration. The end goal is the Shell Eco Marathon, a unique race where the winners are determined by efficiency rather than speed or time. Over 200 teams from Europe and Africa join the European edition of this race. The race is currently held Mid-May in Rotterdam, however from 2016 will be moved to London.

What would you do?

Members of the Green Team Twente partake in various and diverse tasks either on the construction of the vehicle itself or important peripherals. As electrical engineers your expertise in the field will be valuable. It is also a great opportunity to develop your skills and apply what you have learnt into a real world scenario. On top of this you have the chance of widening your capabilities especially in the fields of mechanical engineering, chemical technologies, public relations, fundraising, and day-to-day business operations. Examples of current roles in the car include designing and building a functional car body, motor controller, and fuel cell. Members of the Green Team Twente also have the possibility of doing their minor at the team, as many members have done in the past.

What we expect?

We are looking for enthusiastic students who enjoy electrical engineering and are willing to sacrifice their time and knowledge for their own personal development. This can either be in full time positions taking a year off your academic studies, or part time positions.

Are you willing to take your expertise to the next level? Contact us at info@greenteam-twente.nl or talk to one of our current members. You can also come by our place, of course, next to the "Windpark" on the campus. High chance someone will be there.



Advertorial: Thales

Authors: Judie Ibrahim, Annelot Schuring



“As a student your biggest fear is that your graduation research ends up somewhere in a drawer. At Thales you are truly taken seriously and they have confidence in you. Thus, my recommendation regarding new method for process costing will be implemented in 2016”

“When I was looking for an internship I wrote to many companies, three of which presented me with an offer. I chose Thales because it is a company with an international focus, exporting more than 85%. During my internship at Thales I was involved in analysing the process costing method, looking for ways to improve this. Since I am mainly involved with technology at Aviation Studies, I particularly wanted an internship that gave me the opportunity to work with management processes. The subject of the assignment with Thales was unknown to me, but that was exactly why I was keen to start and I saw it as a challenge.

I believe that with genuine interest you can master the theory. When I started work at Thales I was surprised by the open corpo-

rate culture. You can talk to anyone and they make time for you to give you support. If you take the initiative, there are many opportunities. After having Business Administration at the University of Amsterdam in September. I Business Administration at the University of Amsterdam in September. I think that the combination of a Bachelor’s degree in engineering and a Master’s degree in Business helps you find solutions looking through two different spectacles. I stay in touch with my supervisor and I hope that i will be able to work at Thales once I have my masters degree”

Judie Ibrahim,
Aviation Studies Student,
Amsterdam University of Professional Education, aged 23



Annelot Schuring
Graduated in Physics, Radboud University Nijmegen
Aged 24

“When I was still studying, I was already seeking employment. I was looking for a technical company with an interesting product where could make use of my physics background. At the Beta Business Fair [Bèta Bedrijven Beurs] in Nijmegen I had a conversation with a recruiter from Thales. She invited me to their head office to discuss the opportunities at Thales. One of the vacancies stood out right away, namely the position of Trial Conductor. I applied for this position and after a few interviews they hired me. Meanwhile, I have been working at Thales for a few months and am enjoying it very much. As the Trial Conductor I constantly build on the knowledge gained

during my studies. I will regularly go abroad as part of a team to test our naval radar systems. At sea we show the client that our system is indeed as good as promised in the contract. We do this through various scenarios. For example, we have an F-16 fly in to see when the radar detects it first. While I was applying for jobs I also received an offer from another technical company, but the good atmosphere at thales was decisive for me. People here are very helpful and take the time to explain something. Thales certainly lives up to the image I had of it: a high-tech company with a pleasant working environment.”

“As the Trial Conductor I constantly build on the knowledge gained during my studies. I will regularly go abroad as part of a team to test our naval radar systems.”

