Get Around

Personal Travel Assistant

Waag Society

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get around

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Preface & Acknowledgments

When I started looking for a graduation project, there were a few aspects I wanted to be part of my project. I wanted to create a fun mobile outdoor experience as well as I wanted to do something with sustainability. The idea of a carpool and hitch-hikers platform was something that is on my mind for a long time. I feel there is a lot of space for innovation in this area. The majority of the cars in traffic jams have about 4 empty seats each. With all the current technology in our pockets, there should be a way to make this system of private transportation more efficient, social, sustainable and affordable.

Instead of this, I found something as exciting and relevant in the *Personal Travel Assistant* project at Waag Society in Amsterdam. I came to this project by explaining **Marjolijn Bloemmen** - the **sustainability manager** of Waag Society - what you just read above, and she told me, I got the perfect project for you! And that is how it get started.

I had some experience with interface design from prior projects, but the mobile platform was a new world for me. I had no idea how far I would get in the design of this application and what I could come up with in this limited time frame of 5 to 6 months. I just knew the Waag had a deal with the city of Amsterdam to build a prototype and do testing with real-time data. This context of being involved in an ongoing project and getting the trust and responsibility to do the interaction design was a nice opportunity and a big challenge I was glad to take.

During the conceptualisation phase I could do some work I feel familiar with from learnings at the university, like analysis, creating my vision on the project, conceptualisation, building personas and scenario's, etc. The hardest part started when I had to translate these ideas into a design of a mobile application. Not just as a vague idea how it could look like, but a fully thought through and logically build up interaction design.

I got the luck to be coached by **Joes Koppers**, an experienced and talented **interaction designer** who guided me in this process of familiarising with the world and art of mobile application design. He has experience in the very specific field I had to deal with in this project, what was very valuable because it helped me to create an understanding and vision on how things could and should be done in order to create a nice mobile user experience.
A keystone during my project was when had the chance to work together with **Erik Nap** on the **graphic design**. Erik translated some of my designs into a graphical style more in line with current applications. He also designed the icons for the different means of transportation. From that moment on I continued with inspiration I got from his work. I used the colours magenta and cyan he used in his proposal throughout the whole application and used it as a powerful visual communication tool.

Because a working prototype was one of the objectives, I worked together with **Edwin van Ouwerkerk Moria**, who is the **mobile developer** of Waag Society and responsible for building the prototype. It gave me the chance to learn about working together with programmers and how to communicate ideas and interaction flows. In June we had a working prototype for *planning* and *viewing a trip*. The small scale user test done with the prototype gave me a lot of insights in how to improve my design. I organised this test together with **Sander Hooreman**, **user researcher** at Waag.

After that I continued the design and added some ideas from the concept phase to the design. Because a lot of them are not that easy to develop right away in a working prototype - and because of limited time availability of Edwin in this stage - I decided to build a demo in Adobe Flash, a software program I never used before. I really wanted to get my design interactive, so I could get the look and feel about how to navigate the app, and not just a document showing all the screenshots. It is almost impossible to assess an application based on a set of screenshots. With some help of **Laurens Schuurkamp** and **Jonah Model**, two of my colleagues at Waag, I could get started very quickly and smoothly with **Flash**. From this moment on I felt the power of designing and prototyping parallel at the same time. When I designed a feature, I could put it in the demo straight away and try out the interactions and improve them along the way.

Furthermore I would like to thank **Tom Demeyer** - my **company mentor** and **technology manager** at Waag - and **Paulien Melis** - the **project leader** - for giving me this opportunity and supporting me all the way.

And last but not least thanks to **Walter Aprile** - my **chair** - and **Frans Van Mourik** - my **mentor** - for coaching me from the side of the **Delft University of Technology** and providing me with useful feedback and insights.

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The introduction starts with the project background. Where does the initiative comes from and what is the role of Waag Society and myself? This is followed by a brief overview of the process and the major drivers for this project. What are the end goals and how can they be achieved?

Introduction

Introduction

Project Background

CONNECTED URBANDEVELOPMENT

Gemeente Amsterdam

Waag Society

The PTA project is part of a bigger program called 'Connected Urban Development'. This program is an initiative of Cisco Internet Business Solutions Group (CIBSG) and the cities of Amsterdam, San Francisco and Seoul. The mission of the program is to demonstrate how to reduce carbon emissions by introducing fundamental improvements in the efficiency of the urban infrastructure through information and communications technology.

For the development of the Dutch version of the PTA, the City of Amsterdam works together with several parties including Waag Society, Vialis, Govi and 9292ov.

Waag Society is responsible for the concept development, user interaction and interface design, Vialis for the PTA-server that communicates with the raw data coming from Govi (gps positions of vehicles and stations) and the route planner of 9292ov (creating door-to-door travel advises).

In 2008, Waag Society made a movie with their vision on the PTA, to demonstrate what the role of such a system could mean for Amsterdam and citizens of the Netherlands. In January 2009 they were entering the next phase of the project, in which they needed an interaction designer to develop the concept and user interface of the PTA. This report contains the results of this task, which I conducted during my graduation project at Waag Society in Amsterdam.

SAN FRANCISCO Smart Mobility and Eco-footprint Monitoring

SEOUL Connected and Sustainable Mobility Solutions

AMSTERDAM Connected and Sustainable Work and Living Solutions

Process

By joining an ongoing project, some of the work I would normally start with was already done. Nevertheless I examined it carefully and created my own vision on the project, which I shared with the different stakeholders in the project. Because I was new, I had a fresh look on the problem and challenged the people around me to think a bit further, by inspiring them with a set of idea charts and personas. This was part of my exploration in which I created a bigger future context, for what the prototype Waag Society was assigned to develop is just a starting point. After two months of development of the first version of the application, a user test was conducted and evaluated, followed by the second design cycle, in which the most promising ideas of the exploration phase were implemented in a second version.

List of requirements

At the moment I started my graduation, there was a list of requirements that came out of a few workshops in which was brainstormed to create an idea of what functionality should be part of the pre-alpha and alpha prototypes and which ones are interesting for later stages (nice to haves).

Project deliverables

For the development of a pre-alpha prototype, Waag Society had an agreement with the City of Amsterdam, with a user-test planned in May-June. This meant that I had to work pragmatically in order to have an application ready for testing after 2 to 3 months. Because of this fact, I decided to work with a two loop design cycle, in which the first loop is the design of the pre-alpha application and the second loop the design of the alpha version, including more ideas of the exploration phase.

Exploration (one month)

Given the deliverable mentioned above, together with the fact that there is a concrete problem description (list of requirements), made that the analysis was more focussed on exploring what more is possible in this connected world (of what the PTA is one solution), and how it can redefine our everyday life.

The list of requirements was an interesting starting point, as it gave a lot of insights in the expected product and its functionalities, but is was also limited to the specific tasks that were part of the workshops. Before starting the design phase, I wanted to open up this list by adding some challenging ideas that would be interesting in a future world where PTAs are part of people's everyday life. These ideas are collected in the section 'idea charts'.

I also decided to design a set of personas, since I believed the PTA should serve all citizens of the Netherlands, and not just a specific target group. This in contrast to the movie developed by Waag Society, that was mainly focussing on the professional user.

Design of pre-alpha (two months)

The process to come to the pre-alpha existed of a lot of trail and error. Although the functionality was known, it is quite a puzzle to build the interface for such a complex product. The main focus point was clearness and simplicity: only showing the information a person needs on a specific moment in the trip, and that presented in the most understandable way. This because there is to expect a chaos of impulses that will interfere a person`s attention when making use of the PTA.

At the end of the phase, an interaction flowchart has been build describing the architecture laying behind the interface (which buttons lead to which screens). The design of the interface together with the flowchart served as input for the development of a working prototype on the Google Android Mobile Operating System, programmed by Edwin, the Waag Society mobile developer.

User-test & evaluation

A small user test has been conducted with 4 participants. The observation were translated into suggestions for redesign of the pre-alpha and as starting point for elaboration to the alpha version.

Design of alpha (one month)

Since I only designed the *agenda*, the *planning* and *viewing of the trip* during the pre-alpha phase, all the other essential features and nice-to-haves needed to be implemented in the alpha phase. These features were not defined yet, but could easily be distracted from the scenarios and idea charts. Yet it was important only to implement the most promising ideas.

Next to the development of these features, a flash prototype has been made to be able to experience the interactions and evaluate the final design.

Introduction

Project Drivers

The bigger goal connected to the PTA is increasing the share of public transport, resulting in a reduction of carbon emissions. The means is offering citizens a service what makes them feel as being in control over the situation when traveling from A to B, using public transportation. This isn't necessarily real control, but it is the feeling that is important. This is similar to what people have when using an in-car navigation system. Knowing how to get to your destination and at what time you can expect to arrive is essential in achieving this feeling of control.

Transparency

When people feel in control in the car and on public transport, both ways of traveling can get more competitive. Having insights in how the options relate to each other on travel time, price and carbon emissions could help in making the appropriate choice. What element people find most important on what moment, is something very personal. Only focussing on one of them would not make it transparent and therefore less attractive for certain people.

Carbon Emission Reduction

The element green in certainly an important part of the design, but that doesn`t mean it has to be prominently present inside the product`s interface. When a person chooses to use public transportation and leave the car at home, that means a contribution to the end goal of reducing carbon emissions, independent whether this is considered as important by the user.

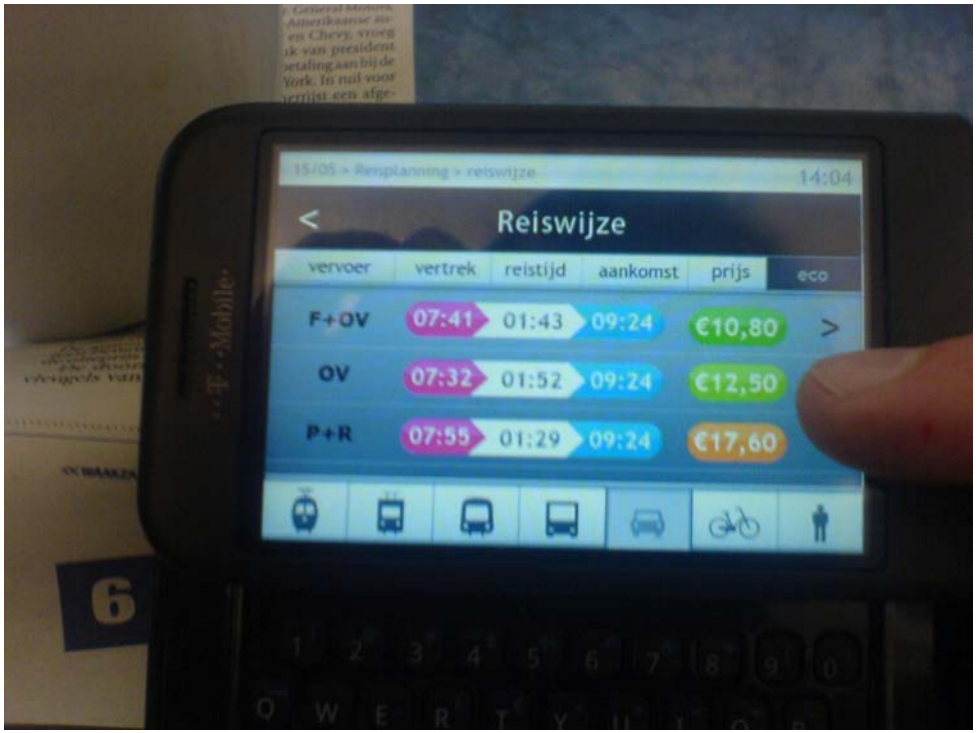
When focussing on green in the design, it can be seen as confirming an environmentally conscious person he is on the good way or telling somebody who doesn`t care that he/she is 'a bad person'. Because the last group is so important when you really want to have impact, it must be sure not to lose them on this issue. Like an expert doesn't have to shout he is one, a green product doesn't need to neither. It is preferable to be subtle in communicating the green character rather than risking a 'tree-hugger'-image.

Route Planner

The planning of the route is essential in the sense that it is the moment a person decides to use one means of transportation instead of the other one. It should go as quick and smooth as it takes someone to check his/her agenda to pick a date when making an appointment. If a person can calculate the travel time and cost to the place of the activity at that very moment, it can become part of the decision making process about where and when to meet. By adding the travel time to appointments in the agenda, one has the possibility to plan his/her days more efficiently. Insights in the cost can help to keep expenses under control.

Way Finding

This part of the PTA should lead a person carefree from any place to any place in the Netherlands, making sure he/she always has all information about the best ways of traveling within hand reach. When a person gets to trust the PTA in this and get rid of anxiety towards public transportation, he/she can be more relaxed and focus on



other things that are important. Where finding the way and paying attention to the traffic both make use of the attention of a person when driving a car, finding out where to take which vehicle at what moment and getting to that vehicle do the same with public transport. The PTA should make way finding and information access so easy, that the user is left with more attention he/she can use to actually catch the vehicle.

Real-time

An important difference with regular route planners is that the PTA makes use of real-time information about the public transportation vehicles. This makes sure people will always have access to the exact time a vehicle will pass a certain stop or station. It will also alert when a problem occurs and offer the best alternatives available. By making the user prepared for anything that can go wrong, this is also an eliminator for an important cause of anxiety people have towards public transport.

Change of Attitude

If the PTA can change a person's attitude towards public transport and take away some of the causes of negative feelings, it could make it more attractive resulting in an increase of the number of public transport users and the frequency they make use of it.

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The analysis chapter starts with some trends of how people are getting around these days. Next to the usual car versus public transport, what other ways do people find to get to their destinations? After that the chapter continues with an overview of the upcoming mobile application in the field of transportation and way finding (from what many saw their first light during this project).

Analysis

Trends

Cars as societal problem

In the Netherlands alone, people drive about 95 billion kilometers in person cars per year, from what one third is for social-recreational purposes and one third home-work transportation. The last third is divided among business traffic, shopping, services/personal care and education/training. (Schroten, 2007) So even if only 1% of the car users would choose for public transport in one on ten trips, it would already mean a reduction of 100 million kilometers per year. Or in words of the NS: "if 1 on 10 car users would change to train transport, it would reduce more CO2 emissions than changing all glowlights by energy saving lights in the Netherlands."

Taxes

The government is investigating and investing in ways to get people out of the car in order to reduce the economic and environmental downside of traffic congestions on dutch roads. An effective way is by 'forcing' people via taxes.

some examples:

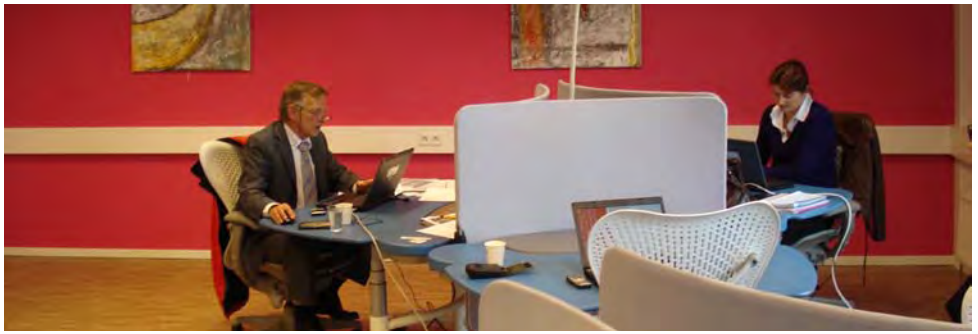
- Tax-advantages for carpooling
- Tax advantages for public transport
- Tax advantages for 'green' cars
- Extra taxes per driven kilometer
- Etc.

Smart Work Centers

Smart work centers (SWC) are office facilities close to living neighbourhoods, where companies can rent office space for their employees to use, close to their homes. In this way employees don't have to travel to their office everyday and it can save time and money both for the company as the employee, as well as it takes more cars from the roads, leading to fewer traffic congestions.

Mobility Management

An increasing amount of companies are dealing with the issue of carbon emission reduction – in the scope of corporate social responsibility – by offering their employees a travel-budget and travel-card. The travel-budget is the amount of money the employee can spend on transportation. The travel-card provides the employee with easy access to all types of transportation (including train, tram, bus, pool-car, taxi, OV-bike, etc.), next to the ability to tank gasoline. It is expected that in this way, employees with fuel-intensive cars will be motivated to make more use of public transport, or to buy a more fuel-efficient car. The pool-car system makes sure the employees have always access to a car for business purposes, so they can still get to places that are hard-to-reach with public transport.



