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TPM
 QUARTERLY

Serious gaming useful in planning future scenarios for railways

Arjo van Loo, Sebastiaan Meijer and Rens Kortmann

To what extent can serious gaming play a role in the future of railway traffic in the Netherlands? ProRail and TU Delft have been putting this to the test since 2009 with highly innovative simulation and gaming projects under the title of the 'Railway Gaming Suite'. The results are encouraging; the unique cooperation between TPM POLG, TPM Systems Engineering and ProRail has already yielded various smart solutions.

We met Arjo van Loo (Manager of the Innovation Department at ProRail), Sebastiaan Meijer (TPM POLG) and Rens Kortmann (TPM Systems Engineering) at De Inktpot, ProRail's imposing, nostalgic head office in Utrecht. "Our first introduction to TPM was actually quite funny", Arjo told us. "I started at ProRail as the Research Programme Manager. On my second day here I was dragged off to TU Delft for a session on gaming. I had absolutely no idea what it entailed, but by the end of the meeting I was completely convinced: if ProRail is how I think it is, serious gaming should get us on the right track. That is how the ball got rolling."

The Railway Gaming Suite will run for a period of 3.5 years. TPM has this time to develop the requisite scientific tools and look at how they can be applied. In the meantime, gaming is being used to practise on ProRail problems. The first case (2009) concerned railway goods traffic. Sebastiaan explained: "Three hundred goods trains travel through the Netherlands every day. They use the existing busy railway network, but with totally different dynamics than passenger traffic. They travel at only 40 to 50 kilometres per hour, for example, whereas an 'ordinary' train goes at least twice that fast."

Important factors for smooth goods traffic are good connections with other countries, no unnecessary stops and certainty of routes once they are assigned. "The key question was therefore: how

can we optimise the game of supply and demand of a reliable route? To test this, we developed the management game 'Goods Marketplace'. The parties involved used this game to try new variants in the market, such as sharing information and working with auctions. But they also looked at the consequences of a big surcharge on travel during peak hours and of working with last minute bookings."

The second project concerned a game about the A2 corridor. The key question here is what happens if passenger traffic between Amsterdam and Eindhoven increases by 50%, particularly at troublesome junctions, such as the Bijlmer, where network controllers have a crucial task in keeping services punctual. "ProRail had already set up its own simulation for this purpose," Sebastiaan said, laughing. "You could compare their version to a Trabant; we made it into a Formula 1 car for this project."

Help in the decision-making

ProRail's third problem related to the bridge over the River Vecht near Weesp. Rens elaborated: "In November 2009 we played a four-day session of the Vecht Bridge Game at the traffic control post in Amsterdam. This bridge is a crucial element in the railway system as it has to open regularly for shipping. At Systems Engineering we developed a new, computer-based game, which enables the network controllers to run through their daily work in a simulated environment. They can also simulate busier future railway scenarios. ProRail can make better-founded decisions as to whether or not to construct an extremely expensive boat lift, or see whether smarter, cheaper solutions are conceivable, on the basis of the results. Gaming can therefore help in the decision-making process when it comes to new infrastructure."

The fourth project was based on 'A Train Every Ten Minutes'. Arjo described the project: "ProRail wants trains to run more frequently in the future. An increase of 50% is anticipated on the A2 section (Amsterdam - Eindhoven) between 2012 and 2014. In other words, there will be intercities on the Amsterdam - Utrecht - Eindhoven stretch every ten minutes in peak hours.

It is, furthermore, the idea that six sprinters per hour will travel along the entire A2 corridor. So it is going to be even more important that disruptions are solved." ProRail and TPM have, therefore, thought up a serious game to simulate big disruptions in the high-frequency railway service. With this simulation game, which is comparable to Churchill's War Room, the parties in question learn, in advance, how to act in the event of disruptions. The simulation was played for the first time last April. Sebastiaan continued: "Everything was copied right down to the last little detail so that the real train service could be simulated with a combination of high-tech visualisations and low-tech materials, such as scouring sponges. All the employees who normally implement the train service were involved: including network controllers, Automatic Routesetting System operators, employees that give travel information, the Regional Control Centre and the OCCR. It went really well, although feelings did become heated now and again."

Enthusiastic

The evaluation of the first three projects was mainly positive. "ProRail is very enthusiastic about the use of game simulation. Gaming can help in complex decision-making on, for example, new infrastructure, but also in trying out new forms of logistic management in traffic control. Some decisions have, in fact, already been made on the basis of the games. Playing the games clarifies the preconditions for the success of a specific concept. Gaming is extremely useful in the operational field, in areas such as traffic control and capacity management. Having people simulate reality reveals knowledge that would otherwise remain hidden. After all, there is a great deal of skill in routines and they only emerge when people get down to work. Gaming is, therefore, also an instrument that is of interest for training," Arjo said.

Moreover, ProRail recognises a breakthrough in its own thinking pattern. "The old railways mentality was that of a production company. The staff all did their own bit and if they received

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A multi-actor system cabinet

A government with a single-seat parliamentary majority consisting of the Christian Democrats (CDA) and the free-market liberal VVD, with parliamentary support from the Freedom Party (PVV), is a perfect example of a multi-actor governance system. After all, it will depend on the support of fluctuating majorities. Intentional relationships have a significant symbolic function in a multi-actor system, their effectiveness being part of the complex and dynamic ties and connections in the system. As we at TPM well know, intentional actions are often counterproductive as a result. In the spring, the journal *Science Guide* politely but unmistakably rejected the intentional policy of the Ministry of Education, Culture and Science on all fronts as ineffective and non-productive. Towards the end of his term as Education Minister, Ronald Plasterk asked for recommendations on applying the 'Californian model' to the Dutch university sector. The reporting committee gave him precisely the opposite: without even mentioning the Californian model, it issued advice that is embraced by the entire higher education sector as the vision the Netherlands should be aiming for.

