STRIJP-S

To

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From
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Subject: Web of Light expert meeting summary of results

Introduction

Expert meeting
21st July 2010 a group of 13 lighting, design, technology and social experts attended a BLISS (Better Living in Sustainable Streets) expert meeting in Eindhoven (participants list with bios can be found at the end of this report). The meeting was set-up by the lighting program management team of Strijp-S (Lorna Goulden and Serge van den Berg) to discuss the potential and value of installing a networked and dynamically controllable public (lighting) infrastructure across the entire (public) area of Strijp-S to support both control as well as data monitoring, feedback and display.

Web of Light
This so called 'Web of Light' idea was introduced as having the potential to provide a visual (re)presentation of the real-time behavior of actual lighting installations providing remote feedback on aspects such as light and colour levels and effects, maintenance requirements plus energy consumption and generation (in case of renewable energy). Real-time cause and effect could be remotely and virtually displayed as lighting is dynamically controlled by sms or rfid or automatically through various sensor types in the environment or programming over time.

Why?
The purpose of the meeting was to ask the experts gathered to critically evaluate reasons why such a digitally enabled web of light may or may not be relevant in the Strijp-S context and to identify potential meaningful applications, considering aspects such as: Control, Monitoring and feedback, Interaction and engagement, Co-creation and prototyping Communication and presentation, Education

Setting the context

Public Lighting for Strijp-S – Developing an experience over time
The vision for the public lighting of Strijp-S emphasizes the sustainable application of light to enhance the *experience* of the eventual residents, businesses and visitors in the public space; a public space that will emerge and evolve throughout the phased development of Strijp-S in 2010 to 2020 and beyond.

Dynamic and controllable
This demands an innovative and flexible approach, with dynamic, controllable lighting solutions that can react to changing contexts and varied activities in the space – in contrast to the traditional installation of lampposts to provide a uniform level of functional lighting during pre-set hours of the day.

Test-bed for innovation
A key ambition for Strijp-S is to become a test-bed for experimentation and development leading to the introduction of the most innovative public lighting solutions. All of the public lighting will be provided by energy efficient LED. The vision is that much of this will be dynamic and controllable with each lamp individually addressable through IP (internet protocol) – as one of the enablers for experimentation and iterative development.

Communication and (inter)national recognition
At the heart of most of the activities surrounding Strijp-S is the desire for (inter)national communication and interaction with a wide group of stakeholders including the development of international recognition for the ground-breaking approach and results.

Summary Conclusions: Why have a 'Web of Light'?

1. Test-Bed for public lighting
2. The future public space
3. Engaging the digital natives
4. Design directions clashing and flowing
5. Meaningful applications
6. Picnic 2010 Hot100 briefing

1. Test-bed for public lighting

The 'intelligent city'
One discussion thread focused on the question ''WHY" in relation to the positioning of Strijp-S as a digitally enabled test-bed for public lighting. If you consider that in Asia complete 'intelligent' cities are currently being built from the ground up this raises the question of why go to the trouble of implementing such a digital infrastructure 'on top of' an established city instead of waiting until these new digital cities have been built and inhabited and then learn from their experiences – effectively leapfrogging the innovation process.

Such a leapfrogging strategy was however quickly dismissed as not fitting with the European Union's efforts to devise its own strategy for achieving urban growth in a 'smart' sense for its metropolitan city regions, nor does it fit with the regions 'leading in technology' motto. In addition the cultural and contextual differences – Asia (east) new city, new population vs Europe (west) established architecture, infrastructure, population and heritage – hint that although some generic, functional aspects of an 'intelligent city' may be globally transferable there will be more specific regional aspects that make it entirely relevant to build up local knowledge and insights to enable meaningful innovation.

However, it was also quickly pointed out that the networking, monitoring and innovation of public city lighting is only a small component of the intelligent city concept which is about developing more complete, effective urban spaces, with the monitoring and managing of many environmental issues; creating more secure but also attractive urban spaces and increasing local prosperity and competitiveness. Nevertheless the 'Creating a public lighting experience' project of Strijp-S does provide a *unique* opportunity to zoom in on one key aspect of innovation that can greatly impact the experience of the public space.

Infrastructure to provide quantitative feedback
One conclusion can be drawn is that in order to provide an attractive and effective test-bed for innovation in the public space a wide network of (embedded) sensors is required, one that covers the entire public space that constitutes the 'test-bed'. This network should provide information on specific environmental conditions (light, temperature etc.); the movement of people and vehicles, for example through footfall, or sound sensors as well as the changing conditions and behaviours of the (test) lighting installations in space and over time (eg. energy consumption, location, light colour, brightness level, content etc.). Connection to a data-logging and visualization system will enable ongoing quantitative monitoring and feedback informing on relative patterns of behavior in direct relation to (changing) innovations that are introduced.