The Pool Car

There are currently about 60.000 people sharing cars in The Netherlands, from which about half of them arrange it themselves with friends or neighbours. The other half makes use of commercial services like Greenwheels, ConnectCar or Wheels4all. With 80% of the market, Greenwheels is far most the biggest share-care provider in The Netherlands. It is a fast-growing market that increases with about 40-60% per year. People start to see the advantages of not owning a car and are prepared to give up their private car for a shared car. High fuel-costs and regulation from the government are the most important drivers. A research conducted by the TU Delft, indicates that people who change their private car for a shared car, drive 72% less kilometers. (van Dongen, 2008)

Greenwheels

Greenwheels offers car-share services in The Netherlands. Since 2008, there are more than 1000 spots (with one or more cars) divided over 60 cities. The places of the cars are indicated by the address of the nearest building. There are also cars available at most of the NS stations in these cities, to offer an interesting combination with the use of public transport. Dependent on where the new subscribers are located, Greenwheels will make more cars available on the most appropriate locations (demand-driven). There is about 1 car every 15 members.

Zipcar - Wheels when you need them

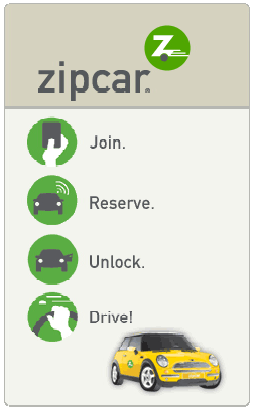
Zipcar offers share-cars for about a quarter of a million people in U.S. and U.K. and expects to double it within the next 3 years. They plan to expand in Europe and will focus on highly populated urban areas with high parking-cost, good public-transport system and high living-costs. They want to be successful in at least a dozen of European cities within the next 3-5 years. (van Dongen, 2008)

Experiences of users

If you browse around on forums, you'll see that availability and cost are the most important influencing aspects for people when considering subscribing. Using these services seems to be valuable for short drives and non-intensive use. If you want to drive more often or longer distances, a cheap private car could be more economical. There are two major disadvantages. Firstly, the price counts per km and per quarter of an hour, what feels like driving a taxi. Secondly, you can only park your car where you picked it up. So going for a visit will be expensive if the car is standing unused all the time (like if taxi is waiting for you). Zipcar dealt with this problem by offering the first 180 miles for free.

The Marketplace

Greenwheels increases it prices regularly, what makes it for many people unattractive. Competition is needed in order to make the user profit from the advantages a car sharing service has to offer. For people living in big cities – who would need to pay a lot of parking cost for their private car - it is attractive. But for people that want to drive longer distances once in a while, it is still quite expensive, sometimes even more than owning a cheap car. It would be positive for the dutch citizens if Zipcar would offer it services in The Netherlands. Some healthy competition could bring the prices down and lead to a high velocity in the growth and attractiveness of the service, leading to more people that give up on their private cars and a decrease of CO_2 emissions and traffic congestion.



Ride Sharing

Vanpool

Vanpool is an initiative from verkeer-advies, Connexxion and Rijkswaterstaat. People can rent luxury vans to drive from home to work with 3 to 6 passengers, for the price of a 2nd class train ticket. They have the privilege to make use of the escape- and bus-lanes. In this way they can avoid traffic jams and win time. There are currently about 60 vans in use, mainly in the area in the north of Amsterdam. The Vanpool concepts originates from a California based enterprise Rent-A-Car, which have a division called Enterprise Rideshare.

Westpoort busses

Westpoort Bus is a bus-service between the train-station of Amsterdam Sloterdijk and 20 companies in the surroundings. These bus lines are meant to overcome problems of mobility due to a lack of public transportation lines. Companies can demand a bus line that will drive their employees between the office building and the train station. It is a kind of privately organised public transport system. The more companies that will demand for the service, the more busses and routes will be introduced into the system.

Carpool Communities

On websites like Carpooldate or Carpoolplein, people can become member and search for people in their surroundings they can share their rides with. Next to information about your location and route, there is also place for presenting your personal interest and occupations, so you get an idea of the person you will 'date' with. This kind of service is independent from your employer and the initiative comes from the users themselves.

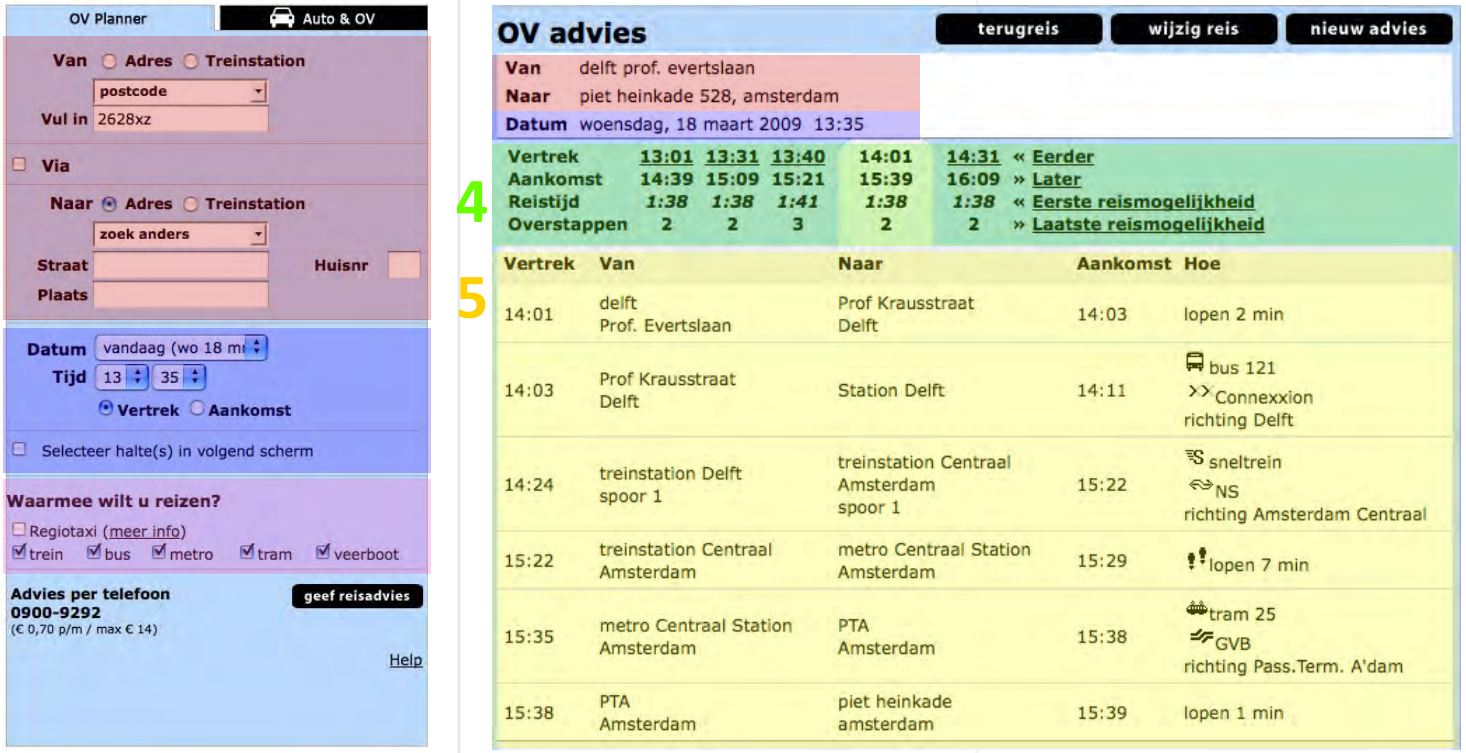
Design Precedents

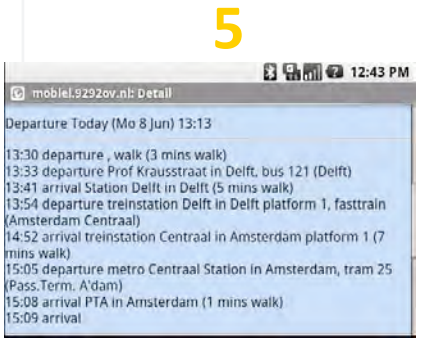
9292ov

9292ov is the most complete dutch route planner for public transport. It generates a plan from door-to-door, getting its information from the different public transport providers. The service started as a call-service, but is already more than 10 years a free internet service. Because planning of the route is an essential part of the PTA (and the static information for the PTA will be provided by 9292) it is important to examine the type of information they can deliver and how they integrate it into an application.

Information Input

Alternatives





1 Location of departure and arrival.
The user can type an address or train station as well as choose from a list of categories (university, museum, beach, etc.) This categories are only available on the website, not on the phone application.

2. Time and date of departure or arrival

3. Transport modalities

4. Options
The list shows the times of arrival and departure, total travel time and number of connections

5. Route Details

Design Precedents

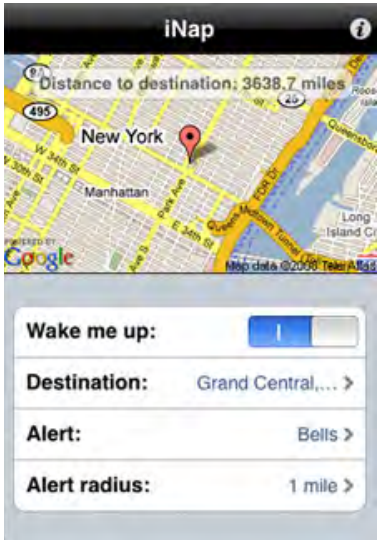
Trein & iNap

Trein is the first widely adopted route-planner iPhone app in The Netherlands. The designer uses the information from the website of the NS. It raised some questions about the legal aspects since he used it without agreement of the NS, who wasn't happy with Trein being on the market before they could offer one themselves.

The app is straight forward and easy to use. It is a well done job, but like many apps these days, this is achieved by focussing on just one function. In order to offer extra functionality, the app can communicate with another app focussing on that other feature. In this case, Trein has the icon of iNap in its under-right corner. In this way, the **iNap** app will alert you when you are in a certain radius of your destination. It is a nice idea because they make publicity for each others apps, but you can doubt if this approach of developing every feature in a different app, with a different lay-out and interaction flow is very user friendly. Especially when you know that the iPhone can't run multiple apps simultaneously.

Publish and learn

Being the first to release an app with a unique functionality seams to be more important (in terms of profit perspective) than spending time on creating an integrated app combining the different user needs. Still it is a nice way because by gaining money on a relatively simple product, the developers can spend more time and money on creating newer and better products. Having feedback on the earlier design is probably more useful than user research, because it is widely used in real life situations and you earn money instead of costing you money.



NS Reisplanner Xra

NS Reisplanner Xtra is an application developed for regular mobile phones (without touch screen) and is the official mobile route planner from the NS (freely available on NS.nl). It claims to be a 'context aware' product, with what they refer to the possibility to use your current location and let other people 'follow you'. Next to data about trains, it also asks for your home and favourite locations as well as if you use a bike or not, to optimise its advise. Last but not least it has the possibility for 'safeguarding' your route, meaning you will get a notification when a problem occurs causing delay in your scheduled journey.

Design

In contrast to the iPhone applications, this one uses very hard colours. The complete screen is filled with the colours of the NS. It works for communicating it is an NS application, but it is graphically not the most attractive choice.

Functionality

The context aware functions like safeguarding and follow-me, all work with sms-notification for what the user has to pay per received message. It is a way to make money with the application, but it makes that these context aware functions are only for real dedicated users. The question is how many people will be willing to pay for this extra service.

Design Precedents

Infomaps

Infomaps is an application for public transport in the city of Amsterdam for the iPhone. It is developed by an independent designer, without the support of the public transport companies. The application has all the schedules of the different transport modalities and let you navigate through it. Differently from 9292ov, it doesn't let you plan a route from A to B. So it is more an interactive map rather than a route planner. The application has all the gps position of the different stops, so it can show the closest stop to your 'current position'.

Design

On first sight, the application looks graphically very attractive and professional. The infographic of Amsterdam is represented by half circles, what works well with the plan of Amsterdam. After browsing around in the application, it seems the map is the most powerful element of the product. The rest of the interaction design is rather basic and not well though out. An example is the home-sreen of the application.

Functionality

The application has a lot of information about different sights and monuments. This probably with a focus on the thousands of tourist with an iPhone that visit Amsterdam every year.

made for iPhone
and iPod touch

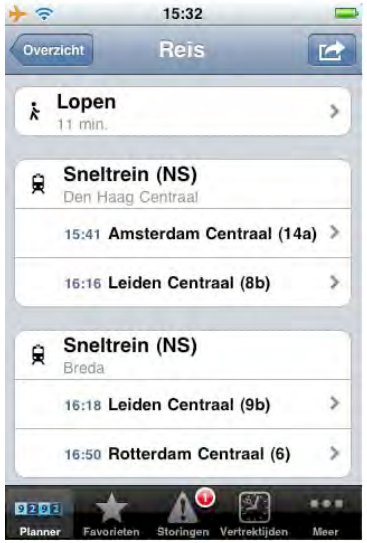
$ 2,99

9292ov on iPhone

The iPhone app from 9292ov, which came out in August 2009, is a big improvement in interface design for the company. It looks a lot like the app 'Trein', but that can have two reasons. One is that they examined train and copied a part of their interaction flow. The other is that for building iPhone apps, Apple offers a kind of toolbox with interface elements the developer can use. Probably a bit of both has its truth, but still it is a good job for a company that is known for its poor interface design.

Because it is currently the only app available that creates travel advises for all types of transportation and 9292ov is the only one with most recent, and soon real-time data, it will probably become the most used app available.

The app has the possibility to save routes, journeys and locations (a journey is a route with a preset time). It also lets you pin point your location on the map while defining your position. In this way you can fasten the process of the gps.



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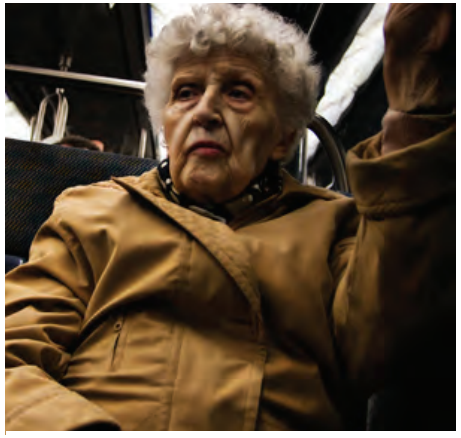
Personas are fictitious characters created to represent the different user groups within a targeted demographic that might use a product. Personas are useful in considering the goals, desires, and limitations of the real user group in order to help to guide decisions about a product, such as features, interactions, and visual design. (Wikipedia, 2008)

Personas

Personas

Maria, a 75 year old widow trying to stay active



Maria always used a car to transport herself. Because of the death of her husband and her bad eyesight, she decided to give up her car and change to public transport. She was motivated to do so since she recently obtained a free seniors public transport card from the local government. But is not as easy as she thought.

"I live in a calm neighbourhood and the bus doesn't pass here so often. When it does, it is so busy that I have to stand up sometimes, what really tires me. Youngsters don't stand up so often to give me their seat, and I don't like to ask for it because they can be very rude. Some busses do have priority seats, that can be very useful"

I'm also afraid to fall; the bus drivers are real cowboys and drive like crazy."

"The busses are high, what makes it difficult to enter. And you have to be fast as well, because the doors can close before you entered well. I've been stuck between the doors once. It really hurt my back."

"I don't like to change between busses and trains. It costs me a lot of energy. I rather travel a bit longer if I can stay relaxed on my seat."

I sometimes use the bus to go to the supermarket, but I have to walk a lot and can't buy so much, because I can only lift a few kilo's.
I prefer to drive together with my neighbour Carl, who sometimes calls me to ask if I want to drive along. But Carl is a busy man. Unfortunately I don't know more gentlemen like him.

If I want to go on a day trip, I don't really plan it, I just choose where to go, alone or with friends. I care more about being back before dark and not getting lost. If I don't know what to do, I'll look for someone friendly and ask for help.

Jack, a 52 year old salesman looking for a breath

Jack lives in a big city and has all the public transport facilities he needs to go from home to work. But when he has a meeting with a client, he often needs a car. His company offered him a chip-card to use company share-cars parked on several spots around the block. In this way, he doesn't need an own car anymore and saves a lot of money on parking fees, taxes and insurance.