Looking for a job, internship or graduation assignment?
Start your career at Thales! www.thalesgroup.com/nl

Living your dream

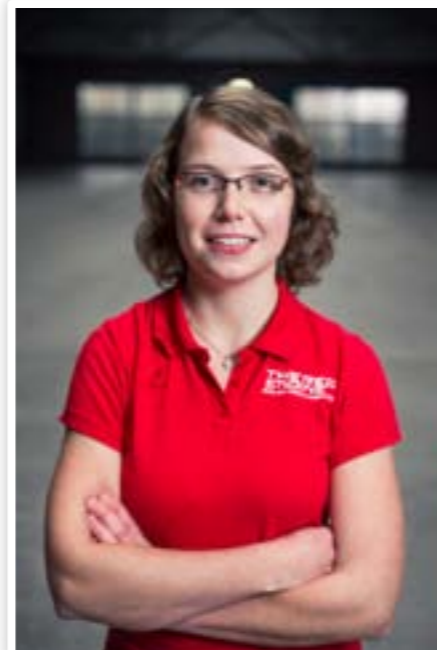
Author: Fieke Hillerström
Photos: Jerome Wassenaar

The doors slide open and I walk towards the white coats. After carefully putting it on, I cover my shoes and put on my gloves and face mask. When my colleagues followed the same procedure, we are ready to enter the space shuttle. We start cleaning the area and placing the wet bench facilities. I have to assemble a LEMO connector and then we are ready for take-off!

Suddenly I wake up and realize that I am not going to build a cleanroom inside a space shuttle, my awesome dream came to an end. Lucky for me, my days are filled with another very exciting project to work on; building a solar car for the World Solar Challenge.

While the sun starts showing up earlier and the temperatures rises, we are realizing that we have only several months left before we start the testing period of our new car. The time of conceptual thinking and designing has ended and the production of the new car started. We had our first testing period in February with the mock-up. The mock-up is a test car with an aluminium frame, on

which all the new mechanical and electrical parts are assembled. During the mock-up testing, we look whether the car is resistant to our highest load cases. For mechanical testing the highest load case will be the cattle grids on the road. Therefore we built our own cattle grid and measured the forces on our car. The electrical tests include testing the telemetry system and the high power components such as the motor and motor controller. The project gets really excited when you see all the parts built up together into one car. The first time I drove a kart was already impressive for me, but while driving the mock-up I learned what real racing would be like.



Since the beginning of March, the production of the body of our car started. During the design presentation, we held an interactive quiz and presented the new design of our car. This outer shell makes the car more aerodynamic and is made out of carbon fi-

“we are realizing that we have only several months left before we start the testing period of our new car.”

bre. The production process starts with making plugs of our design, which have exactly the same shape as our final car. Thereafter molds are made using these plugs, which are the negatives of the car. Inside these molds, the final carbon shell is fabricated. Every ir-

regulation inside these molds will be visible in the final car, therefore the producing of the body must be done very accurate. We already saw the importance of the carbon shell when we easily improved the top speed of our mock-up with 10 km/h, just by adding an improvised aerodynamic shape.

Monitoring the battery keeps the battery in a safe state.

Being part of the solarteam makes you days very dynamic. Contacting partners, solder PCBs, working out new concepts, writing C-code, testing electronics, there is always a lot to do and you have to switch your focus every time. One of the systems we are working on, is the battery management system (BMS). The BMS has two main functions, it has to monitor the battery and it has to determine the state of charge (how much energy is left inside the battery). Monitoring the battery keeps the battery in a save state. Because it is dangerous to charge or discharge the battery too much,



the cell voltages of each cell are monitored continuously, which is also required by regulations. The temperature of the battery is measured too, to make sure the cell will not overheat during fast charging or discharging. The state of charge measurement is done by measuring the current coming from the battery cells. This information is used to predict our strategy during the race. The BMS also contains a circuit to precharge all the capacitors on the bus and protect our power electronics and a system to balance our battery pack, to be able to draw as much

energy for the batteries as possible during the race without crossing the safety limits. Last year I dreamed about being part of the solarteam, I wondered if I would ever pass the applications and get the chance to build a solar car. Thanks to my friends, who told me “If you never try, you will never know”, I am getting an amazing experience. I think building a cleanroom inside a space shuttle is somewhat unrealistic, but still, I like having these absurd dreams. Maybe, one day...