Infrastructure to provide qualitative feedback
However, in order to truly facilitate the innovation process, *quantitative* feedback must be reflected with *qualitative* feedback. Not only is it important to know when and how many people moved from one place to another, or how long they lingered in a particular place, it is equally if not more important to have insight into *why* they behaved in a particular way. Why did someone choose to walk on one side of the street? Why did they follow a particular route and how did they feel during their experience of the public space? How did the environmental conditions (and the lighting) influence their actions, their behavior and their emotions?

Challenges and opportunities: Quantitative and qualitative
Enabling and connecting these two inter-related feedback dynamics – quantitative and qualitative – while being an *essential* requirement for an effective test-bed environment also provide a set of interesting challenges. For example, the process of gaining quantitative feedback in the public space touches on issues of privacy and provokes discussion on the level of openness and anonymity that should be provided by such a monitoring system. How can you ensure that such a sensor embedded environment is not perceived as a 'Big-brother' scenario?

The process of gaining qualitative feedback on the other hand can *only* be carried out with the full cooperation and engagement of citizens – making them in effect the most important 'intelligence' of the system. This raises the critical question of how to involve them in ways that are engaging, fluid and mutually beneficial, adding to their Strijp-S experience rather than becoming irritating, time-consuming, or even worse invading their privacy (bearing in mind the varying perspectives on what is private and what is public amongst the citizens of today).

How to develop truly innovate ways of engaging citizens in developing the public space

These challenges can also been seen as presenting an exciting opportunity to develop ground-breaking ways of engaging citizens in such a public test-bed environment. This would most likely require a combination of digital and physical, automatic and guided, interaction and dialogue tools. These will also have to connect appropriately in the context of a wide variety of potential participants; from the digital natives with their blog, twitter, iPod and blackberry interactions through to the much younger or the more mature (and often less digitally inclined) members of the population where more personal dialogue or perhaps playful physical interactions can be applied as methods to elicit qualitative feedback.

Approached in the right way such a comprehensive development could provide the opportunity to develop a deeper understanding of tangible ways to support the development of a ' digital city' into an 'intelligent city' and perhaps even further towards a 'smart city'.

Expert meeting participants expertise relating to this opportunity

Duncan Wilson – application of footfall sensors in public space
Karmen Franinovic – application of sound sensors in public space to monitor crowd movement
Lorna Goulden, Jorien Kemerink and Bram Bos – Interaction design thinking
Jane Hardjono – PR, event and Communication
Ben Schouten – Playful interactions and serious gaming
Francesca Bria – Researching the involvement of people (end users) in innovation processes
Alan Munro – Ethnographic and situationist techniques
Mathias Funk – Tracking and analyzing how complex connected products are used and experienced
Maurits Kreijveld – Investigating wisdom of the crowd and smart cities
Rob van Kranenberg – Author and expert on the Internet of Things and privacy issues
Serge van de Berg – Sustainability and infrastructure

2. The future public space

When considering a potential 'web of light' the discussions touched on the future of the public space. In the Strijp-S book "Creating a public lighting vision" three key needs were specified as a direction for the development of the public lighting and the qualities that should be provided for people:
- Feeling comfortable
- Sense of belonging,
- Enjoying creativity

One group concluded on three key functions of the public space to enable:
- Belonging (space, group)
- Navigation
- Creativity
- Public infrastructure (connecting to smart cities)

Another group concluded that public spaces need to provide the following to people:
- Daily meaningful things
- An invitation for the community to participate
- To be more than just safe

Lighting was seen as being able to facilitate this by, for example:
- Delivering a function that creates a desirable shared space; such as artificial light to cultivate 'midnight farms' to feed and delight people.
- Reminding the community to take responsibility for 'their' public spaces – by having the ability to control usage and (energy) consumption
- Making residents into passionate curators – proud of their city with a sense of identification of space.
- Visually reflecting the creative energy and activity of the environment, (the new 'smoke stacks').

It was also advised that the public space should not become a 'mall'. We were cautioned not to create too 'shiny' a vision of happy collaborating citizens and forget the harsher reality of real people and real (city) life. Vandalism, poverty, drugs and alcohol, social exclusion, crime – don't expect too much from every citizen.