In my profession, planning and punctuality are very important. I can't afford to be late on a clients meeting. Sometimes hundreds of thousands of euros are at stake. Since I have a very busy agenda, I let my secretary calculate the traveling times I need to make, and how to transport myself. It is always a risk to get stuck in traffic, so I need to leave in time. But when I calculate too much extra time, it is a waste of valuable time, and time is money, a lot of money!

Sometimes the distance between me and my clients place is too far for both of us to meet without losing a lot of time. In this cases, we will meet in an office that is somewhere in between our both locations. My company is setting up Flexworkplaces at different cities among the country, where we can easily book a room for working or meetings. In this way, if it is planned well, I can meet more clients a week than I was used to. But this planning is a big challenge. Meeting different people, with different agendas, coming from different places is a complex occupation.

When I am in an unexpected situation or I need to make adjustments in my schedule, it costs me a lot of time for calling around and rescheduling the original plans. In this way, it is hard to be flexible. While that is exactly what I would like to have sometimes, flexibility.

The chance to stay a bit longer at one client's place, if I know it doesn't matter for the other one to be 30 minutes late for example, would be very useful. Having insights in how tight the schedules of other people are and if they can usefully spend their 'waiting time' or not, would be worth a lot to me.

Personas

Stephanie, a 24 year old colourful psychology student

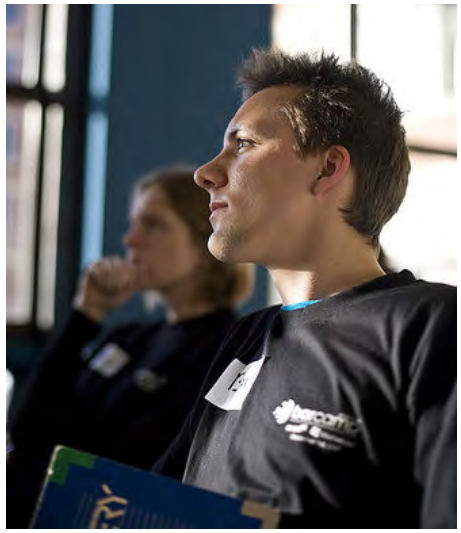
Stephanie is a real passionate student. She is enjoying her time as a student, and likes to make people happy with her infinite optimism and energy. She is a good friend and listener. She likes to get to know the real stories from people, not just superficial chitchatting. She and her friends are very impulsive and spontaneous. Going to a party, on holiday and exploring unknown places gives her the feeling of being a happy and free human being.

I live in a student house, have a bike and a public transport discount card, which I can use after 9AM. I know we students are lucky to have so much free time and possibilities. I mean, when you work, you have a fixed schedule everyday, and only a limited amount of holidays. Now it is the moment to enjoy life. I am in The Netherlands for an internship, and hang out with a nice bunch of international student. We agreed that we want to discover the country, and not sit on our lazy asses every day. If somebody has a suggestion, he looks for the details on the web and mails it to all of us. We always meet about 15 minutes before on the train station. To some of the Spanish guys we sometimes say that we meet earlier, because they're always late. Often, we are not that well prepared like the real tourists. We just go to a place that sounds nice, but we don't know everything that is worth a visit for example. We just walk around, pass some bars, and enter an exhibition or museum when we feel like. Sometimes we split up if we have different interests. But it is hard to find each other back if we don't make clear agreements beforehand.

Unfortunately we don't always have a map with us and we lose a lot of time walking into areas that are not that interesting to see. And then there is always discussion about wether to continue or return. If we can't get out of it, the one that planned the trip makes the decision. Just a little rule to make it easier.

When I want to go out on a regular evening, I never know what my friends are up to. Wether they are going to a bar or feel like staying home. Calling all of them is a bit too much, it costs me a lot of money with my prepaid card. If people would just indicate on facebook or something what they're up to, I would be able to decide on the last moment to take my bike and go for one or two beers. But now I keep it to the regular party on Wednesday night at a nice bar in the centre, where we always meet.

Michael, a 30 year old entrepreneur with a voice



Michael is the example of the ambitious young entrepreneur of the 21st century. Next to his activities as designer, web developer and business strategy consultant, he is an active blogging journalist. His opinions on design and business are read by hundreds of people. He is an active networker, present at any design event and is a inspiration to many. For his activities, he has a busy agenda. Michael knows he can make a difference, and never gets arrogant.

I live in a small town, and mainly travel by public transport, although I own a little car myself. In my car I have a navigation system. When I go by public transport, I look for my route on the web, via my iPhone. Route planners and Google Maps are great tools, but it's not as easy as my Tomtom.

Because of my activities as a blogging journalist, I am invited on events, and I give my critic view on everything that's going on. Here for I have to travel around the country. I use Linked-In, Facebook, Twitter, Flickr, etc. to create a network and spread my word. When I join events, I do real-live blogging and twittering. Before a keynote is over, you can already find my review on my blog. By using Twitter, I can find out what others are thinking about the presentation, what gives me the ability to write on behalf on more than just myself.

Sometimes I regret that I only talk to some of my favourite contacts on these events. I spend hours a week in car and train, while I'm sure some of them are out there as well, on their own, wasting their time to get from point A to B. I would love to have a way to connect to these people on those moments. Sharing a ride, sitting together on the train, and just talk like we would do on a networking event. It'll cost me nothing, and it would be a good inspiration for my work and articles. Now I use Twitter to stay in touch with some of them, but it is different. You know what they are doing, but you don't have the speed and the vibe of a real networking talk.

4

The scenarios are sketches of possible situations in which one could use a Personal Travel Assistant. It is meant as a set of examples that can bring up more ideas and be a topic of conversation and discussion. Furthermore it is a way to demonstrate what a PTA could have to offer to people who are new to the subject.

Scenarios

Scenarios

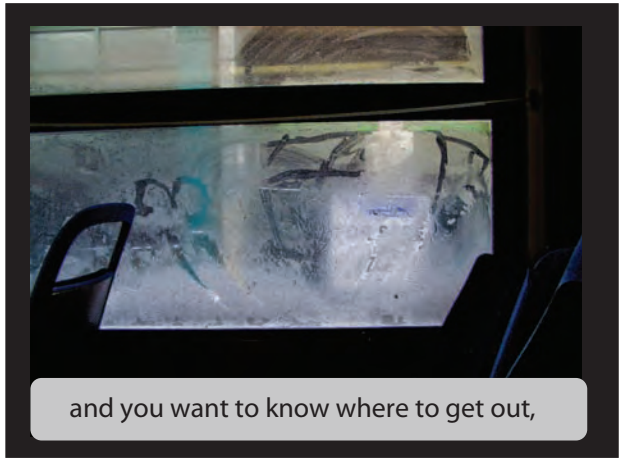
What if I take the next train?

8:15 You arrive at the platform

your train leaves in **2 minutes**

Where to get out?

You take the bus,



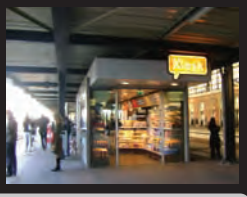
and you want to know where to get out,

You are hungry and want to buy a sandwich,

but your train just arrives ...

TASK

You have to decide quickly, are you going for the sandwich or do you better catch this train?



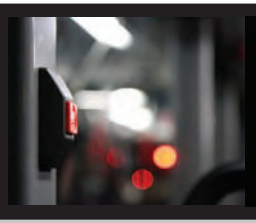
You want to be at work at **09:30** *the latest*

so you can call for the right stop ,

and you don't pass it accidentally.

TASK

Set an alarm that notifies you just before you have to get out



let it go off **2 stops** *before arrival*

Scenarios

At what time will I be there?

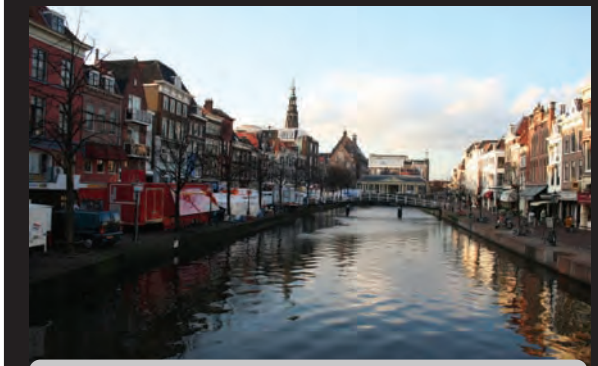
You get a call from a friend,

he invites you for dinner at his place.

Can everyone make it on time?

You are in a meeting at a partner's office,

and you make a new appointment,

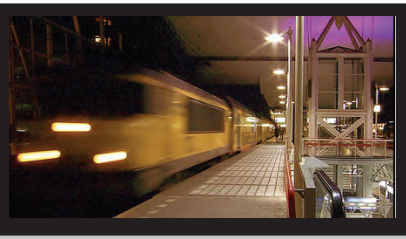


He is in Leiden today,

and suggests to pick you up at the station.

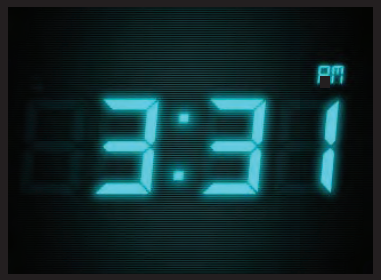
TASK

At what time do you arrive in Leiden Centraal?



You leave your work at the usual time, 17:25

at your office in Utrecht



You want to be sure everyone can make it on time,

Invite the others using the PTA feature for getting together and find out at what time everybody can be there.

5

The idea charts are the result of an exploration into the future of getting around. How do we get around right now and can it be improved? Are there habits we have now that are so common that we don't realise it can be different? What are the opportunities current technologies can offer us? In this chapter I try to answer these questions with concrete examples.

Idea Charts

Idea Charts

Get Together

Meeting people is an activity as old as mankind. Setting a location and time to meet has always been essential in the act of getting together. But what if we would take another angle when looking towards this paradigm? Do we still have to agree upon a time and place, or can we find each other in more dynamic ways? With the technologies available nowadays, we certainly can. The only question is, do we want so, and what would be the factors that make people hesitate?

Since the coming of mobile communication, peoples behaviour and attitude changed a lot. Being late is not that big issue anymore since it just takes a phone call or text message to notify the other person. This makes that the necessity of 'being on time' is fading away, and many people calculate with margins of what is acceptable. Still, it doesn't feel comfortable to know somebody is waiting for you because you are late or vica versa.

Imagine, when planning a meeting with one or more friends, you could agree upon a period of time and an area in which to meet. This would give each other the flexibility to walk around, hide for the rain inside a bar, or to whatever you like.

How would it work?

From the moment you (B) enter the zone you agreed upon (red circle), you will get the exact position of the ones that are already in the zone (A), and the time it takes for the rest to reach it (C, D, E). This would give you the ability to do whatever you want during your waiting time.

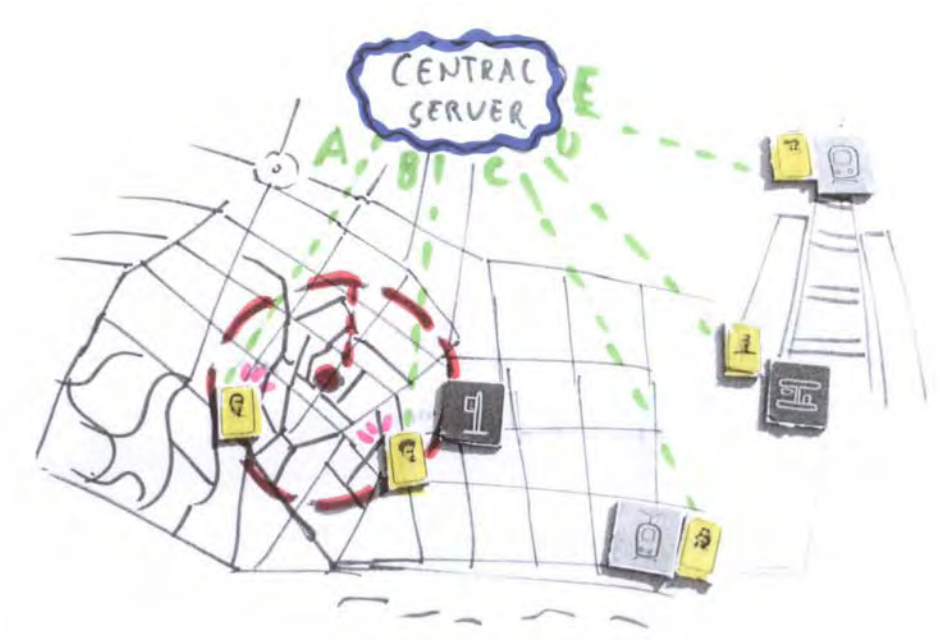
To find another person there are several ways to visualise their position. You could make use of an arrow, indicating the direction and the distance, or work with maps, indicating the person's location.

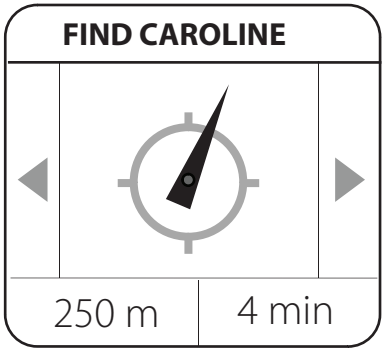
When would this be used?

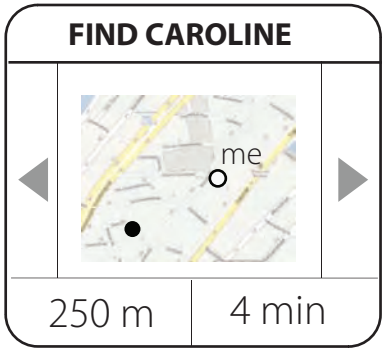
Shopping
Go in and out shops on your own and still be able to find your friends.

Going Out
Find your friends who are having a beer downtown, even if you barely know the place.

Any social activity in which it is preferable not to make too strict appointments.







Crowd Sourcing

When the PTA gets released, probably not all Public Transport vehicles will communicate their real-time data with the PTA system. But if there are PTA users present in the vehicle (train, bus, tram, etc.), they can give input - actively or passively - which can be adopted by the system in its real-time data flow. The more people that make use of the PTA, the more accurate the information will be. Before this system can work trustworthy at any moment, a critical mass of users should be obtained.

When the user plans its route, the system is aware of the expected position of the user on any point (geo-position) during the trip. When the physical presence of the person on a certain location does not match the expected one, it means there is a change in the situation the PTA should know about. Of course it is very crucial that the PTA interprets this information correctly.

Imagine a person being 10 min. late on its route. Does it mean the train has a delay, or that the user missed a train and took the next one?

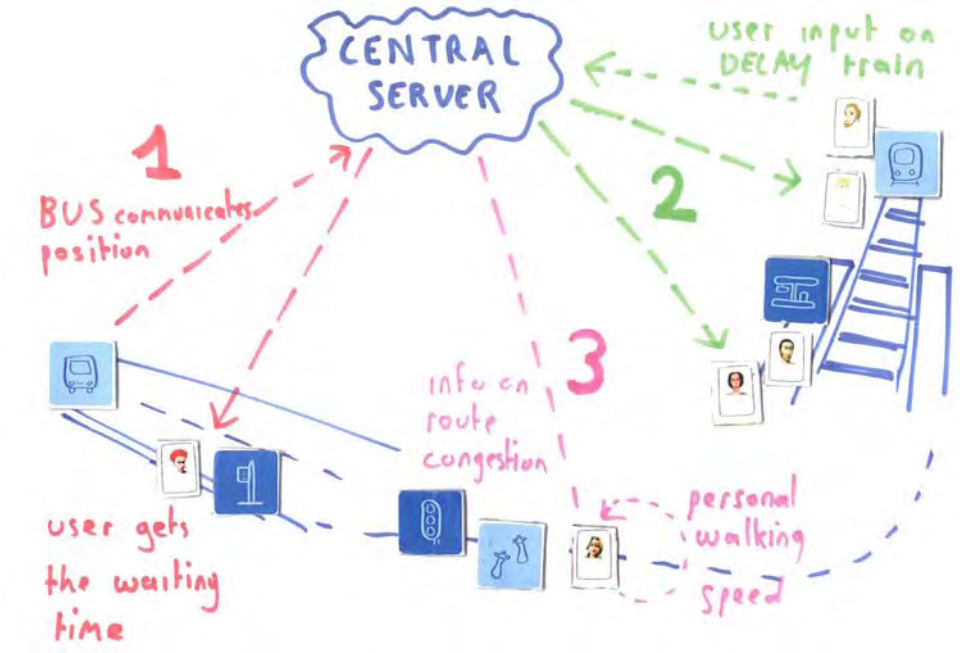
1

In the best case, the vehicle communicates its real-time information to the PTA central server, which adopts it into its information flow, so the PTA-users will find out about it automatically.