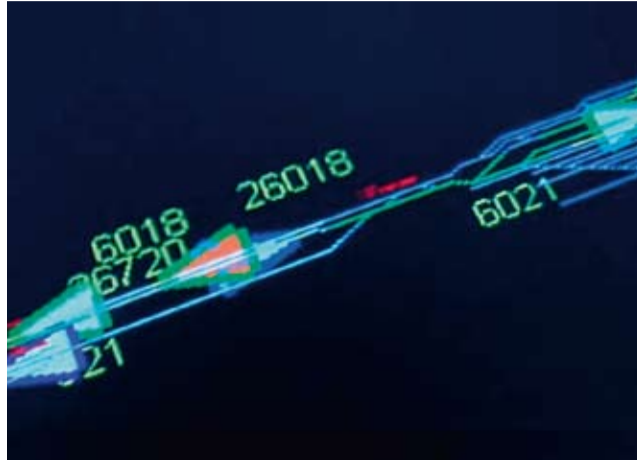
This is how the ministers, deputy ministers and parliamentary supporters of a new government will fare, time and time again. An interesting system effect is already emerging in the run-up to the appointment of the new cabinet. Europe is becoming increasingly important for universities of technology, technological developments, large infrastructural projects, ICT applications and combating climate change. The PVV's staunchly anti-European standpoint is well known. But during the CDA party conference (at which party members voted on CDA participation in a VVD/CDA/PVV cabinet), it was PVV leader Geert Wilders who proved himself to be the only politician operating in the European political arena by giving a speech in Berlin - the rest were at home watching Dutch television. Many prominent politicians accuse Wilders of prejudicing Dutch national interests, not European ones. They argue that the Netherlands 'will pay the price' for his activities: nationalist Christian democrats lining up to attack a European anti-Islamist.

In Denmark, a minority government has relied on the support of an anti-European party for years now. Within Europe, the Danes have the reputation of being difficult and of slowing down decision-making processes, but once decisions have been taken, implementation in Denmark tends to go smoothly. In the Netherlands, however, this is precisely where things repeatedly go wrong. Implementing European Directives is always problematic, due to administrative mismanagement of European funds, stifling policies or a humiliating anti-European referendum result. The anti-European attitude of the Danish People's Party ensures that Denmark's ruling liberal-conservative government cannot afford to be sloppy in its dealings with Europe. The coalition therefore ensures that all decisions with a European dimension are prepared extremely well, right down to the last administrative and political detail, both in Denmark and in Brussels, with national implementation issues already taken into account in European decisions. For the Netherlands, European effectiveness of this kind would mean nothing short of reversing the system. We often brag about our international outlook but, in practice, we are far less pro-European than we think. Implementation often lets us down. This could quite possibly change with a government that relies on the support of an anti-European party.

Prof. Theo Toonen, dean

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Serious gaming useful in planning future scenarios for railways



Images from the game 'Elke Tien Minuten Een Trein (ETMET)'

enough instruction and blueprints, the overall picture was fine. However, this way of thinking did not take into account variable factors like interaction, communication, the weather and, for example, fallen leaves on the tracks. Such factors were simply not incorporated - but they are sometimes of decisive importance. The simulation games enable you to think differently; suddenly you see all the variants very clearly. They say that the proof of the pudding is in the eating or, in other words, you learn by doing, and we seem to have proved the point."

Very serious

It was also surprising how seriously people took the games. "That really struck me," Arjo told us. "We have already seen how incredibly seriously people take gaming," added Rens. "They can get really stressed out if matters get out of hand. I saw that once when I was a spectator at a game. A participant asked me to pass something on to someone else, but that was, of course, not the intention. When it became apparent that I had not done so, the person in question became very angry. Naturally we could laugh about it afterwards."

"We were able to simulate the technical side of things before, but we have now been able to add the human factor. This is where the scientific innovation comes in. Consequently, the games have a high validity and everything is very real. Every second is accurate and all the signals are accurate. The most significant added value from the point of view of simulation is that human behaviour can now be simulated. Normally this is based on assumptions, whereas the reality is often different. And that reality is precisely what is so decisive for the outcome!"

Arjo went on: "The good thing about all the projects so far is that the interests on both sides are satisfied. There is a win-win situation for both parties." But that is not all, to Sebastiaan's way of thinking: "It was an eye opener for us TU Delft people too. Such projects require different dynamics to what we are used to: a mentality of 'cut the crap and get to work'. We had to adapt, but because everything went well, several 'gems' were created in the gaming." Rens took over: "I felt that the mutual cooperation went very well.

ProRail worked really hard to provide our simulations with input and we transformed this into a usable application."

Future?

Development is already continuing. On the simulator side, for example, two PhD candidates, three graduates, programmers and the staff are setting up the technical architecture for the Railway Gaming Suite. "The scientific challenge facing us is to synchronise the various



components of the game timewise and subsequently maintain the synchronicity. In the meantime, we will continue to game ProRail cases," Rens added. There are a lot of problems to be solved on the decision side. According to Sebastiaan: "One important question is how ProRail should formulate questions. On the other hand, we, at TU Delft, have to learn how ProRail projects work as regards decision-making. And the people in the ProRail organisation have to learn how to ask the right question for the best result."