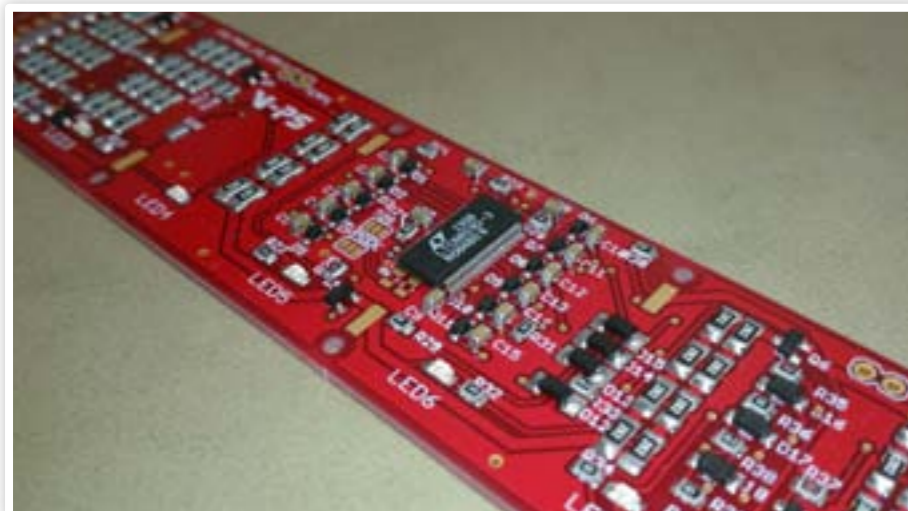


Figure 1: One of the voltage monitors



What if...

Author: Dieuwertje ten Berg

I once read a story, that story explained what happened when you take a decision. Every time that you take a decision, another world is created. In this world you take the other decision. So in the end there are so many different versions of you as you take decisions. This concept probably has a name and I tried to google it, but what I found was not what I searched. In some other world, another Dieuwertje probably choose different searching words and did find what she was looking for.

But anyhow, no matter how stupid this theory might be (I do not know, this is not my area of expertise), the possibilities it gives are almost endless. The information that this could provide. Think about it, is there a choice that you once made that you are not really sure about.

How defined are you
by the choices that you
make?

Imagine that you could look into a world in which you made the other decision and see what the consequences of that choice were. Perhaps you would feel very blessed with the choice you made or maybe you wish that you have made the other choice.

Imagine being able to meet and talk to that other version of you. How different or the same would that person be? How defined are you by the choices that you make? What would that person say to you? What would you say to that person? I am quite curious about what I would ask and say in such a situation. But even just being able to see how that other persons lives, what kind of person it is, would be so fascinating.

Then again, what would you do when that person has a way better life then you have? Would that be okay with you? Perhaps, when you are happy with your one life. But what if the situation was different and you would be homeless. Would you be okay with your counterpart having a good life? How big would the regret of your decisions be? Would you be able to overcome it, or would you be completely lost?

It would be an interesting situation but also a tricky one. If you would get the choice to meet a version of you that made a specific decision different then you, would you want to meet that person? Would you take the risk of feeling like a failure when he turns out to be rich? Or what if he is homeless, how would that make you feel? Would you take the risk?

Would you take the
risk of feeling like a failure
when he turns out
to be rich?

I don't know what I would do. It is very easy to say that you do want to meet that person.



That it doesn't matter what that person does or how he lives. But I think that that is not realistic. I think that it would matter. So do you take the risk or are you happy enough with your choices to say, I don't need to meet that person. That would be the safest (and perhaps smartest) answer but would it be really satisfying? Or would you still wonder, what if I made the other decision? In another world somebody made the decision to look, he knows...