2

When the PTA can't find out the answer for a problem, it will have to ask the user. By presenting users with easy to answer questions (preferably multiple choice), the PTA could collect a lot of information. The more people that give feedback supporting the same facts, the more reliable the information will be considered and be adopted into the system appropriately.

When there are contradicting responses, the PTA needs a way to detect and exclude the unreliable source for as far as possible. If not, the user should know about the level of reliability of the information it gets presented by its PTA. When a person actively gives an explanation about a delay (or other problem causing event), it could be compared with the passive data sent by other PTA users. If it makes sense, the reliability of this information will be valued higher.



3

For walking and cycling, the PTA will make use of a mix of personal data and system data. The time it takes a person to go from A to B, depends on the walking/cycling speed of the user, as well as on the congestion of the route. This is related to time, place and haste. Imagine a person that walks through a busy street with many traffic lights and wants to take the metro but has to wait in a big cue due to rush hour. It would be very inconvenient if the user arrives late on his/her destination because of lost time in the cue. By collecting the data of all PTA users that move through public space, the system will improve the accuracy of its information.

Idea Charts

Route match

When people travel around, they often use similar routes to get to their destination as many of their peers. Unfortunately, they are usually not aware of that situation. Since people have relative busy lives, and traveling is rather seen as wasted time, having social contact during a trip could be convenient. Maybe someone's friend took a bus on the same line a few minutes before him or her, without knowing about it. Or both go to the same party and one goes by train while the other is driving by car. A route-match service could be the solution for these type of situations.

How would it work?

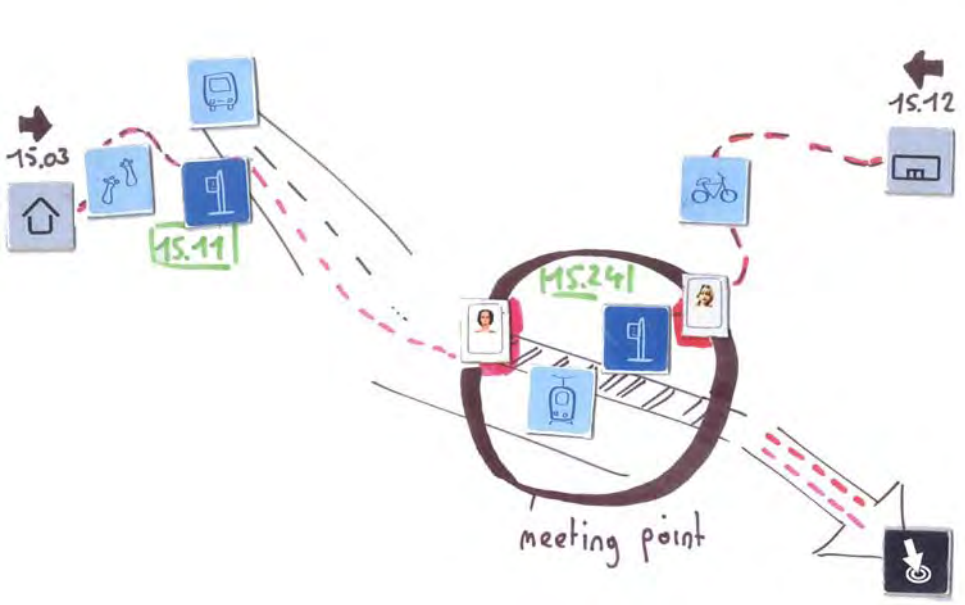
With route-match you can find out about which people are traveling on the same route and whether you could travel together or not. When there is a possible match, the PTA will calculate the options and make sure both persons can meet at a certain time on a certain place during the trip, from where they can continue together.

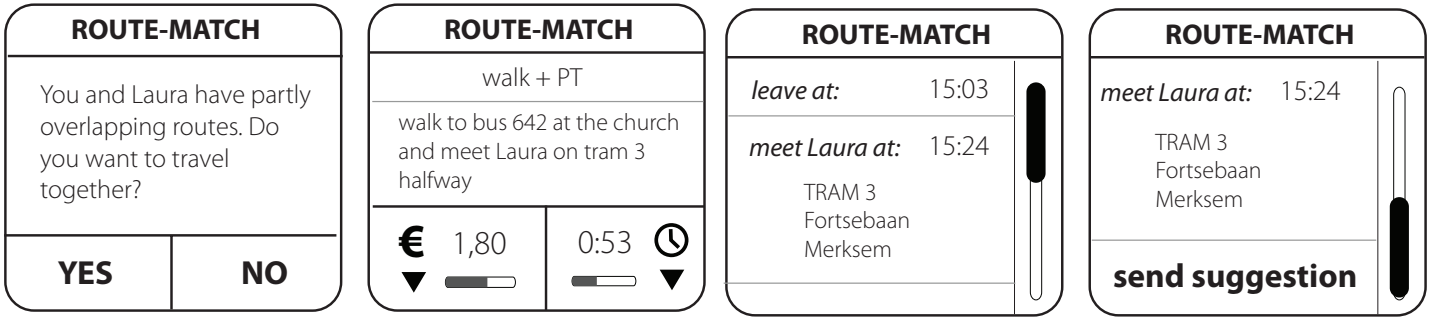
Scenario

Caroline, Laura and Kim decide to go shopping together on Saturday afternoon. Caroline lives on the other side of town, but Kim and Laura live on the same route. When Kim puts the event in het agenda, the PTA notifies her that she and Laura have a similar trip, and asks if she would like to travel together.

It seems that if she leaves her home at 15:03, she would meet Laura at 15:24 on tram 3 halfway her trip. In that case Laura will have to leave her place at 15:12. She sends the suggestion and waits for a response. If Laura agrees, they will meet on their way to the city.

NOTE: Since the PTA server knows the addresses of Kim and Laura, it also knows where their routes come together.





Context awareness

How we interact with products is very dependent on the situation. Being able to fully concentrate on one product is not always possible. This is one of the biggest differences between PC and mobile phones. When somebody sits behind a PC, concentration on the task is much higher than when interacting with a mobile phone. People can use their phone while being in a bar with friends, during a meeting, in the car, while running for the train, etc. How one would prefer to get the information presented is highly depend on these contextual aspects. The more the system knows about the context, the more it could adjust the type of information and the way it is presented, appropriately to the situation. For e.g. increasing the font size and reducing complexity while running or cycling.

Active input

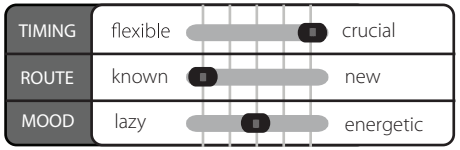
In order to make the system understand the context, it should know some personal details of it's user. Some of it will be indicated in the profile page, like the type of vehicles he has, how much money he wants to spend at max, etc.

Nevertheless, situations can be very different from time to time. Having some basic variables which can be changed per trip, could help the system to act appropriately. The amount of time available, familiarity with the route and the mood of the moment can influence the way that someone wants to be assisted. A set of sliders could for example be a way to let the user communicate this information with the system.

Some examples:

1

Imagine you go to a place you know, but it is crucial you are there on time. For e.g. when having a meeting at work.

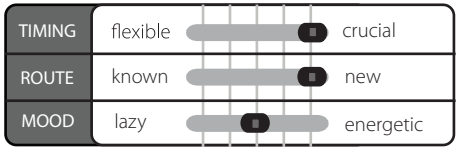


In that case you don't need a route description, but you want to be sure you'll be on time. So any change in the plan should be notified with a warning signal.

warning signs

2

Now imagine a meeting of the same importance, but at a place you never been before, for example at a client's place.

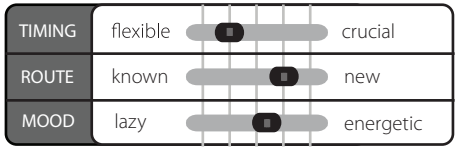


In this case you probably want to be guided step-by-step without nonsense. Your PTA is the 'commander in chief' giving you straight order. Because of the importance of the event, it would be an acceptable level of obtrusiveness.

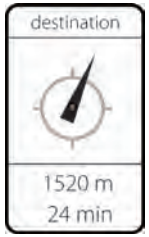
step-by-step guidance

3

Imagine you are on a day trip in a city you don't know very well, but you have no time restrictions.



In this case you are probably mostly interested in the direction, and walking distance, rather than being told what to do every step you take, like in the previous example.



indication of destination

Idea Charts

Events

Facebook is the virtual place to be to find out anything about your friends. When logging in, you can see an overview of all most recent updates made by your friends, changes in their status, added pictures, comments, messages, etc.
An interesting feature is called 'events'. It gives people the possibility to create an event (what can be anything from a birthday party to a conference) and invite the people they want to attend. People just have the option to reply with 'attending', 'maybe attending' or 'not attending'. It is a simple concept with a great social impact. Knowing who else is going is probably one of the most important reasons for people to decide whether they will attend an event or not, next to availability of course.

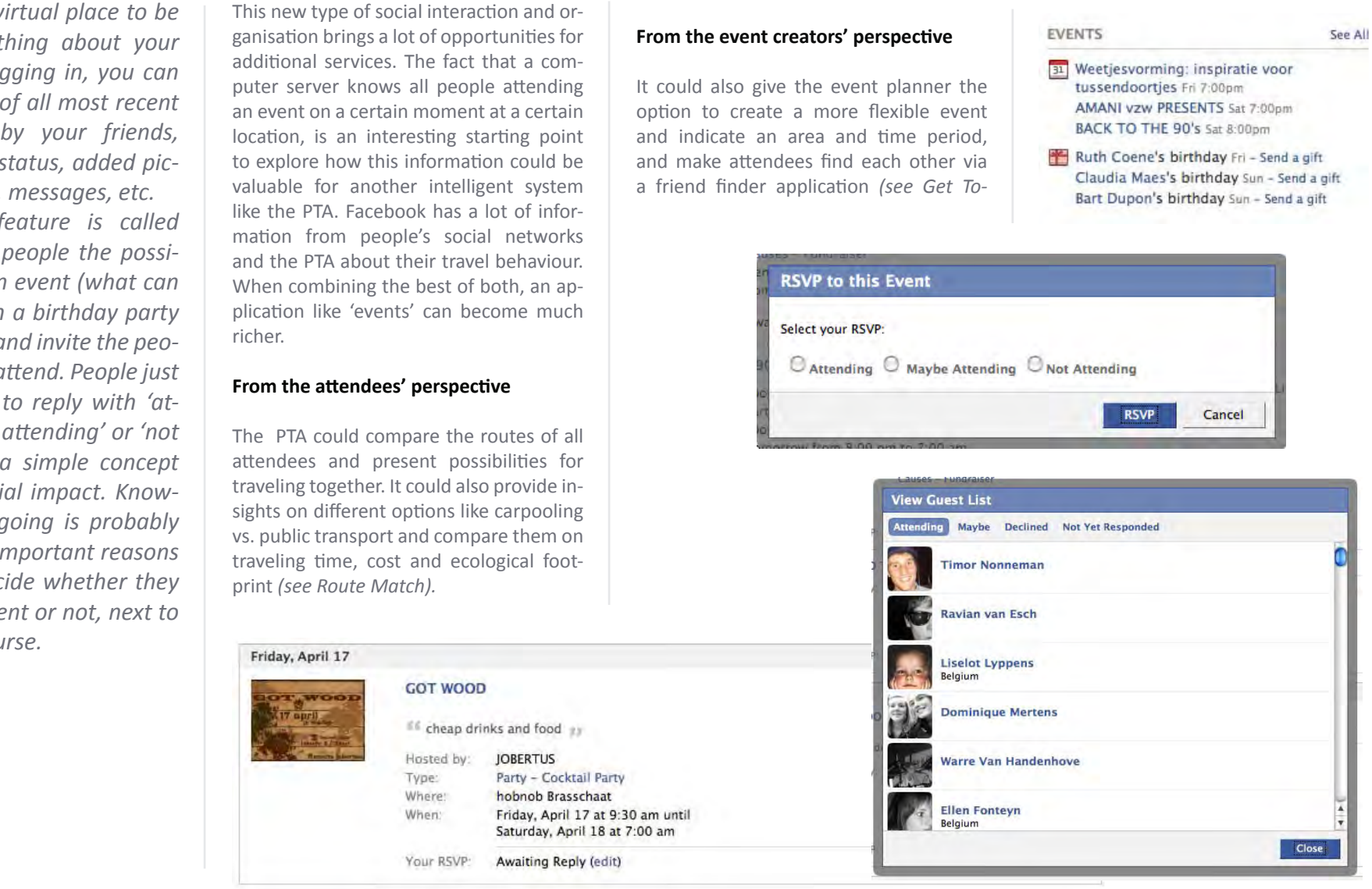
This new type of social interaction and organisation brings a lot of opportunities for additional services. The fact that a computer server knows all people attending an event on a certain moment at a certain location, is an interesting starting point to explore how this information could be valuable for another intelligent system like the PTA. Facebook has a lot of information from people's social networks and the PTA about their travel behaviour. When combining the best of both, an application like 'events' can become much richer.

From the attendees' perspective

The PTA could compare the routes of all attendees and present possibilities for traveling together. It could also provide insights on different options like carpooling vs. public transport and compare them on traveling time, cost and ecological footprint *(see Route Match).*

From the event creators' perspective

It could also give the event planner the option to create a more flexible event and indicate an area and time period, and make attendees find each other via a friend finder application *(see Get To-*



Route visualisation toolbox

When getting around in daily life, you don't always have a map, drawing or route explanation at hand. Sometimes you have to ask a person, who explains you by making use of one or more of the following strategies:

1. point into a direction and make an estimation about distance and/ or walking time,

2. check for (mutual) points of recognition on the way to use in the explanation,

3. count number of streets before each turn to take ("second right and than first to the left")

It is information you need to be able to keep in your memory, preferable until you reach your destination. Sometimes it is even clearer than any map or route description you would use when preparing the trip.

"After Albert Hein go to the right and than continue under the bridge until you see a red container, there go left. At the library go right until the traffic lights, than go the 2nd left. That is the Prof. Evertslaan. Go to the big flat at the end of the street. You have to be on the first floor..."

When listening to such a story, people will probably try to filter out the essential information and sometimes run it in some kind of a mental video clip. By going through the list one or more times, they are able to remember some information.

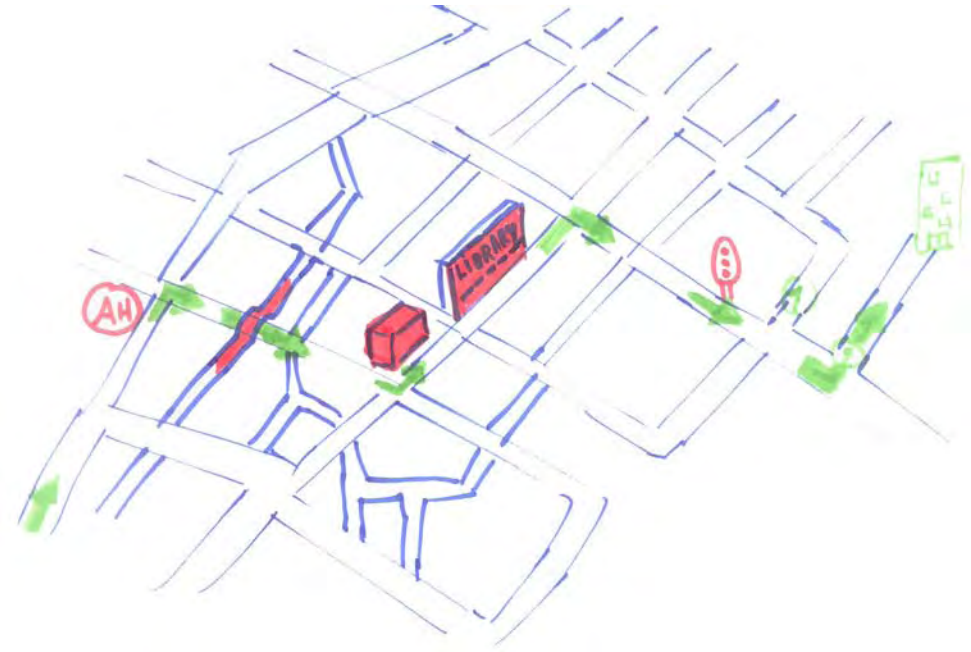
The essentials to remember would be:

Albert Hein	RIGHT
Red container	LEFT
Library	RIGHT
Traffic lights	2nd LEFT
Flat	END OF THE STREET

So maybe people tend to avoid counting streets or using street names, but rather use visual elements (like Albert Hein or red container in the previous example).