Optimisation by gaming

The Dutch Railways network is a complex infrastructural network which is intensively used. There is little room for expansion, whereas the maximum has almost been reached. An increase in capacity can be achieved by optimisation, but how can it be achieved? ProRail and TU Delft are investigating the extent to which serious gaming can help here, taking account of the human factor.

The TU Delft sections TPM POLG and TPM Systems Engineering are cooperating closely on the Railway Gaming Suite. Since last year, four projects have been virtually tested with a game: the goods marketplace, the A2 corridor, the Vecht Bridge and 'A Train Every Ten Minutes'. ProRail feels that the first findings are promising.

"Gaming can help in complex decision-making, but also in trying out new forms of logistic management in traffic control. Some decisions have, in fact, already been made on the basis of the games. Gaming is extremely useful, particularly in the operational field. Having people simulate reality reveals knowledge that would otherwise remain hidden. Gaming is, therefore, also an attractive training instrument."

The cooperation between ProRail and TU Delft started in 2009 and, in the first instance, will have a duration of 3.5 years.

ALUMNUS CORNÉ VERSTEEGT BUILDS AUTOMATED CONTAINER TERMINAL OF THE FUTURE

“I know a thing or two about building a crane like that”

The view from his workspace on the seventeenth floor of a Rotterdam office building is just as varied as his job at APM Terminals. When Corné Versteegt looks out of his window, the former TPM student and researcher sees a panorama that stretches from Dordrecht on one side to Delft and The Hague on the other. The dynamism inside is equally great.

The TPM degree programme was still in its infancy when Versteegt started on it in 1994. He had been looking for a course with a technical slant, but which also explicitly handled related aspects. “The interdisciplinary combination of fields appealed to me very much.” After graduation, Versteegt opted to carry out PhD research on unmanned transport. In practice, it was surprisingly similar to an ‘ordinary job’ outside the university. “I was simply engaged by companies and authorities and I felt like a sort of academic consultant. Rather than merely doing my work on a businesslike basis with an hourly invoice, however, I focused expressly on the scientific background.”

All over the world

Because he had the good fortune that his research subject was so very popular, Versteegt travelled all over the world on behalf of TPM. “At the time, I concentrated on urban underground distribution systems and how to get supplies into inner cities without old-fashioned lorries and the related traffic jams and impact on the local environment. I looked at the possibilities of a tunnel system with electrical and automatic vehicles. Everyone was interested in the research since cities all over the world have the same traffic problems.” Three years ago, after a few interim moves, Versteegt became

project manager of innovation at APM Terminals, a worldwide group active in container transshipment between different transport modalities. He feels that his doctoral research is really well matched to the project on which he is now working, that is, the construction of a hypermodern terminal on Maasvlakte II. Computers and robots support or take over the tasks of the working man wherever possible.

The reasons for the far-reaching automation are very varied, according to Versteegt. He summed up a few: “Cost savings play a significant role, of course. But we are also obliged to look for alternatives because it is becoming increasingly difficult to find people who want to do this work. It is hard going and can be dangerous. If they also have to commute a long way and work shifts, it gets even more complicated. Continuity is key: it does not matter to a robot whether it works during the day or night. It just goes on.”

Strategic cooperation

The lion’s share of his work consists of consultation, mainly with partners who will be involved in part of the construction at a later date, but also with numerous other parties. “I try to conclude strategic partnerships with our suppliers. Negotiation comes easily to me, partly as a result of my TPM background.



The human and management aspects play a much more crucial role than the technology. I look at all the technical possibilities and the innovative ideas we can apply, together with the company in question. Ideally, there is a continual interaction of ideas.”

But Versteegt issues a warning too: TPM must never neglect the T in its name. “It is vital that it keep this Delft link. It was in Delft that I learned how to calculate the forces on bridges and suchlike. I no longer use this know-how on a daily basis, but if we are talking about how one of those cranes is constructed, I can take part in the discussion.”

International student Hadi Ashgari wins IBM Thesis Prize



MoT Master’s student Hadi Asghari has recently won the prestigious IBM thesis prize with his thesis ‘Botnet Mitigation and the Role of ISPs’, for which he was awarded a mark of 9.5.

The prize, which amounts to 1,500 euro, was presented during the graduation ceremony for MoT (Management of Technology) and EPA (Engineering and Policy Analysis) students. He also received the MoT 2010 academic prize.

Hadi (32) comes from Iran, where he studied Software Engineering. He also ran his own software company there. “However, I often ran into management-related issues for which I really wanted answers. Then friends pointed me in the direction of the TPM MoT study programme. The programme appealed to me immediately: a management course, but especially for engineers. So that is how I got started here three years ago.”

Hadi’s prize-winning thesis is about combating botnets. The term ‘botnet’ is used for a network of computers that are infected with undesirable software (a bot). The computers are under the control of an administrator who uses the group remotely for illegal tasks, such as sending spam e-mails, without the users being aware of it. Botnets form an enormous threat; millions of PCs have already been annexed globally.

In his thesis, Hadi looks for solutions: “We concentrated mainly on determining the extent to which internet providers (ISPs) can be used in fighting botnets, how they differ in their approaches and the reasons for this. We also looked at the consequences of these aspects for the policy to be pursued.