How to engage the disaffected?
This caution presents an interesting challenge, how to engage the disaffected? The public space is often a key staging ground for the expression of social division; with social problems often manifesting themselves first in the public environment – from graffiti to gang behavior and riots. For the groups that 'inhabit' (hang-out) in the public space could enabling a level of control and creativity change the way they view and behave in relation to the public space?

3. Engaging the Digital natives
Another interesting discussion focused on the citizens of the future, the so called 'Digital natives'

> *A digital native is a person whom was born during the existence of digital technology, and, as a result, grown up with and known digital technology such as computers, the Internet, mobile phones and MP3s for all of their lives. (Wikipedia)*

Although again cautioned to remember that not all the citizens will be as digitally enabled as each other, depending as much on the cultural conditions as well as age of birth, but nevertheless this will be a strong component of the future population.
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The question was posed as to whether having a smarter – augmented, connected and open – experience might change the nature of how the public space is perceived and in turn how the public's relationship to that space might evolve. With more engagement would there still be a public space as we know it?

4. Design directions clashing and flowing
Looking further into the detail of how to develop such a 'Web of light', a list of design directions were proposed addressing a range across a scale of **Flow** (where end users are barely aware of the interactions as it seamlessly merges with their daily activities) to **Clash** (where users are perhaps more rudely jolted into awareness by a system that is making them stop, think and react). Three directions were described:
>Consciousness
>Feeling
>Perspective

"As the key balance of a successful integration of daily life and co-curated events is about the openness of the platform and the agency of end-users, it has to become clear for them over time where the 'knobs' are that can be turned, ie what kind of input generates a particular output in light. These should become clear in daily movements and through intuitive ways of moving in the area. Once people have some agency over these 'knobs' they can generate more spectacular effects, from flow to clash.
These become part of the intuitive patterns." (Ron van Kranenburg)

5. Meaningful applications

Energy management, safety and control
Ideas such as the community midnight farm, or the new smoke stacks were matched against the core applications of energy management, safety (both physical and social) and control (and monitoring of infrastructure) presented at the start of the meeting. The latter still maintained their position as the most practical and easier to explain directions, and more likely to be accepted by a wider audience as relevant starting points – they veer towards the functional and therefore less 'glamorous' or inspiring concepts than the community engagement, creation and expression.

Catch 22
The more 'engaging, social and emotional' applications were intuitively seen as having the potential to provide more meaningful value for both individual and community, as is often the case, but the downside is that they are infinitely harder to explain in a way that people fully grasp the value being proposed. As a kind of 'Catch 22' these applications really need to be experienced first-hand before the value can be properly understood.

Start small and open
There was a general consensus of opinion that enabling a 'Web of Light' in the perspective of such a tangible context as Strijp-S and the public lighting, although limited in terms of the 'intelligent city' concept, could still provide an incredible 'real-life' platform from which totally unexpected directions could (and will) emerge. There was a call not to attempt to control everything, but to leave parts open for broader stakeholder creativity and development, in that way it will be more likely to thrive and grow. Although the more inspiring discussions centered on the involvement of the community in the public space, starting small and tangible was also seen as a pragmatic approach. Once an (open) system is in place and practical lessons have been learnt, acceptance will grow enabling more abstract concepts to be added as new contexts arise. The challenge will be to get the first building blocks in place as part of the backbone of the Strijp-S infrastructure. Start small, simple and

functional, and build from there is a strategy worth considering - this will also go a long way to support the challenge of enlisting wider stakeholder acceptance and buy-in.

6. Picnic2010 Hot100 briefing

There is an opportunity to delve deeper into one of the issues discussed in this meeting with a group of creative 'Digital natives' via the Hot100 talent program at the Picnic festival in Amsterdam, September 23rd 2010. www.virtueelplatform.nl/hot100

PICNIC is a unique festival and an inspiring conference complimented by a set of networking events and hands-on technology experiences for top creatives and innovation professionals in business, technology, new media, entertainment, science and the arts.

The PICNIC Academy HOT100 event is organised by the Virtual Platform (the sector institute for E-culture in the Netherlands). It brings together the crème de la crème of the Dutch art academies, universities and universities of applied science in the fields of design, theory, communication or development skills. These talented students will soon be working or have recently started working in the new media sector. During the event the students are given 'real-world' problems to solve creatively in a half day workshop session.