I guess it is typically something for humans to generate such a vivid explanation. Information generated by computer algorithms can never reach such a dynamic.

How would a mobile service be able to offer that level of vividness so we can remember our routes more easily?



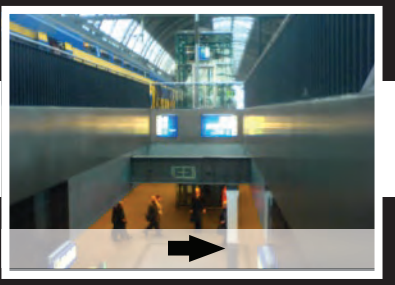
This can only be achieved by letting people attribute to the creation of route descriptions. If people, in an online community or on their own, can collect images and descriptions of different points of recognition, they could add them to the route explanation they create for themselves or for others.

Imagine someone is giving a housewarming party and wants to inform his friends about how to get to his place. And that he could build a route description by dragging and dropping pictures, text and icons into a route-time line, so his friends can check the route in a kind of slide show, while their on their way by train or during the trip when they forgot how to go. The time line would present the next item to look for. In this way the navigation system is more like a memory support rather than a step-by-step commander in chief.

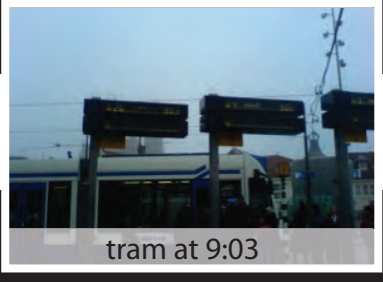
Idea Charts

Route visualisation toolbox


arrival in Amsterdam



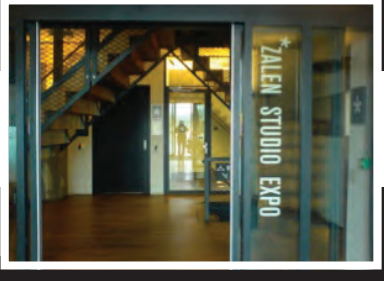

exit the train station

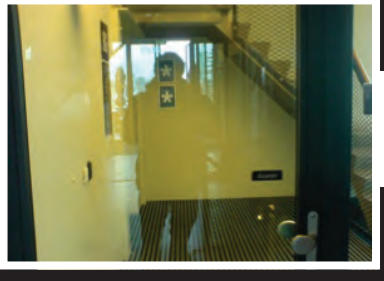

tram at 9:03

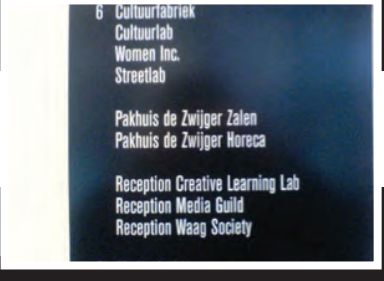

on platform 1

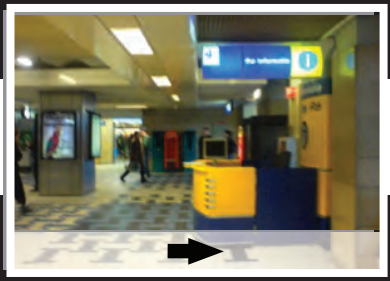
line 26 to IJburg


Pakhuis de Zwijger



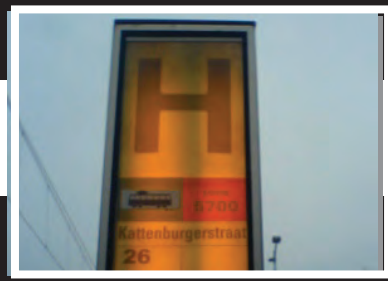




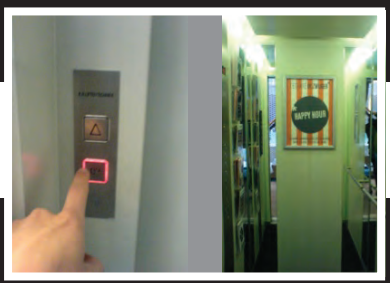


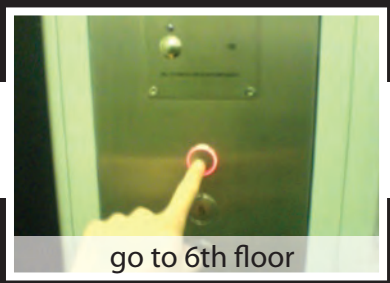
travel 2 stops (1 zone)

Get out in Kattenburgerstraat

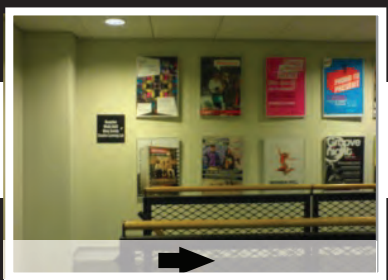


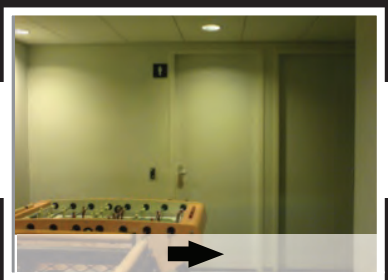
look for the indicated buiding





go to 6th floor





welcome at Waag Society

6

In this chapter you get some insights in the creative process of the design of this application. What was the starting point? Which ideas did and didn't make it to the final design? And how did they evolve over time? It is not just a chronological journey through the process, but it is divided on topics like visualisation, time and modalities, navigation, planning, etc.

Design Process

Concept Development

Route visualisation

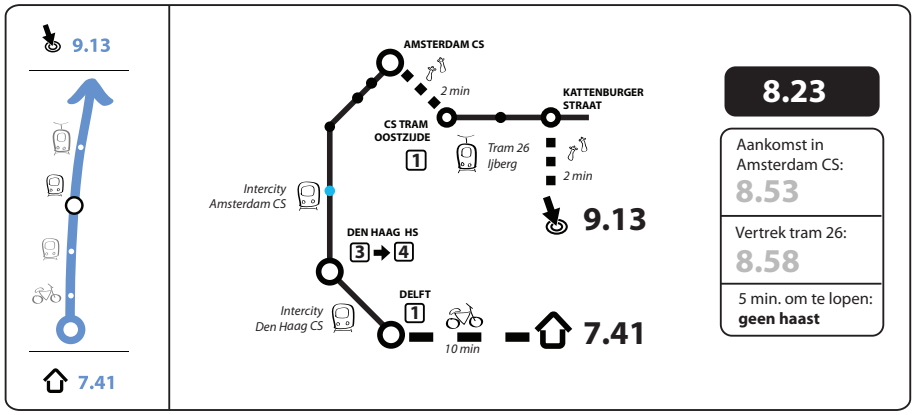
Where traveling by car only exists of one transport modality, a trip via public transport can take multiple. As an example I worked out my trip from home to work in different ways. Next to the reference picture of 9292ov (the online route-planner), this page contains two alternatives I worked out for visualising the same information.

In the first example the trip is worked out in a map, showing the different parts of the trip from location of departure to arrival, with all additional information you need to know on your way: names of stations, trains and trams and walking time.

In the second example the trip is worked out in a time line (from left to right) showing all the relevant information in bricks. With a white circle showing your current location.

When comparing both, it feels like the map is more for a print version, probably difficult to generate automatically and too big to fit on a screen of a smart phone. The need for zooming in and out would make it a too complex interface.

In contrary, The time line feels more like a story board, in which each brick is a different scenery. On a small screen you would just have to slide from left to right, what is a quite convenient and easy to manage interaction.

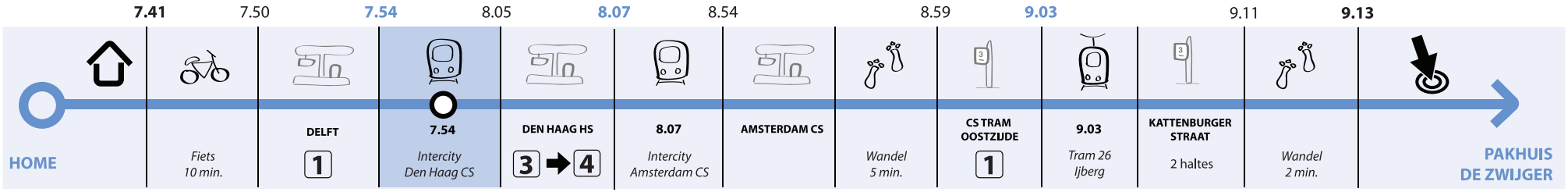


OV advies terugreis | wijzig reis | nieuw advies

Van prof evertslaan 132, delft
Naar piet heinkade 172, amsterdam
Datum woensdag, 27 mei 2009 07:00

Vertrek	6:38	6:57	7:12	7:37	7:41	«	Eerder
Aankomst	8:35	8:39	9:05	9:09	9:21	»	Later
Reistijd	*1:57*	*1:42*	*1:53*	*1:32*	*1:40*	«	Eerste reismogelijkheid
Overstappen	3	2	3	2	3	»	Laatste reismogelijkheid

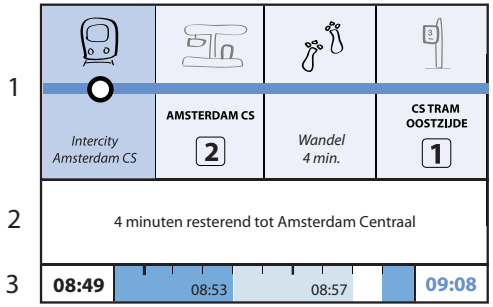
Vertrek	Van	Naar	Aankomst	Hoe
7:37	prof evertslaan delft	Prof Krausstraat Delft	7:40	lopen 3 min
7:40	Prof Krausstraat Delft	Station Delft	7:46	bus 121 >> Connexxion richting Delft
7:54	treinstation Delft spoor 1	treinstation Centraal Amsterdam spoor 2	8:53	sneltrein NS richting Amsterdam Centraal
8:53	treinstation Centraal Amsterdam	metro Centraal Station Amsterdam	9:00	lopen 7 min
9:05	metro Centraal Station Amsterdam	PTA Amsterdam	9:08	tram 25 GVB richting Pass.Term. A'dam
9:08	PTA Amsterdam	piet heinkade amsterdam	9:09	lopen 1 min



Modalities and timing

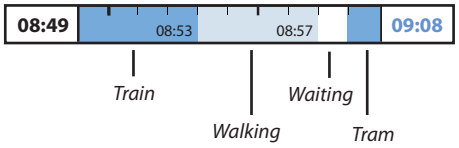
With the time line as starting point, I started to explore how to implement it on a screen of a smart phone (480x320px). Next to having the time line on the screen, there is also a need for displaying more detailed information like train station you pass on the way, possible problem situations, changes in expected time of arrival, etc.

When applying the time line to a screen, it seems that 4 bricks at a time fit perfectly in the upper half of the screen. The part under it can be used for the extra information that would be necessary in certain occasions.



1. step-by-step time line
2. extra details
3. minute-by-minute time line

So when selecting a brick in the time line (1), more details are shown in the 'extra details' part (2). The next ten minutes is a minute by minute time line, showing if there is an *event* coming close or not. The following example shows that there are 4 minutes left before arriving to Amsterdam Central, after which you have to walk 4 minutes to the tram stop and wait one minute before the tram will leave.



To access details about a certain brick or the 'next ten minutes' you can select the elements and the screen would change to one of the next examples.

1. Details about the train ride:

When you go to the details of a certain vehicle, you see an overview of your part of the route on that vehicle. In this case a ride from Den Haag HS to Amsterdam Central. It shows you current location, your time of arrival at your destination, and the list of all stations on your way. By selecting a station you can see the time the train will pass there.

2. Details about the coming minutes

When selecting the *minute-by-minute time line*, a list opens with the relevant time information: current time, how many minutes and stations before you have to get off, how many minutes to walk and wait, the time the next vehicle will leave, etc.

Because the minute-to-minute time line and the detailed version are different in their appearance, it feels a bit confusing, as well as the link with the step-by-step time line is a bit lost. In order to create a better link and make the time that is shown more relevant, I changed the screen layout. By taking two bricks together, the nature changes to 'a movement to a certain place' In which the time shown is the time between departure and arrival (in a vehicle) or between arrival and departure (connection)

The image below shows the connection between a train and a tram ride. The times shown are the time the train arrives (08:53), how long you will have to walk (4 min.) and to wait (1 min.) before the next vehicle will leave (08:58).

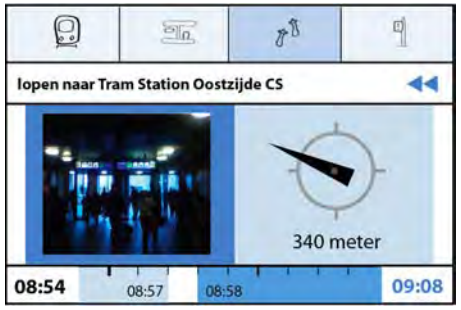
Although this is a valuable improvement, there is still something inconvenient. The screen shows 4 brick of the time line, which does not give you the overview of the whole route, neither the details of one specific element. Reducing the time line to only a beam of icons in the top of the screen would make more screen space available.

Concept Development

Navigation

Now the application contains information about your steps and time, what about navigating: how to find a bus stop, train station, etc? Is a Google maps type of interface relevant when making a connection, or are there better ways to guide a person? Like mentioned in one of the idea chart, an alternative could be a compass type of arrow pointing to the place you have to go, or a picture of the place you are looking for.

The image below shows a combination of a picture slide show (geo-tagged) together with an arrow pointing towards your destination and the remaining distance. In this case pointing to the tram stop on the east side of the train station.



This arrow probably works great when you are close to your destination, but maps can sometimes be the preferred option, showing your current location and the one of the destination.

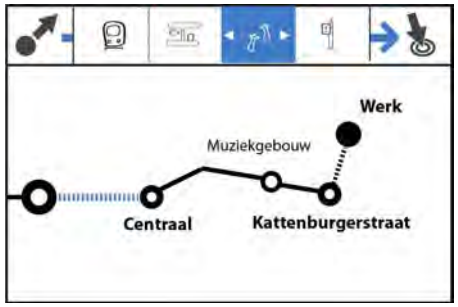
Now maps seem to be needed and unavoidable in the PTA, I explored some ways of how it could be implemented. Just linking to Google maps would be a too obvious thing to do and not leading to the best usability possible, since they contain a lot of unnecessary information and are made with another purpose than the PTA.

A map generated by travel time

One idea was to create a route visualisation in which the distance between 2 points is not defined by distance, but by travel time. In this way the map would give better insights in the different parts of the trip and how they relate to each other.

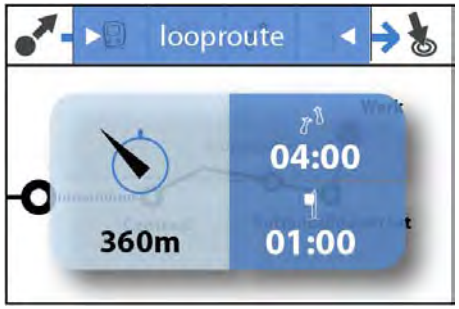
In the upper image on the right you can see the cycle route from the place of departure to the Delft train stations takes about the same amount of time as the train ride from Delft to Den Haag HS.

The second image on the right shows the walking time from the train station to the tram stop takes about half of time you will spend on the tram.



When replacing the original time line by a map interface, there needs to be an easy way to get access to the details provided in the version before. By making different elements on the map selectable as well as the possibility to open a button in the time line, a pop-up could show that details related to that part of the trip.

The upper image on the right shows the information you need on the station. The following image the details about the train ride between Delft and Den Haag HS and the last image the walking route from the train station to the tram stop.