The most significant conclusions were that ISPs can, indeed, play a leading role in tackling botnets. The solution for around 80% of the problems rests with only 200 ISPs. Moreover, automation can help in creating a uniform approach.”

Honoured

According to the juries for both prizes, the thesis stood out in terms of relevance, academic quality, originality and language use. Hadi said that he felt honoured: “It is wonderful recognition of all my work. I would, however, like to emphasize the fact that I would not have achieved this without the help of my supervisors, Prof. Michel van Eeten and Dr Roland Ortt, in particular. They kept me on the right path. I have learned that it is all about cooperation and focus.”

Hadi is now working on his PhD in the Policy, Organisation, Law and Gaming Section. He is continuing his research work on Internet security, concentrating on Dutch Internet providers and economic means (Economics of Information Security). His MoT study is very useful here. “I have learned to tackle a problem from various angles, to work with others and to meet deadlines. These skills have been exceptionally useful.”

In ten years’ time, Hadi hopes to return to Iran with a special mission: “I would like to do what professors here in the Netherlands do: use academic means to advise the government on what is good for citizens. That is my big ideal.”

“Use academic means to advise the government on what is good for citizens. That is my big ideal.”

Scientists

“Ithaca is Gorges!”

Caspar Chorus in Ithaca

“It is freezing cold in Ithaca, USA. In fact it is so cold that Cornell University, which is located there, has issued its students with advice on how to deal with the winter weather. That is, of course, typically American: the university that tells you that you should wear gloves. I really wanted to visit this Ivy League university, although preferably without gloves.”



That is why I went to Cornell's Civil and Environmental Engineering Faculty for a working visit for two months this summer. My American colleagues and I worked together on the development of a quantitative model system that can simulate the market for 'green

car technology'. The idea is that, by using this model, we can arrive at optimally designed government interventions whose objective is to help create a sustainable fleet of vehicles. Governments are stuck on issues such as: 'should we invest as early as possible in the very newest technology, or wait until it is clear what technology has most market potential?' There is also the question of how to intervene in the first place: by subsidising the supply side or by means of tax incentives which increase the demand for 'green' cars?

Model system

My expertise lies in the market demand side, and my American colleagues are specialised in developing optimisation models. We want to combine these two and present a model system that gives a clear image of the subtle dynamics that play a role in this type of assessment.

The summer is the ideal time to visit a university in the USA. That is the time that the staff can work full-time on their research, which leads to great opportunities for truly interesting discussions. Moreover, the concept of working visits is much more common there, so no one is surprised if someone from Delft occupies an office for a couple of months. They appreciate it if you actively approach people to exchange research ideas, and even more so if you give a guest lecture. Half way during the lecture I gave, a cart was pushed into the hall with a big cake with 'Welcome, Caspar!' on it, plus masses of crisps and Coca Cola. That was a bit different than all the bottles of mineral water you see here in the lecture hall benches. In any case, my wife, daughters and I were given a very warm welcome – we rolled from BBQ to 'waffle breakfast'. And the countless gorges with breath-taking waterfalls gave us an unadulterated holiday feeling. As they quite rightly say there: 'Ithaca is Gorges!' In the summer, at least.”

Caspar Chorus (1977) studied Systems Engineering, Policy Analysis and Management at TU Delft (2002) and Econometrics at Erasmus University Rotterdam (propaedeutic, 2000). He obtained his PhD cum laude at TPM for his research on the quantitative modelling of mobility choices. After a two-year stay at Eindhoven University of Technology, he returned to TPM's Transport & Logistics Section in 2008; he is currently working here as an associate professor.



“Working on better mutual understanding”

Jan van den Berg in Yemen

“Internationalisation is an important theme at TU Delft, not only because of its many contacts with the other top universities in the world, but also because of its involvement in development cooperation projects in countries in Africa, South America and the Middle and Far East. CICAT, the central liaison office at TU Delft, helps faculties manage international projects.”



About two years ago I was invited to go to Yemen for a project financed by the Ministry of Development Cooperation and implemented by NUFFIC. The most important objective of the project was to set up Master's programmes in ICT & Management and Engineering & Management. After a great deal

of travelling and consultation with local authorities, companies, ministries, international project employees and representatives of Taiz University of Technology, the first batch of two Master's programmes started in March 2010. It was a tremendous milestone!

Second batch

The second batch began on Saturday 18 September (in Arabic countries the working week runs from Saturday through Wednesday or Thursday). These are the very first two Master's programmes at Taiz University of Technology (until recently it only provided Bachelor's programmes) and they clearly meet a need in the country: After a hesitant marketing campaign, there is now a stampede of applicants...

In addition to providing an elective, as an 'academic team manager' I spend time every week on the further development and rolling out of the Master's programme in ICT & Management. Our creativity and adaptability have been severely tested, and all the more because the cooperation is truly international. Even lecturers from as far away as the Philippines have been recruited to transfer sufficient knowledge and expertise to their Yemenite counterparts in the coming two years. All sorts of cultural and language barriers have to be overcome in the process of course.

That applies to working in Yemen as well. After all, you are a visitor in a country which is very different. Take the street scene for a start. Besides the many markets and continuous traffic chaos, you immediately notice that all Yemenite women wear black on the streets, and visit the university dressed like this as well. The university employees that you meet at Taiz University of Technology have very different ideals than the average western scientist. Furthermore, the security situation is far from optimum: it is inadvisable to just go for a walk through the city on your own... But if you approach things with a flexible attitude, you soon learn how to behave in this totally different environment. You have to if you want to achieve any success here.