Love,
Dieuwertje

Puuzle

Author: Truusje

G	Y	C	N	E	O	O	D	E	U	G	A	K	D	M	G	E	F	C	M	I	G	B	B	U
Q	U	C	T	X	T	B	X	Z	W	S	U	L	S	M	C	F	I	C	M	I	B	K	C	F
M	A	R	J	W	L	A	D	K	C	I	C	I	L	Z	I	K	A	F	C	T	H	I	U	C
Z	C	S	I	G	E	S	B	X	Y	C	T	I	Z	I	S	Q	M	C	R	S	A	E	K	Y
E	N	Q	H	Y	O	R	F	X	U	C	S	R	M	N	T	G	N	N	M	O	P	V	B	C
A	A	W	T	F	T	A	J	Z	V	K	V	Y	I	S	P	N	O	A	L	X	F	A	D	C
O	M	O	R	C	S	A	E	I	L	Y	O	D	M	P	L	J	I	H	J	H	P	D	I	A
Z	E	S	I	I	X	D	G	Y	I	C	H	N	Q	P	E	S	D	C	Y	X	L	W	N	P
C	Y	P	J	L	C	V	A	E	I	S	S	I	M	M	O	C	S	U	S	R	U	C	Z	V
F	O	H	P	Y	L	A	D	X	P	P	E	R	W	D	Z	A	V	T	Z	C	W	U	Q	J
V	L	Y	S	H	O	N	R	N	T	Z	N	I	I	Z	B	P	Q	T	N	N	F	A	N	X
E	X	T	E	R	N	T	E	W	I	K	E	E	M	K	H	M	D	G	J	Y	K	T	W	O
A	U	B	H	P	F	O	D	O	Q	B	V	A	N	D	O	A	S	P	O	C	K	X	W	C
L	G	L	Q	I	B	E	U	W	T	X	B	O	C	O	T	K	C	Q	J	E	M	A	B	A
L	K	O	T	W	R	Z	O	G	N	D	V	H	H	C	I	M	G	T	I	T	N	C	A	J
I	M	H	B	H	F	I	K	M	N	E	O	C	U	X	S	U	F	B	W	F	N	W	P	S
T	I	W	I	O	S	C	V	M	D	D	V	S	H	G	A	R	A	G	O	U	B	E	V	S
I	I	S	U	K	O	H	K	Z	T	V	E	J	M	V	V	T	R	X	S	P	C	B	L	N
K	S	R	Z	H	P	T	L	F	E	Q	Z	A	J	Q	Y	S	E	R	O	T	S	T	B	W
S	R	X	S	O	H	W	E	P	P	G	J	A	Q	T	A	U	D	O	X	V	U	E	R	S
F	G	H	J	T	O	H	R	W	K	D	T	R	R	T	V	L	P	E	Z	R	V	A	I	O
R	L	U	X	I	E	W	R	V	F	A	V	S	F	D	Q	B	L	K	G	Q	H	M	Z	T
O	E	C	G	Q	K	F	O	B	B	E	J	C	D	E	L	W	N	S	A	P	B	D	R	N
Q	L	V	Z	U	W	U	B	C	A	M	E	I	J	O	F	L	F	A	L	C	B	U	S	C
A	K	I	R	Z	T	L	O	Q	S	T	I	E	V	I	H	J	J	W	A	Y	Y	N	J	F

- BATA
- BHV
- BORREL
- CCS
- CURSUSCOMMISSIE
- DEVONK
- EWITRIP
- EXTERN
- FCSCINTILLA
- GALA
- KCC
- LEX
- LUSTRUMKAMP
- MEEKI
- OUDERDAG
- RAADVANTOEZICHT
- RVA
- SCALA
- SCVMDDVSHGARAGO
- SHOCK
- SJAARSCIE
- SJACO
- SKIC
- SKITILLA
- SOT
- SPOCK
- SRC
- STOEL
- STORES
- SUN
- SYMPO
- WEBTEAM

While doing some administration for our beloved Scintilla, Truusje found an old file with “commissions” on it. Wondering about what could be inside it, Truusje opened the file a bit too enthusiastically. This caused all the letters inside the file to fall on the ground, curiously aligned in a 25 by 25 letter grid, with the words in perfect straight lines either placed upwards, downwards, backwards, forwards or diagonally. Truusje manages to quickly find the words and put them all back into the file, but one commission unfortunately got lost in the chaos of letters. Do you know which one? If so, send an email to truusje@scintilla.utwente.nl with the answer, and have the chance to win a delicious pie.



WE TURN YOUR IDEAS INTO TOMORROW'S PRODUCTS



APPLIED MICRO ELECTRONICS

AME is a fast growing organization **developing** and **manufacturing** high quality products with electronics. Our goal is to create **innovative** products for our customers that exceed market expectations by making use of state-of-the-art development facilities and a highly automated manufacturing environment. Driven by **technology**, we strive for the best solution combining the disciplines of applied physics, electrical, mechanical, software and industrial engineering.



OUR OFFER

We offer you a **challenging career full of opportunities** for personal and professional growth.



JOIN OUR TEAM OF EXPERTS

Driven to exceed expectations and to excel in creating innovative solutions, our team of experts is continuously looking for future best-in-class colleagues within the technological disciplines of applied physics, electrical, mechanical, software and industrial engineering.



CAREER POSSIBILITIES

If you are interested in working with a talented, ambitious and experienced team of professionals using the best tools available and would like to work in a fast growing organization full of career opportunities then you are most welcome to apply for a job or take a look at our opportunities by visiting our website.



INTERSHIP OPENINGS

AME is the ideal work environment to develop hands-on experience while completing your studies. You will be involved in challenging real-world projects and work with experts from a multitude of technological disciplines. We invite you to get in touch with us to discuss any internship openings.