The idea of the map based on travel time did not survive for a long time because of the multiple challenges that would make it hard to get it logical and consistent. What about waiting times at a station or stop? Or when a delay occurs in a vehicle you are in? It would make the map too complex for one to understand. And it would also take away the possibility to link the map with a real geographical map.

Different maps for different modalities

Because of the problems mentioned above, it would be better to present every part of the route in the way it is best presented. Walking and cycling maps have other criteria than car maps or train, bus and metro maps.

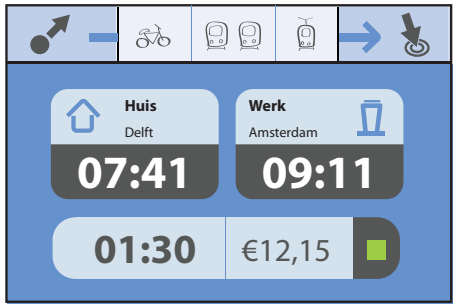
In the image on the right you see a cycle route based on a map of the city with points of recognition for the user. When showing the users current position on the map, he could see how far he is from his next turn, while not giving him an overdetailed map filled with every street within the city.

Such a map could contain points of recognition added by the user himself, or general ones like city hall, churches, a river, etc.

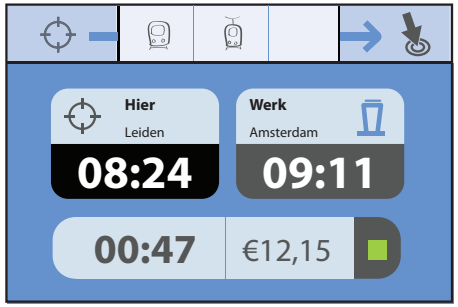
Where on the bike you need to orient yourself on a street map of a city, on the train you want to know where you are in function of transfers you have to make. It is more important to know how close to the next stop or destination you are, rather than knowing your exact GPS position.

In the next three images you can see an overview of a train ride between Delft and Amsterdam, in three different zoom levels. The overview only shows intercity stations, one zoom level deeper would show *'sneltrein'* (fast train) station and the deepest zoom level *'stoptrein'* (regional train) stations.

In order to get the overview of the trip, you can select the icon of departure or arrival. The screen below shows the places between which you travel, times for leaving and arrival, travel-time, price and ecological footprint.



During the trip the departure icon gets replaced by *current location*. In this way the user only has access to what will come next, but not anymore to what is behind him.



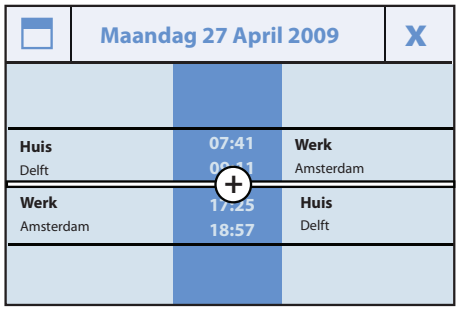
Concept Development

Planning the trip

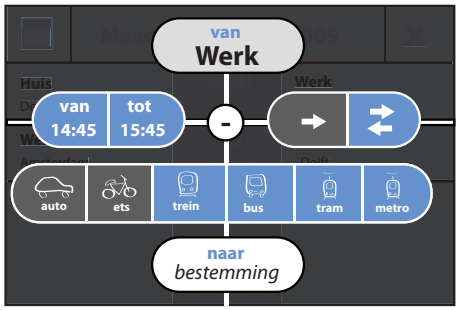
Until now I only focussed on displaying a trip that has already been planned. An important part of this product is of course the input of the location of departure and arrival, the preferred time and way of traveling. Since a user will not only plan his trips just before departure, but sometimes a while in advance (when making an appointment), it should be linked to an agenda functionality. Next to the option of planning beforehand, the user should also be able to reschedule his trip anytime he wants.

When planning a trip, the user can switch between his schedule of the day and an overview of the month. In this way it is easy to select the day you want to travel. By sliding you can switch between days or moths.

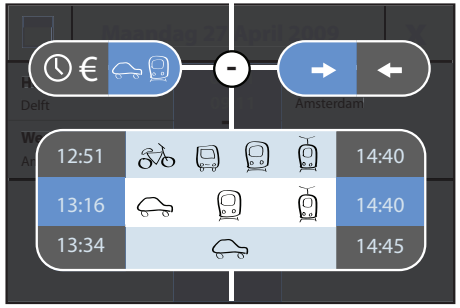
In the next two images you can see an example of how the calendar and agenda could look like. The calendar is meant to pick a date and the agenda to show the trips of the day.

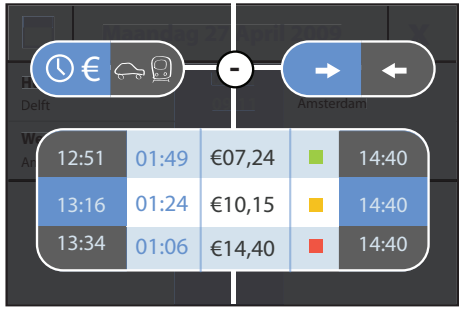


When the day of the trip is selected, the user should be able to choose the time and locations. When the user selects the '+' icon appearing between two trips, it shows a tree of buttons with which the users can define the details. Since the user is expected to leave from work, it already fills in the button of 'place of departure'. Furthermore the user can fill in the times of the meeting, if he wants to plan a one-way or round-trip and which modalities he is willing to use.

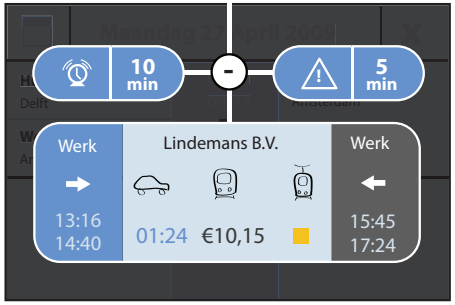


When finished with filling in the information, the user gets a list of options, which he can compare on time, duration, price and ecological footprint.





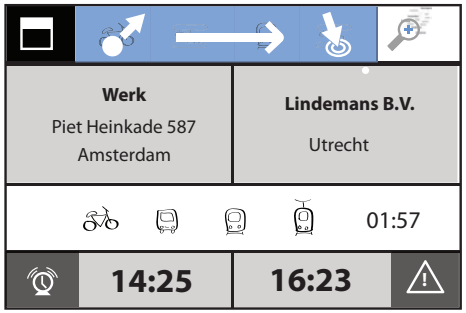
When the user made his choice, he gets an overview of the trip, and the possibility to add an alarm before departure or an alert messenger when having a delay.



When selecting the overview, the user will enter the trip and be able to access detailed information about the different parts of his journey. If he clicks the '-', he will go back to the agenda.

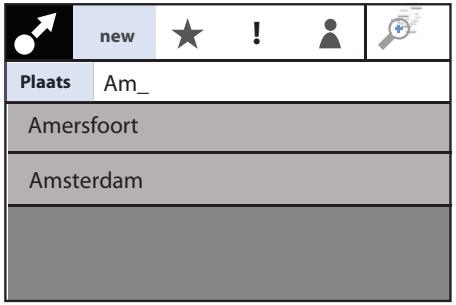
Because of the overload of buttons, the star-trek kind of look and the fact that every button leads to another screen, it was obvious that the options should be structured in a different way.

By dividing the screen in 4 areas for the necessary input, it does not give the feeling of overload like in the version before. Below you can see the start and end screen when planning a new trip. The icon on the buttons get replaced by the details of the input.

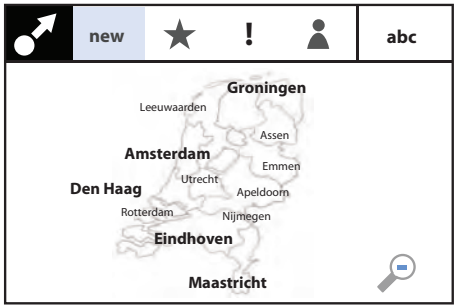


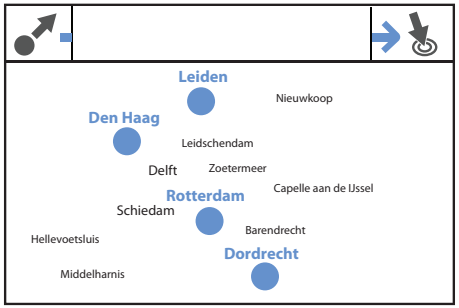
Selecting a location

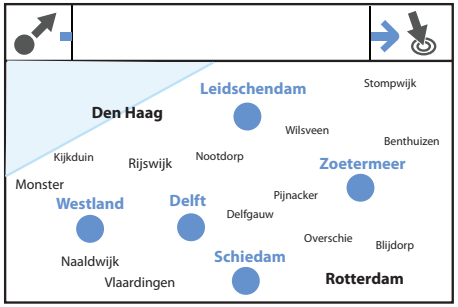
When selecting a location, the user has the option to type an address or to select from a list of favourites, points of recognition, contacts, etc. Furthermore the user has the possibility to select the location on the map. With a button in the upper-right corner of the screen, the user can switch between the text input/lists view and the map view.



By zooming in on the map, cities and villages will become selectable, the biggest first, the smaller later.

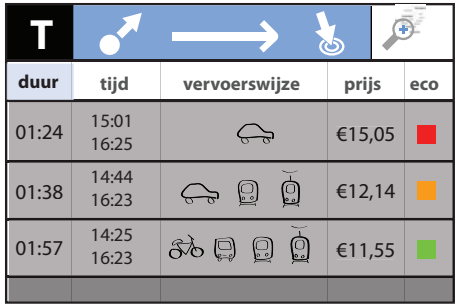






Selecting options

While in the previous version you could see the modalities or the duration, price and ecological footprint, it is now combined in one view. It also contains a row of buttons with which you can order the options on travel time, number of vehicles, price and ecological footprint.