The objective of this development cooperation project is to create a sustainable infrastructure, from the technical and organisational points of view, for a Master's degree programme in Yemen. A more general TU Delft objective is that this kind of project contributes to a better mutual understanding between all sorts of people 'throughout the world', even if they have very dissimilar backgrounds, wishes and intentions.”

Jan van den Berg (1951) studied mathematics and physics at TU Delft (mathematics, 1977). He subsequently worked at various institutes of higher education in the Netherlands and in Mozambique as lecturer in mathematics, physics and informatics. In 1989 he was appointed assistant professor and in 2000 associate professor at the Econometric Institute of Erasmus University Rotterdam's Faculty of Economics. He obtained his PhD with his research on an area of artificial intelligence, recurrent neural networks, at this university in 1996. Since then he has been primarily engaged with intelligent data analysis (business intelligence) and information security. In 2006, he became part-time lector in human centred ICT at Rotterdam University and part-time associate professor in ICT at TPM. Prior to this he had been working full time at our faculty since early 1998.

abroad



“Could you just hand in that report yesterday?”

Martin de Jong in Harbin en Shenzhen



“Early in 2005, Hugo Priemus, the Dean of TPM at the time, asked me to look at the ‘Harbin Ice and Snow Sculpture Festival’ to investigate the possibilities for cooperation with

the School of Management at the Harbin Institute of Technology (HIT). Although I have a reputation for being internationally experienced, I had never been to China before, so I was rather nervous when I stepped out of the aircraft. But I was picked up by hospitable employees, many of whom have now become friends.

Since I started work here, we submitted a European proposal (Asialink) for cooperation on TPM education together with various European and Chinese partners which, unfortunately, was rejected. We have, however, succeeded in setting up a double degree programme for the Master’s programme in Engineering and Policy Analysis and have published various joint articles. The most important benefit is perhaps that many employees and some students at our faculty have become much more aware of Chinese policy and politics. Countless people from Delft have already been to Harbin (usually for two weeks) and countless people from Harbin have been to Delft (for several months to a year). I myself have also done pretty well out of the cooperation: I have been part-time professor at HIT since May 2009.

Eco city

I have also been very fortunate in that I am now carrying out contract research on the development of a new eco city for the municipality of Shenzhen from the second HIT campus in Shenzhen. I am working together with Margot Weijnen and other scientists who are acting on behalf of Next Generation Infrastructures. Compared with developments in Europe, we can simply increase everything tenfold in China; everything has to be ten times bigger, ten times faster and ten times more ambitious. “We want to know what the eco city has to look like and how the GNP of Shenzhen can grow even faster than it is already growing within three months!” What do you mean? We have to research it first surely? “Yes, but everything goes fast in China and you European slow coaches will just have to adapt. Only losers take the weekend off!”

Fast, faster, fastest. China seems to give me unbridled energy. Weekends and holidays have become unjustifiable luxuries, but I seem to be able to cope with it all. I am growing in terms of personality ten times faster too. I do not know what all this is doing to my health though.”

Martin de Jong (1970) is associate professor of public administration at TU Delft’s Faculty of TPM and professor of public management at the Harbin Institute of Technology’s School of Management in China. He publishes and teaches in the field of the international comparison of institutes, management and decision-making, investment in infrastructures and eco-city development, particularly in China.

“The TPM approach works - and it works in London too”

Koen van Dam in Londen

“At the moment, London is ‘the place to be’ for me. I have been a guest researcher at the Department of Chemistry at Imperial College (IC) since April 2010. This opportunity was open to me because TPM’s Energy & Industry (E&I) Section, where I am carrying out post-doctoral research, has a Memorandum of Understanding with IC. This cooperation also provides exchange possibilities for PhD students and graduates.



I’m involved in the Energy Systems for Cities project. In a sense, this is a continuation of my research on modelling infrastructures, through which I obtained my PhD in 2009. Then it was all about finding generic elements and a common language between the various disciplines involved

in the infrastructure. A comparable approach has been followed for urban energy systems in London. One of our first experiments was to link the different languages of the disciplines involved together to be able to build a comprehensive database. This is beneficial to everyone, even if only some of the models can be reused.

In the case of energy systems in cities, all sorts of disciplines converge, including electricity, gas, waste flows, water and sewerage. If we can combine models of these areas, we will, in time, be able to make large models with which we can organise cities differently and provide them with energy in different ways. If, for example, we all switched en masse to solar panels, this would have an enormous effect on the infrastructure of cities. But what effects? And furthermore: what policy (TPM!) do we need now to enable the realisation of these plans in the future? A common language between the various disciplines would help here.

Working at IC suits me just fine. What is remarkable is that the approach used here is the same as that at TPM. Here, too, various disciplines, such as philosophy, economics, chemistry, electrical engineering and business, all put their heads together to find solutions for energy systems. It is all very familiar.”

Koen van Dam (1978) studied artificial intelligence at VU University Amsterdam (2002). He spent a year as researcher at Mechanical Engineering at TU Delft. Subsequently, in 2009, he carried out PhD research on modelling infrastructures at E&I (TPM). He is carrying out post-doctoral research at E&I and is currently guest researcher at Imperial College in London.