A challenge from the Strijp-S 'Web of Light' concept will be proposed as one of the 'real-world' problems by one of the HOT100 workshop teams. After discussion with Klaas Kuitenbrouwer, one of the organisers of the Hot100 event the challenge of "qualitative feedback", in particular in relation to the experience qualities of: feeling good, sense of belonging and being creative was selected. Below is a short text that will be used to introduce the 'design problem' to the HOT100 creatives.

Problem owner – Rik van Stiphout – Eindhoven City Council
Content Specialist – Lorna Goulden – Creative Supervisor for Light at Strijp-S
Process owner – To be selected from the HOT100 alumni

Eindhoven Strijp-S – a test-bed for creating a public lighting experience

How can we intelligently engage with citizens in the public space in an intuitive and inspiring way? In this workshop you will develop concepts for embedding interfaces in the urban environment, exploring ideas of how to motivate citizens to interact and participate.

Strijp-S, a 66-acre, former industrial site is currently in the preparatory stages of being transformed into an inspiring creative quarter close to the centre of the city of Eindhoven. A fundamental part of this transformation will be the unique way that lighting is applied to influence urban life. It is a logical ambition for the city council that the lighting plans for the area be highly innovative, providing a dynamic, interactive and inspirational experience for inhabitants and visitors alike. Eindhoven-Strijp-S is enabling this by providing a test-bed for urban lighting innovations.

An essential requirement of such a test-bed environment will be the ability to uncover the deeper meaning behind the public's reactions to the innovations and the quality of the experiences they provide. How can design and technology best be employed as a tool to learn about the effect and success of innovations in the urban environment?

Participants

FACILITATOR - Lorna Goulden www.design.philips.com
Lorna Goulden is the lead Creative Director at Philips Design responsible for Product & Service design for the external market. She is the author of the award winning 'Creating a Public Lighting Experience' which outlines an innovative vision for the public lighting of Strijp-S in Eindhoven and is currently the creative supervisor of it's implementation.

After joining Philips Design's in 1994 Lorna has worked with Philips research and business groups in both Europe, Asia and the US on interaction concepts and new product development. In 1999 she set up a design team carrying out early Experience Design research - the foundation of what is widely employed by Philips Design today. More recently she has been directing innovation and strategic design initiatives for a range of external clients as well as Philips Corporate IT Innovation and Strategy. Lorna Goulden trained at Sheffield University in the UK, where she received a first class honors degree in Design and Technology (1992). She completed her postgraduate studies in Interaction Design at the Royal College of Art in London (1994) where she used RFID as part of her investigations to develop more natural relationships between hardware and software interfaces

Serge van den Berg www.hetenergiebureau.nl/
Serge van den Berg graduated from the University of Nijmegen in Environmental sciences (1998), He worked in France (university of Rouen), Cameroun and Holland, mainly in the field of project leading/management with a specialty in joining various cultures and thinking styles in one project. In 2007 he founded HetEnergieBureau B.V. in Eindhoven, consulting on projects and opportunities on sustainable development and energy. He is also working as the program manager for the innovative Strijp-S Lighting project.

Ben Schouten
Ben Schouten graduated from the Rietveld Art Academy in 1983 and worked as a professional artist. He found himself interested in patterns and iconography, and after travelling in the Magreb and studying number theory he rediscovered his fascination for mathematics. He received his master's degree in mathematics, specializing in chaos theory, in August 1995. In 1996 Ben Schouten founded Desk.nl, an 'Application Software Provider', providing innovative internet related solutions to a wide range of customers. Since 2008 he is lector Ambient Intelligence & Design and Serious Game Design at Fontys Hogescholen, Eindhoven. His group focuses on multimodal interaction and ambient game design in intelligent systems.

Rob van Kranenberg www.theinternetofthings.eu/
Rob van Kranenburg wrote 'The Internet of Things' and co-organised the DIFR (a broad range of pro and anti RFID positions) network in the Netherlands. In 2009 he set up Council - Internet of Things think tank.
Rob works one day a week for Professor Ben Schouten at Fontys Ambient Intelligence in Eindhoven as member of the Lectoraat.

"From the workshop it became clear how important it is to know that you are discussing a real location and a real place when debating design principles for smart systems. It immediately becomes clear that the basic challenge is between the performative functions of the platform and the ability of end users to tweak these. Still, this is too abstract. By focusing on one particular source: Light, the different actors and functions become tangible. The multifaceted nature of the location ensures a variety of ordinary daily functions as well as more curated events (festival, creative hub) and as such it is also a case study in how to bring light as a language deeper down into the architecture of designing smart environments. Soft architecture includes all kinds of wireless access, but also the use of sound, smell and light. As such it is not an added value or added layer but a solid building block of smart architecture".