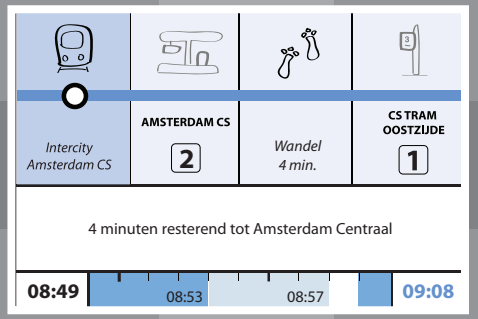
Design Evolution

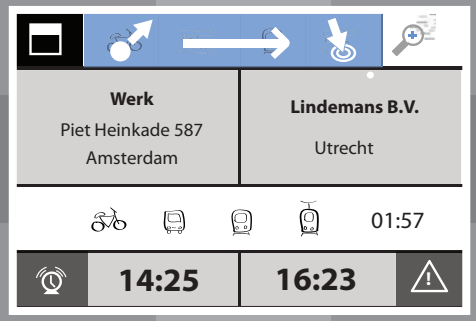
graphic styling

April

May

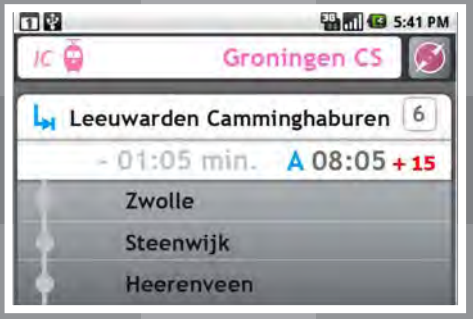
Overview





Details 1

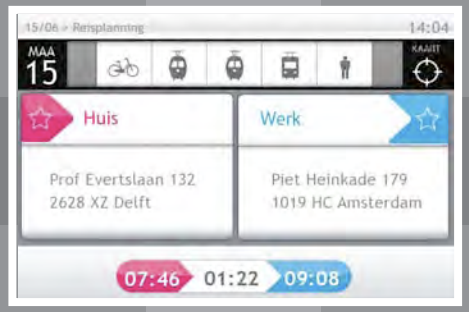
Details 2

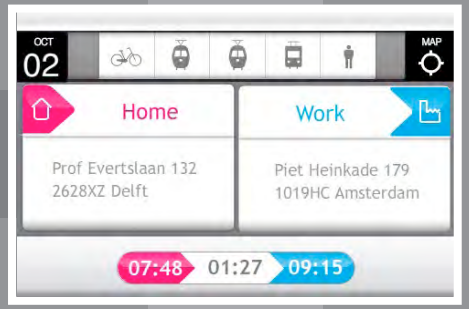


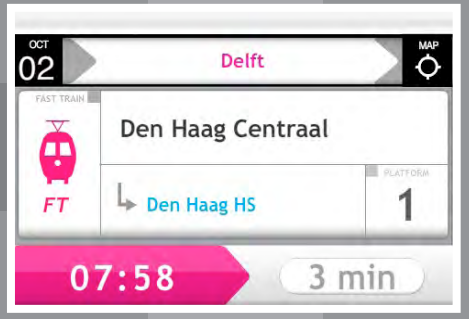
June

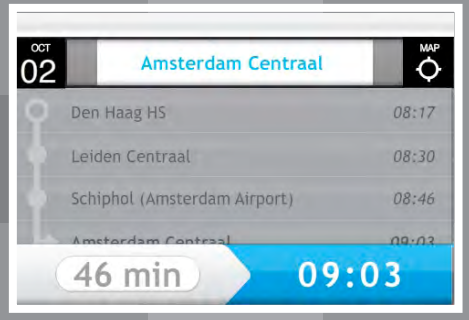
user test

final version









Design Evolution

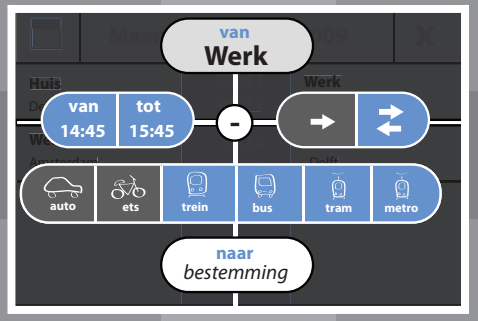
graphic styling

April

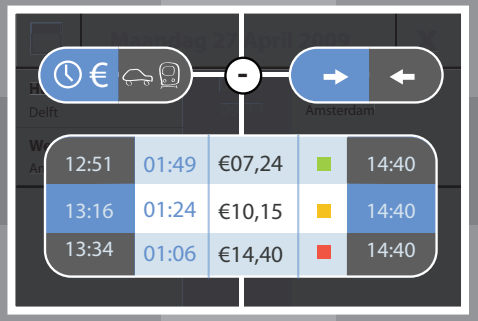
May

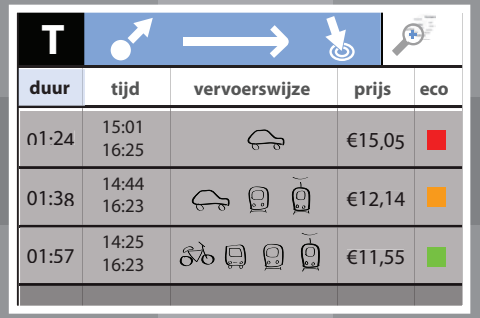
Agenda

Planning 1



Planning 2

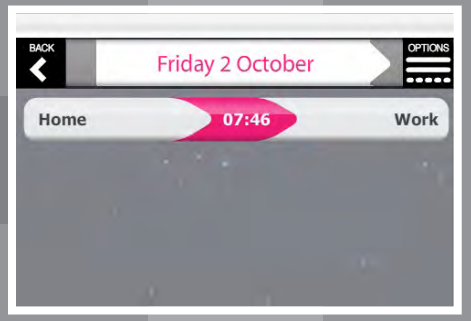


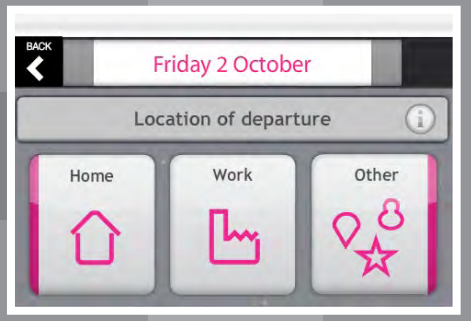


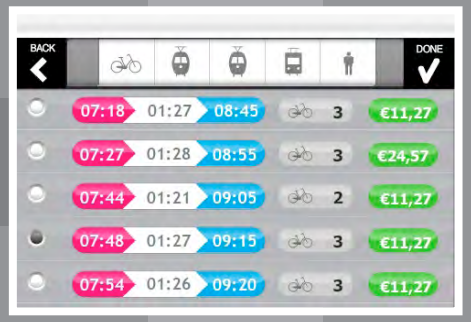
June

user test

final version







Interaction Flow

The process of designing the interface

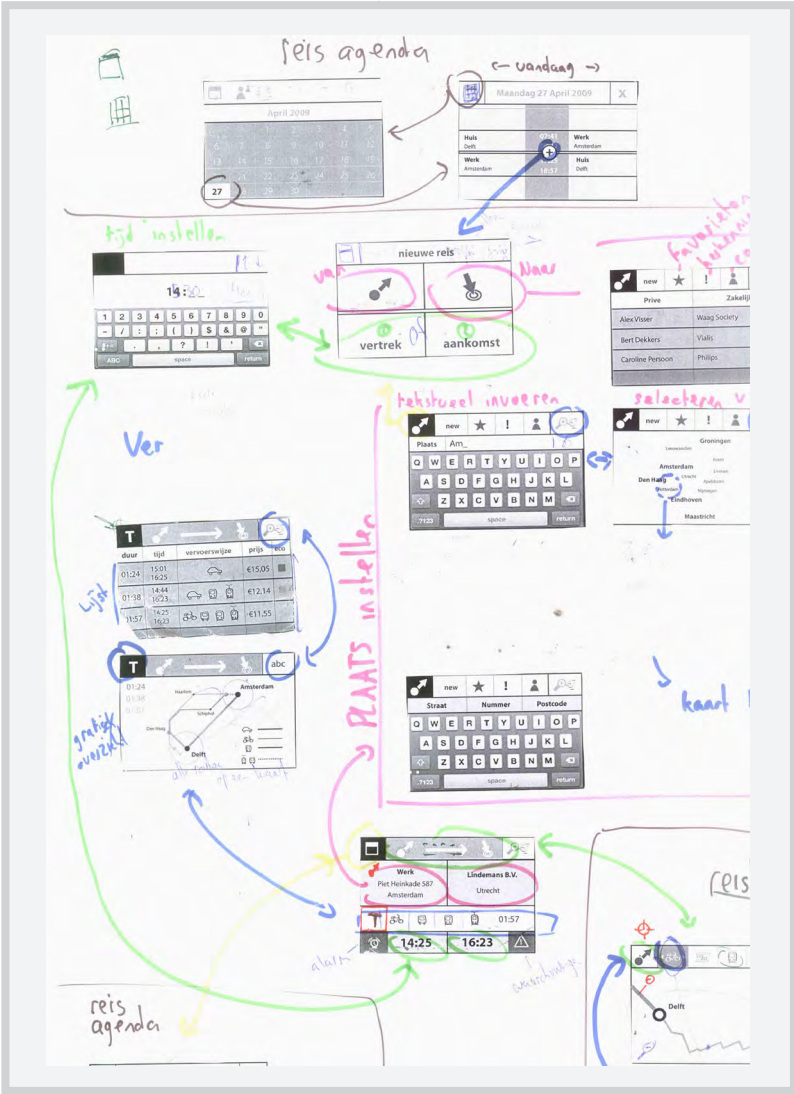
Designing the interface for specific screens and designing an interaction flow between those screens are two different tasks that need to be developed simultaneously. You can't just come up with a bunch of screens in which you can do everything, without having a clear and intuitive way to navigate between them. Still sometimes focus on the one is needed and attention to the other is missing. In this way continuous iterations and a lot of trail and error is the only way to create an understanding and build up the application bit by bit. First coming up with the full interface architecture and then design the screens or vica versa doesn't work.

These are some my personal learnings I gathered along the way. I cannot speak for interaction designers in general, but for a novel interaction designer like myself, dealing with complex products like the PTA, I see this as the best practice. Over time, when building up experience, maybe less iteration and trials and errors will be needed, but I think they will always be a part of the creative process when designing interfaces. Especially for mobile interfaces where you are dealing with a small screen and thus a higher amount of different screen interfaces.

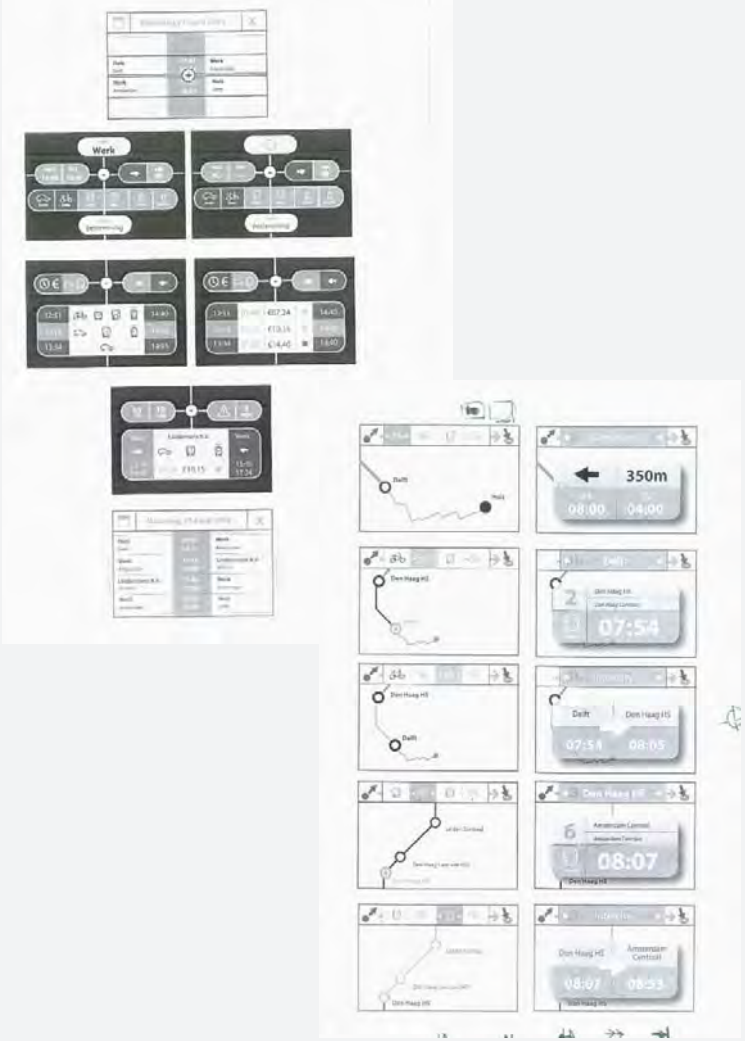
What on one day seems a great idea, can be seen as a poor one a while later. Things can start on an easy track, but gain complexity over time when new features are added. I had to learn to reject a high amount of my ideas on the way, even when developed until a very detailed stage. Taking a fresh and critical look on the designs and deciding how to go further was inherent to my design process.

In order to get an overview of my work, I often printed, cut and pasted the different screen on a big page. With coloured markers I drew the interaction flows. In this way I could find missing and ambiguous elements and evaluate the features togehter with others. On the right you can see two examples of such overviews.

NOTE: What I created is actually called wireflow in the world of interface design. A wireflow is the combination of a wireframe and a flowchart. A wireframe shows the layout and specifies the possible interactions and a flowchart shows the links between the screens.

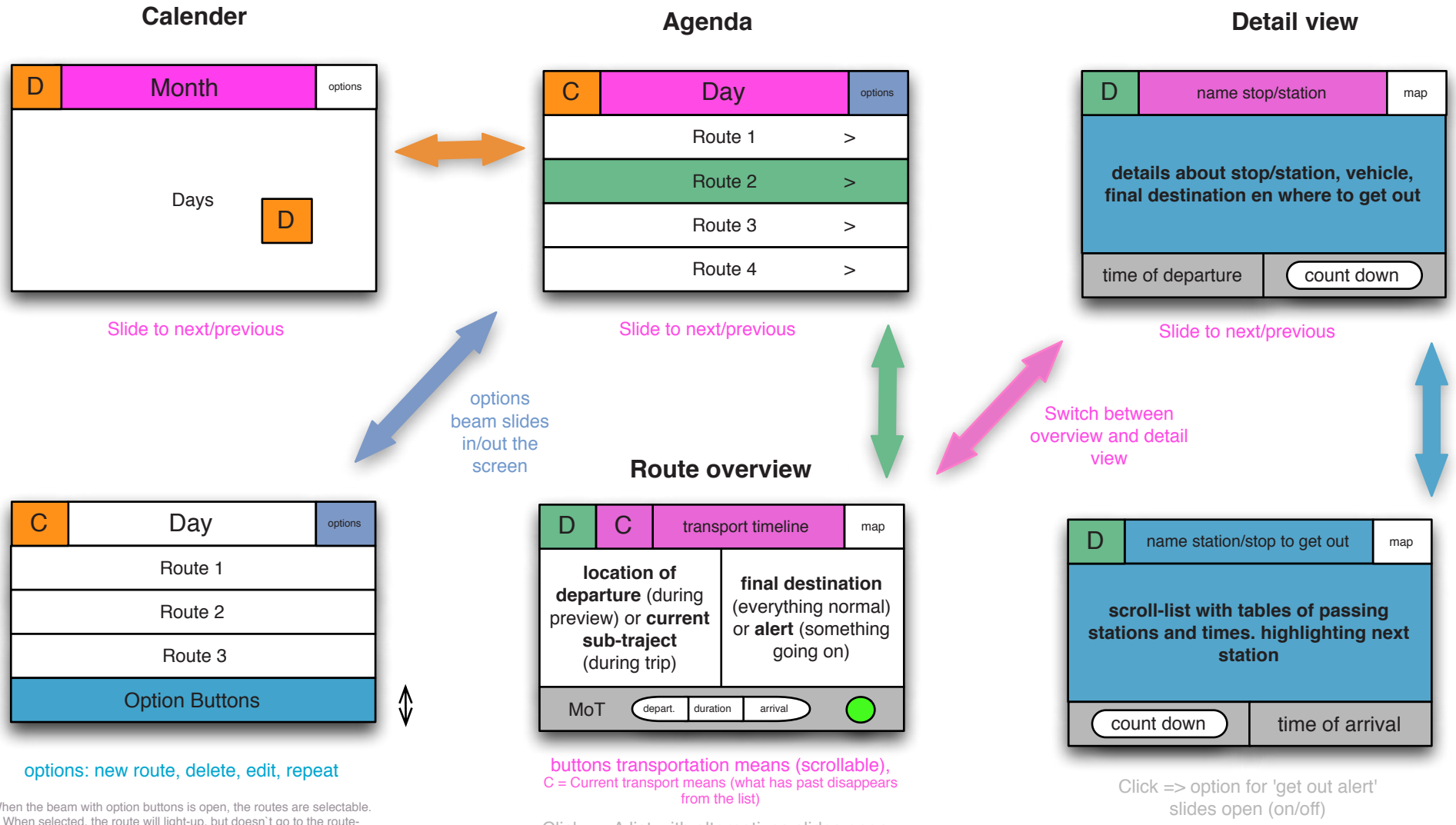



Nieuwe reis plannen
Van
Naar
vertrek
aankomst
Ams_
Amersfoort
Amsterdam
Straat
Nummer
Postcode
Reis bevestig / details route
Dordrecht
08:42
4
Amsterdam Centraal
Rotterdam
Den Haag HS
Leiden Centraal
Leiden Centraal
09:30
4a
Amsterdam Centraal
Hillegom
Heemstede-Aerdenhout
Haarlem
09:53
Rotterdam
Leiden Centraal
09:28
00:46 min
Rotterdam
08:56
00:16 min
Den Haag HS
Uitstap overwitiging (alarm)
Leiden Centraal
Verwittig
op voorhand
Rotterdam
Den Haag HS
Leiden Centraal

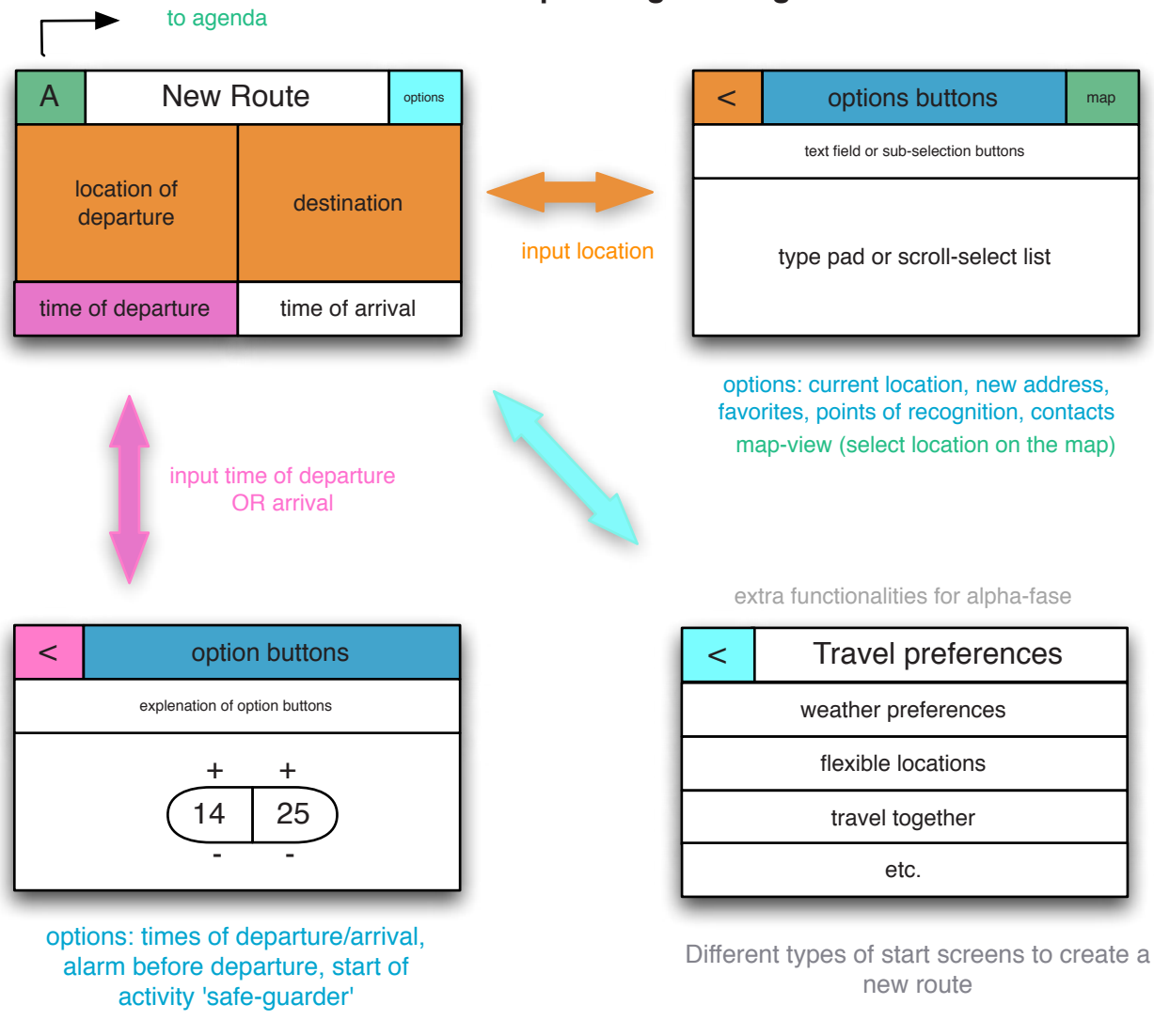

Werk
350m
07:54
08:07

Interaction Flow

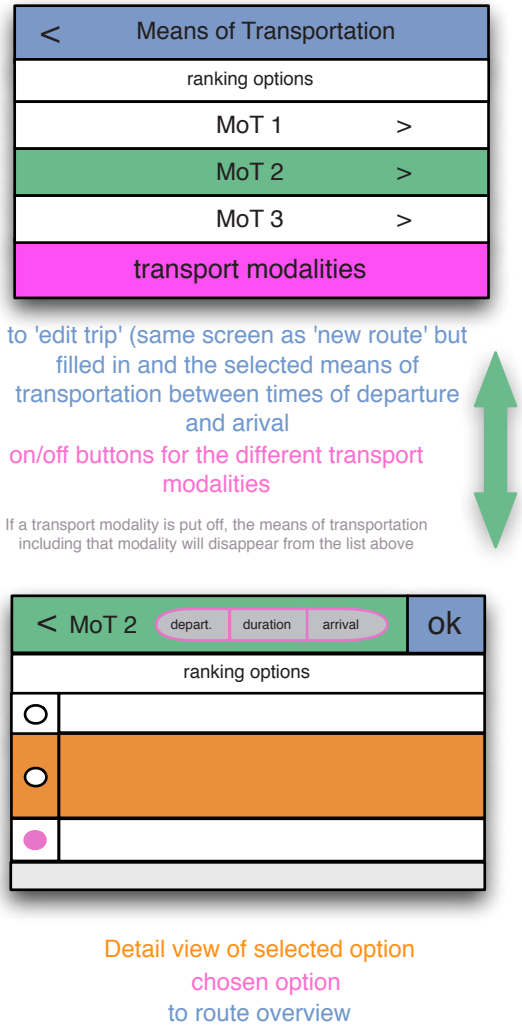
Guidelines for development of the prototype