In short

Dissertations



GEERTJE BEKEBREDE

Experiencing Complexity: A gaming approach for understanding infrastructure systems
24 August 2010, Delft



JOHANNES DE HAAN

Towards Transition Theory, Transitietheorie tegemoet
10 September 2010, Rotterdam

More information:
www.dissertaties.tbm.tudelft.nl

NWO subsidies awarded

NWO has awarded subsidies to the following two TPM-related research projects.

Firstly, *Prof. G.P. van Wee* of the Transport and Logistics Section, VU University Amsterdam, the University of Groningen and TU Delft's OTB Research Institute for Housing, Urban and Mobility Studies have been awarded a grant for their joint research into the feasibility and effects of the transition to electrical transport. The degree to which consumers are willing to switch to electrical transport and how the switch will affect car ownership, car use and therefore the accessibility of the Randstad conurbation are to be investigated. The position of other parties, such as the various authorities, car industry and energy companies will also be studied. One of the questions to be examined is how these parties can be encouraged to work together on the successful introduction of electrical vehicles.

Secondly, *Dr Caspar Chorus* of the Transport and Logistics Section has been awarded a VENI grant for his research into regret minimisation. The occurrence of regret afterwards is often an important motive in the making of choices. This study will convert this human tendency to minimise regret into an econometric model of (mobility) choice behaviour. The model will be used to make predictions about traffic flows and the accessibility of cities.

Inaugural address

Prof. P.T.W. Hudson held his inaugural address 'Safety Science: It's not Rocket Science, it's Much Harder' on Friday 24 September.

Severe accidents, such as the BP catastrophe in the Gulf of Mexico and a great many recent air crashes, continue to take place despite the best efforts of engineers and managers. The ultimate objective of zero accidents remains a difficult target to achieve. We want to understand how accidents occur in order to prevent them in the future. Our thinking processes must no longer concentrate solely on preventing the next accident but also on how we can do dangerous, exciting and profitable things.

Read more on www.tbm.tudelft.nl.

TPM CO-ORGANISER

Major Congress on Sustainable Innovation in Delft

'Sustainable innovation' is a slogan that has caught on. Innovation which is responsible with regard to both environment and society is applicable not only to production processes and consumption patterns, but also, for example, to how we organise our living environment and our higher education. What precisely do we need for this? How far have we come in sustainable innovation? A major international congress to be held in Delft at the end of October will address all these aspects.

"It is a broad topic, but it has a great deal in common with TPM's focus on multi-actor systems", Jaco Quist of the Technology Dynamics and Sustainable Development Section told us. He is the TPM coordinator of the *Knowledge Collaboration & Learning for Sustainable Innovation* congress which will be held in Delft from 25 through 29 October 2010. "You can innovate on all sorts of levels: from a product in a company to the organisation of a social system such as a city or region. The congress will gather new scientific knowledge about sustainability together. Not only are the innovations themselves important, but also their actual application. After all, innovations only yield environmental benefits if they are bought and used. They have to be geared to social needs in order to become part of established consumption patterns. Actors will have to learn to work together in different ways if innovations are to be successfully developed and marketed. We need more knowledge about this – about changes in multi-actor systems as well as product innovation. That is what the congress is about."

Wubbo Ockels, Jacqueline Cramer and experts in the field in question, such as Tim Jackson (who works at Surrey University and is author of 'Prosperity without Growth') and Don Huisingh (who, amongst other activities, works for the *Journal of Cleaner Production*) will open the congress. The three key themes are: (1) sustainable universities and higher education; (2) sustainable innovation and socially responsible business practices; and (3) sustainable consumption and production. The majority of the presentations will be about these three topics. There will



be sessions about design for sustainable behaviour, about transitions in large social systems (such as the transition to electrical mobility or industrial ecological systems), about eco-cities and sustainable business models.

Another important theme of the congress will be sustainable innovation and consumption in developing countries. In this way, congress participants will

not look at innovations exclusively from the western point of view. A congress is being organised in South Africa simultaneously with that in Delft, so that participants from the two venues will be able to hold discussions by means of videoconferencing.

Quist continued: "The programme pays a lot of attention to the TPM side of sustainable innovation: how do you use technical innovations, what is needed to implement them and which actors can best do so? In addition, we want to find out exactly how much is known about sustainable innovations at universities in general, and especially at TU Delft. Finally, we hope to be able to learn from what developing countries are doing in this field."

TPM is organising the congress together with the Faculty of Industrial Design Engineering and two other partners. Quist continued: "In fact, we have merged two congresses into one. TU Delft wanted to host one of the big European sustainability congresses: the ERSCP (*European Roundtable on Sustainable Consumption and Production*) in Delft. In the same period, The Hague University of Applied Sciences was organising a congress, from its new premises next to TPM, on sustainable universities: the EMSU (*Environmental Management for Sustainable Universities*). We are now combining the two events. TNO is also joining in. This means that we will appeal to a larger network of researchers, knowledge users and educational developers. Furthermore, we will be giving cooperation on the Delft campus an enormous boost."

Curius

A new academic year: new first-year students, new expectations and a new board for the Technology, Policy and Management Society 'Curius'. We are delighted - and proud - to announce that the 18th board was installed on 9 September 2010.

Curius' main resolution is to make its mark on the progress of the society and the policy weekend was a good beginning in this respect. One of the most important points in our policy focuses on providing information on education, careers and internships.