Maurits Kreijveld www.stt.nl/woc
Maurits Kreijveld is carrying out a foresight study on Wisdom of the crowd and the future of decision making at STT, the Dutch Study center and think tank for Technology Trends. In the past years Maurits has worked at the Ministry of Economic Affairs on Innovation policy and the ICT and new media policy. Maurits holds a Master's degree in applied physics. He is particularly fascinated by the interaction between technology and society and how this shapes the future of our society and organisations.

Mathias Funk www.uxsuite.com
Mathias Funk is a PHd student a the University of Technololgy in Eindhoven and the founder of a company UXSuite which is a commercial tool developed to help in tracking and analyzing how complex connected products are used and experienced by diverse users around the globe on a day-to-day basis.

Alan Munro www.munrobius.com
Alan Munro is an consultant researcher studying people, use of new technologies, and interactions through them. His work uses primarily ethnographic methods towards informing design of new technologies, and informing critical reflection on them. He has sometimes been mis-labelled as a philosopher.

Jorien Kemerink www.knol-ontwerp.nl
Jorien Kemerink graduated from Industrial Design at the University of Technology Eindhoven and runs her own design company Knol-ontwerp. She is particularly interested in rich interactions, adaptable living, human perception and "would like to see technology that is subtly woven into our environment, enhancing the experience of being in that space and time. More personal and intuitive."

Jane Hardjono thedossier.nl/
Jane Hardjono is is a freelance writer and editor originally from Australia. She has seven years experience in marketing and advertising in Australia before moving to the Netherlands where she gained teaching, event organising and PR experience. She currently provides communication advice and text to Océ-Technologies BV in Venlo. She is also the creator and editor of The Dossier, a blog that documents the creative and cultural happenings in Eindhoven.

Francesca Bria
Francesca Bria is is currently a PhD Researcher at Imperial College Business School. In her research she's investigating how design-driven methodologies can foster the direct involvement of users and communities in co-designing and co-producing future urban systems and services. She's also looking at the way ubiquitous and pervasive urban technology will impact collaborative creativity and socio-economic practices. Francesca has an Msc in E-business and Innovation from the University College of London, Birkbeck and she is currently working as Tutor in Business Strategy and Organisational Change at Queen Mary University in London. She is political consultant and expert on Innovation policy, Media and the Information Society for the Region of Lazio, the Province of Rome and the European Commission. Francesca has a background working as video journalist, writer, filmmaker and network activist and she's an advocacy adviser on access to knowledge and collaborative production in the digital economy.

Karmen Franinovic http://iad.zhdk.ch/en/people/karmen-franinovic   www.zero-th.org/ProjectsKarmen.html
Karmen Franinovic is an interaction designer and architect working with social and phenomenological aspects of interactive technologies. At Zurich University of Arts, she leads BA interaction design program, supervises MA students and conducts research in the area of sonic and tangible interaction design.

Bram Bos www.design.philips.com
Bram Bos is an interation designer in the Lighting group at Philips Design involved in the design of many different types of interaction with lighting products and systems from outdoor to indoor, consumer to professional.

Duncan Wilson www.arup.com
Duncan Wilson is an Associate Director at Arup in London and is responsible for researching medium and long term futures with a focus on social and technology factors. He develops foresight and innovation capability within Arup, co-created the Drivers of Change concept (http://www.driversofchange.com) and has a personal research focus on ubiquitous computing in the built environment (http://blogs.driversofchange.com/emtech/). His EU and nationally funded research merges interests in sensing and monitoring and creating interactive, ambient displays that solicit and feedback information with the intent of influencing behaviour. Duncan is a Chartered Engineer (IET), has a PhD from University College London in Artificial Intelligence and Machine Vision and comments on work at http://twitter.com/djdunc

"The most important aspect of the Web of Light workshop for me was the focus on the motivation for installing any of the multitude of technology wizardry available. The question "Why?" took us beyond the functional aspects of safety and security or the aesthetic art installations, and forced us to think about the different

community perspectives that "public light" could play in creating stimulating urban environments. The discussions through the day meandered between different ideas but the three themes we presented at the end encapsulate the major themes of: creating interventions to encourage the digital natives to interact in public spaces (a positive take on hanging around on street corners); encouraging community interaction through creating desirable shared public spaces (a midnight urban farm was proposed as a vehicle for productive light and a beacon(s) of activity); and the idea of displaying the inputs and outputs of the creative community at Strijp S (the new smoke stacks)"