In order to realise our aims, we have made a start with the renewal of our website. As well as information on the society itself, our social activities and business-oriented information, all the events we are organising this year will be publicised on the site. The following activities are already online: the first-year students' excursion to Schiphol, parents' day, CaseNight (during which Master's students work the whole day on company cases), the presentation of our yearbook and the P-Co, the biggest party in Delft! All employees and students can also use Curius to share any other information they wish to with our members.



The TB café, which falls under our management, is once again open every Thursday. This is the perfect meeting place for students, lecturers and employees to get to know each other better.

The members of the 18th board are enthusiastically looking forward to this academic year!

President - Koen van Schijndel

Secretary - Clementien Fabels

Treasurer - Rob van Waas

Education & Bachelor's Study Programme Officer - Sebas Greeven

Master's Study Programme & Careers Officer - Lilian Maat

External Relations Officer - Cornelis Eikelboom

Professor profile

NAME

Paulien Herder

POSITION

I am Professor of Engineering Systems Design in Energy & Industry at TPM. I am primarily engaged with the design of large-scale complex systems in which both the technology and the institutional embedding play a role. I am also one of the scientific directors of the international research consortium 'Next Generation Infrastructures', together with my colleagues Margot Weijnen and Ernst ten Heuvelhof."

Tell us about your personal life

"I am married and the mother of three children of five and three years and nine months, respectively. I was born in Delft, and grew up in the beautiful surroundings of Twente and Salland. I came back to Delft when I was eighteen and for several years now we have had the pleasure of living in Delfgauw. This is a neighbourhood with a lot of children and plenty of playmates in the street, like when I was little."

What is your favourite hobby?

"I like scuba diving, squash, reading, puzzles and gaming. Although honesty compels me to say that at the moment, with a young family, I seldom have the chance to spend much time on my 'own' hobbies. We like to take the children to museums and exhibitions, and to enjoy the countryside and Dutch national heritage."

What was the highlight of your career?

"It is perhaps an obvious one, but my appointment as a professor certainly belongs on the list of 'highlights'. There are other moments I will always remember, such as when we were awarded certain big subsidies or commissions. We were, for example, incredibly pleased when we heard the good news about the 20 million euro subsidy for the Next Generation Infrastructures programme, despite tough competition within the context of the Decree on Subsidies for Investments in Knowledge Infrastructure (Bsik)."

What is your greatest challenge at the moment?

"I foresee a significant international role for TPM in the field of problem solving and design on the interface of complex systems engineering and the social sciences. To my way of thinking, TPM's power lies in actually integrating these perspectives without losing sight of the practical applicability. A couple of colleagues and I are currently working on combining these TPM forces in a Delft Center for Complex Systems Design. We have an ambitious target: to capitalise on our scientific and social qualities, and greatly increase our impact and raise our profile in the coming years."

What do you enjoy most about your work?

"Working in an academic environment means that you are almost always working on new things, that you can elaborate on great new ideas and that you have the freedom to work together with

people from all over the world on things that you find inspiring or exciting. I enjoy the little things in an environment like this: a successful article, inspiring lectures and discussions, wonderful graduation projects and interaction with students during lectures and projects."

Why Delft?

"This is the type of research that interests me. I feel that Delft is the best place to be for the design of complex systems and infrastructures if you take both the technical and social complexity seriously, as my TPM colleagues do. And they speak the same language and are very passionate. I also have to admit that I have simply become very attached to the faculty and the city of Delft in the last 15 years."

Your best characteristic?

"I hear from the people around me that I am efficient and result driven. Perhaps it is typical of young mothers, but I enjoy multitasking or keeping several balls in the air at the same time. I am only able to do so because of a flexible home front and I consider myself fortunate in that I have a family that accepts my irregular working hours and the pressures involved."

Your worst characteristic?

Every good characteristic has a flipside...

What subject do you think should be high on the political agenda? Two things really: education and energy. If the Netherlands wants to continue in the 'premier league' of science, we will have to keep paying serious money and attention to education. That applies across the board, from primary to academic education. Now that my oldest son goes to primary school, I keep seeing the impact of our education policy on the early school years and the education of young people. I am not only worried about the much-criticised and often-changing jungle of regulations but also about the lack of diversity amongst teachers.

I mention energy because the Netherlands has to have the nerve to make choices with regard to its sustainable energy policy. The country is not known for its tenacity regarding policy, and, apart from other things, this uncertainty in the market means that investment in sustainable energy is even riskier than it would be otherwise. In my capacity as board member of the Delft Energy Initiative, I am trying to utilise the power TU Delft has in the field of energy research, which covers the entire spectrum from fundamental to policy research, to help remove the uncertainties and increase the sustainability of our society.

Your source of inspiration?

There is no single person or source that inspires me. I draw inspiration from cooperation and surprising new views, beautiful stories and enthusiastic researchers. If I had to name a particularly striking source of inspiration, I would say my sabbaticals at Carnegie Mellon University and at MIT. A change of environment, new researchers and a different academic culture are all very inspiring!

Your life philosophy?

Perhaps I have slightly Calvinistic tendencies, but I will not pretend that that is also my life philosophy. I am probably too pragmatic for that.



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TPM hosts research institute on e-government

The iGov research institute, a summer school for PhD students on the impact of information and communication technology on government organisations and public administration, was held at TPM from 18 - 24 July. "This week has taught me what interdisciplinary research is", one of the participants told us. During the week, participants attended presentations and went on working visits, and then carried out a research project over two days.

The research institute, which was organised for the fourth time this year, is an initiative of the State University of New York's Center for Technology in Government (CTG). Its objective is to build up an international research community around e-government and it is financed by the U.S. National Science Foundation. Anne Fleur van Veenstra and Marijn Janssen of the ICT Section organised the programme, in cooperation with CTG, on behalf of TPM. After the earlier venues - New York, Manchester and Seattle - it was Delft's turn to play host to twenty PhD students of no less than fifteen different nationalities. The group represented various disciplines, including information technology, political science, anthropology and urban development.

A combination of science and practice

The programme included working visits to the Ministry of the Interior and Kingdom Relations, the municipality of The Hague, the Immigration and Naturalisation Service (IND) and the Port of Rotterdam. This gave the PhD students a picture of the challenges

we currently face in developing e-government in the Netherlands. Senior Fellow at CTG Sharon Dawes said: "In Delft and The Hague we had a unique chance to actually see different layers of government at work: local, national and international."

At TPM, presentations were given by Alexander Verbraeck (Systems Engineering), Ibo van de Poel (Philosophy) and Marijn Janssen. The PhD students were, moreover, given two days to carry out project work in groups, with a presentation of the results on the last day. The themes of the group work were based on the experiences of the students during the working visits. "The presentations were of a high level! I never thought that the project groups could do so much work in such a short time," Janssen said.

Interdisciplinary and international

Anne Fleur van Veenstra was a participant last year and the mentor of a project group this year. "It is terrific to see how quickly participants form a group and what they can achieve within just a single week. The programme is a fast track to getting to know electronic government - and each other."

The participants saw the iGov research institute as a way to exchange ideas. "At my university I am the only one working on e-government, so this was the perfect opportunity to get to know others who are also studying this field," Gustav Aagesen, PhD student at the Norwegian University of Science and Technology, pointed out. Marc Hebert, PhD at the University of South Florida was also very positive: "It was an inspiring week full of new insights. I will certainly keep in touch with the other participants!"



For more information:
<http://www.ctg.albany.edu/institute>



are we aware of the fact that this is not completely without risks? Politicians feel that it is important to raise citizens' awareness of the lack of security on the internet. Campaigns such as the Consumers' Organisation's 'Online security' alert citizens to the possible risks of using the internet. But can computer users protect themselves from online risks? We asked Michel van Eeten, a professor in the Policy, Organisation, Law and Gaming Section.

The average computer user can follow a couple of rules of thumb that help against online risks, but that is about it. Technology does not offer much to hold on to either; quite the reverse, in fact. Take, for example, the advice that banks give: internet users should keep an eye on the precise domain name in the browser window, to little padlocks somewhere that may or may not be locked, to addresses that start with "https://", to security certificates when installing software and so on. This advice is well meant but must be improved all the time because online risks are continually changing. You cannot expect users to keep up with

We are doing more and more online, from social networking to internet banking. However,

these developments. Furthermore, and this is rather ironic, it is precisely this advice that is used by hackers to break in. For example, criminals recently managed to steal official electronic security certificates from a number of legitimate companies. As a result, they were able to pass off their malware as genuine software during the installation process. In this case at least, recommending these types of security measures to users thus actually decreases security. Security campaigns try to teach online users how to protect themselves from online risks - that might seem commendable, but actually is not. There are two

reasons for this. Firstly, following security recommendations costs society more than the actual damage suffered as a result of online risks. In this case, the prevention is worse than the cure.

The reason why so much advice is drilled into users is simple - these costs then have to be borne by the user and not by the organisations issuing the advice. Economically speaking, the value of the user's time is estimated at zero. If you were to value that time at the minimum hourly wage, the costs of prevention would be higher than the financial damage prevented. The second reason is that these campaigns secretly communicate something else: that users have to solve this problem themselves. The implicit message is: "You are responsible. We sympathise and we help you by handing out advice, but you have to do it yourself - and face the consequences yourself too."

Sometimes it is more efficient if intermediary organisations bear the risks; they have the expertise to contain the risks. Internet users cannot, for example, always prevent attacks on internet banking. After all, it is banks that benefit the most from internet banking and they should bear the risks. Once that fact has been established, then they can issue advice to users and ask them to take precautions.

TPM's educational programmes

■ **BSc Systems Engineering, Policy Analysis and Management ('Technische Bestuurskunde', TB)** ■ **MSc Systems Engineering, Policy Analysis and Management (SEPAM)** ■ **MSc Management of Technology (MoT)** ■ **MSc Engineering and Policy Analysis (EPA)** ■ **MSc Transport, Infrastructure and Logistics (TIL)** (in cooperation with the Faculty of Civil Engineering & Geosciences and the Faculty of Mechanical, Maritime and Materials Engineering) ■ **MSc Information Architecture (IA)** (in cooperation with the Faculty of Electrical Engineering, Applied Mathematics and Computer Science) ■ **MSc Geomatics** (in cooperation with the Faculty of Civil Engineering & Geosciences and the Faculty of Aerospace Engineering)

Did you thoroughly read the available information and are you considering enrollment in a TPM-programme? Are you not sure your educational background is sufficient? Then please contact one of our study advisors: Drs. Marja Brand ✉ (m.j.c.c.brand@tudelft.nl), Ir. Jeanette Blokland ✉ (a.h.blokland@tudelft.nl) or Drs. Danielle Rietdijk ✉ (d.rietdijk@tudelft.nl).