Route planning - settings



Route planning - selection

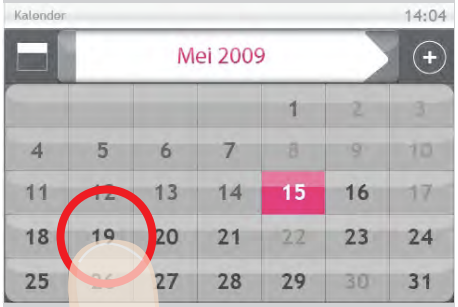
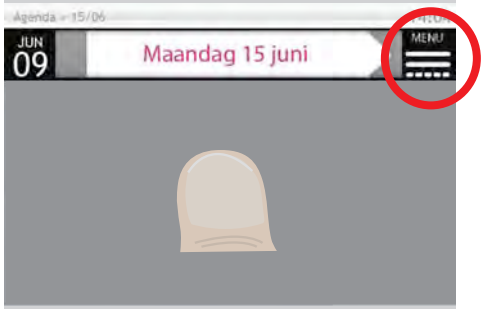


First Prototype


TERUG
KLAAR
adres
postcode
plaats
straat
huisnummer


tijd > nieuwe reis > tijdsinstellingen
16:58
TERUG
KLAAR
vertrektijd
16
58
1 min
5 min
10 min
15 min

User Test

	1 **unexpected start screen**	2 **too many/small buttons**	3 **non prominent menu button**
observation	The user starts the PTA and gets into the agenda. He didn't expect this and presses the calendar button in the upper-right corner to go a level up in the application	The user finds out he is in the calendar and wants to select a day. He tells he wants to select the 19th, but he presses 26 accidentally. He thinks it is fine as well for now and doesn't go back to the calendar.	The user sees an empty agenda in and tabs the big grey (empty) area, but nothing happens.
interpretation	The agenda is an unexpected start screen for the user and he looks for a way to get into the main menu.	The buttons are too small and close together for the user. (the user clearly doesn't have experience using touch screen smart phones and has relatively robust hands and movements).	The menu button in the upper right corner is not prominently present and doesn't attract the attention of the user straight away.
suggestions	Make a PTA home screen where the user can start by choosing what to do and is able to use it as an 'escape route'.	1. Create an option for 'easy mode' with bigger buttons for people who find the buttons too small. 2. Change the calendar by a date picker in which the user doesn't need that much preciseness	1. The menu could open up when pressing the empty zone 2. Straight go to 'new trip' 3. Put a text in the background explaining what to do.
			

Note: The screens used to visualise the observation are not always the same as in the user test, but they serve to show the aspect of discussion.

4

unclear how to plan a trip

The user discovers the menu button and presses it. He compares the options and wants to plan a trip. He selects 'terugreis' (return trip) instead of '+ toevoegen' (add).

He doesn't immediately gets that *'+ toevoegen'* (add) means plan a trip. Only the button *'terugreis'* (return trip) he links to a trip and tries to select this one.

1. Change 'add' to 'add a trip'
2. Clearly distinguish selectable and unselectable buttons.

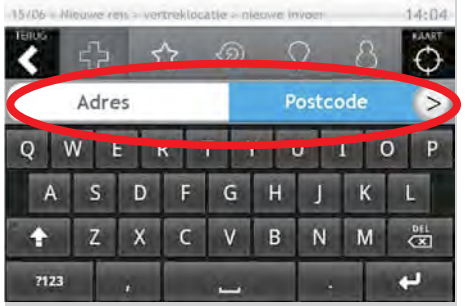
5

confusing options

The user fills in the address and wants to add the postcode. When he discovers he can add address OR postcode, he wants to go back to the address. What he wrote disappeared and he had to write it again.

This is a problem of the prototype data is not 100% working. Normally the PTA remembers what is filled in by the user.

Make clearer beforehand that the user needs to choose between address (place and street) and postcode, and that he isn't supposed to fill in all of it.



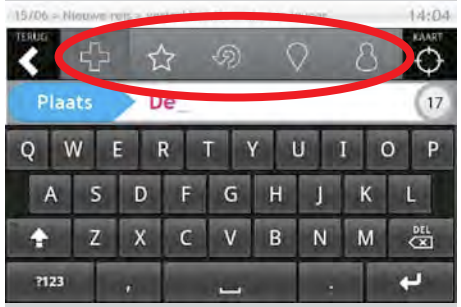
6

ambiguous icons

The user finds out there are icons in the menu beam at the top and can't figure out the meaning straight away, even for the universal star-symbol meaning favourites

The icons are not text-labelled and most of them are not universal symbols. This makes that they are not recognised immediately

Label all the buttons to avoid ambiguity.



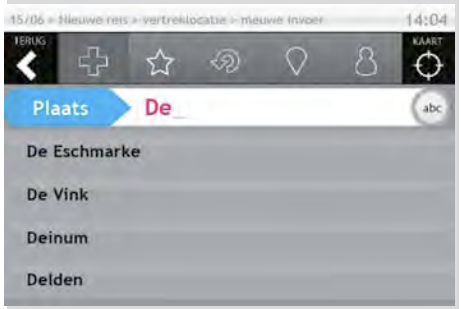
7

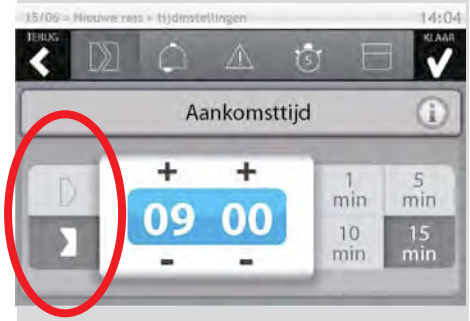
unclear how to confirm

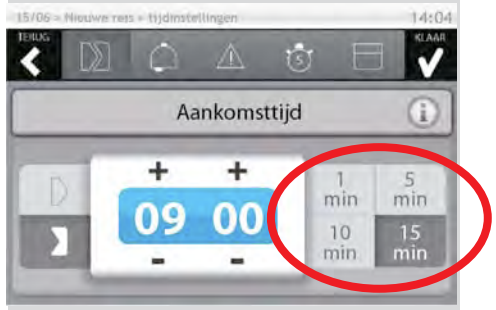
The user can't figure out easily how he can confirm he is ready.

The button for confirmation in the prototype is less clear and has a similar look as the other buttons. In the original design the button is clearer and more distinguishable.

8	9	10	11
word suggestions	**no back button**	**unclear and hard to find buttons**	**doubtful usefulness of intervals**
The users tells that it would be useful if the PTA gives suggestions based on the typing of the user.	The user presses the departure button to set up the time. When he realises he could better use arrival time, he looks for a back button he can't find.	The researcher gives a hint telling there is a way to change to the arrival time from within the current screen. Even after the hint the user can't find the option.	The user doesn't use the interval buttons on the right of the time element.
This feature is part of the design, but not from the prototype.	There was no back option available in this mode. Even if it is not needed theoretically, it is a kind of recognisable and comforting element.	1. The icons and positioning of the buttons are hard to find and understand. 2. The screen is rather complicated what can lead to some confusion for first time usage.	The test was too small scale to compare the advantages and disadvantages of this option.
	Adding a back button as 'escape route'	1. Make the icons and buttons clearer and more prominent 2. Make the screen less complicated and straightforward in what is expected.	1. Do extra testing on this specific aspect 2. Remove it, so the screen gets less complicated and the time-buttons bigger.







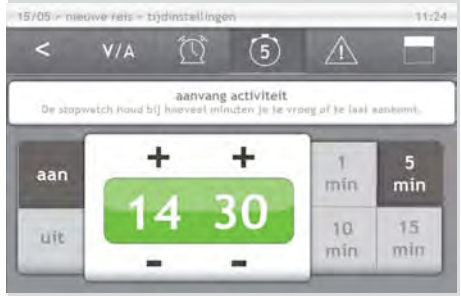
12

too many/complicated options

The user searches in the menu beam in the top for the arrival time. He presses the stopwatch and reads 'start of the activity'. He supposes it means the same as arrival time, but is confused because of the green colour.

Advances features are on the same level as the basic features. This can confuse novel users.

1. Create an options menu for the advanced features.
2. Leaving the advances features away since they are hard to understand and probably difficult to use as well



13

coding method not understood

In the list of options, the user doesn't understand the code 2OV and 3OV. OV means 'Openbaar vervoer' (public transport) and the number means the amount of vehicles.

OV3 is a code name designed in order to make it fit into a small space within the list of options. It is something the user will discover after a while, when playing around with the application.

Show the combination of vehicles on the same screen so the user can compare a 2OV and 3OV and see what happens.

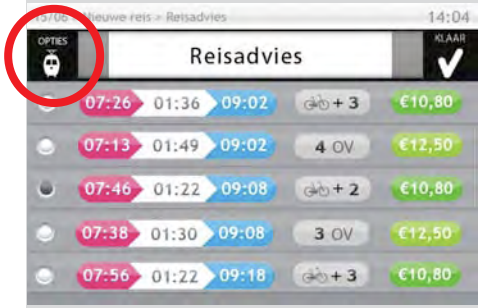
14

option in wrong part of process

The user thinks it is strange first to see options and then be able to put on/off vehicles.

These settings are done in the creation of a profile and are only meant for adjusting in exceptional situations.

1. Make the icons and buttons clearer and more prominent.
2. Make the screen less complicated and more straightforward in what is expected.



15

modifying the travel advise

When the user gets to see the screen with the details about the route, she says she would like to be able to make adjustments like changing a bus for a walk.

Add the option to change vehicles within the same travel advise.

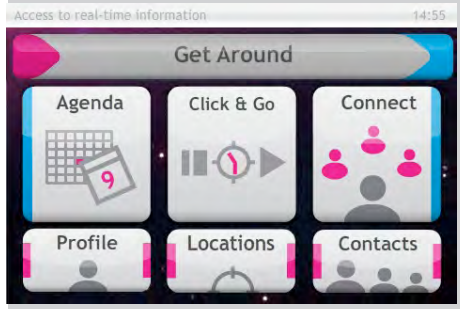
Redesign

Changes based on findings from the user test

1/3

Design of a home screen

Make a PTA home screen where the user can start by choosing what to do and is able to use it as an escape route



2

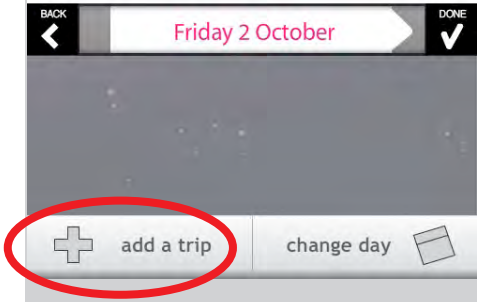
date picker

1. Create an option for 'easy mode' with bigger buttons for people he find the buttons too small.
2. Change the calendar by a date picker for which the user doesn't need that much preciseness

4

a more prominent 'add' option

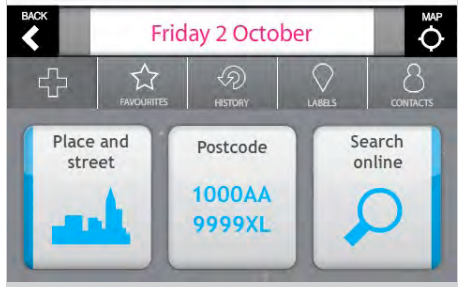
1. Change 'add' to 'add a trip'
2. Clearly distinguish selectable and unselectable buttons.



5/6

clarifying buttons

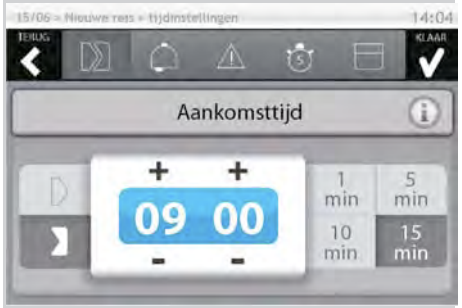
Make clearer beforehand that the user needs to choose between address (place and street) and postcode, and that he isn't supposed to fill in all of it.

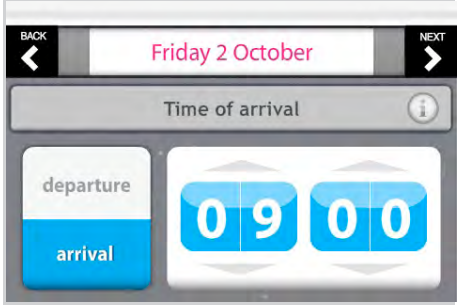


10/11/12

simplification of time settings

1. Make the icons and buttons clearer and more prominent
2. Make the screen less complicated and straightforward in what is expected.

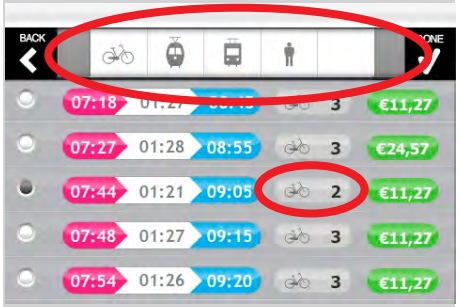




13

making meaning of code visible

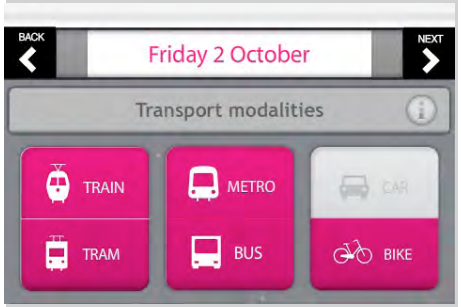
Show the combination of vehicles on the same screen so the user can compare a 2OV and 3OV and see what happens.



14

moving vehicle choice

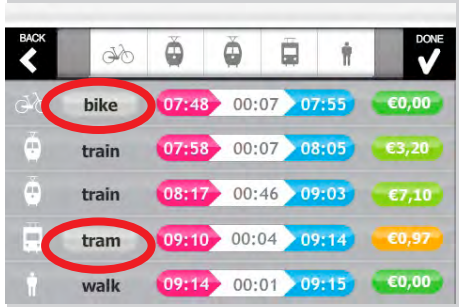
1. Make the icons and buttons clearer and more prominent
2. Make the screen less complicated and straightforward in what is expected.



15

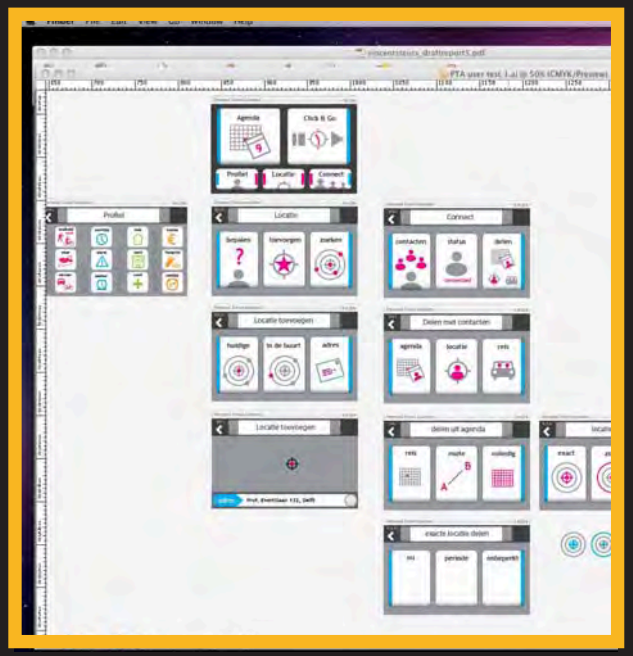
modifying the travel advise

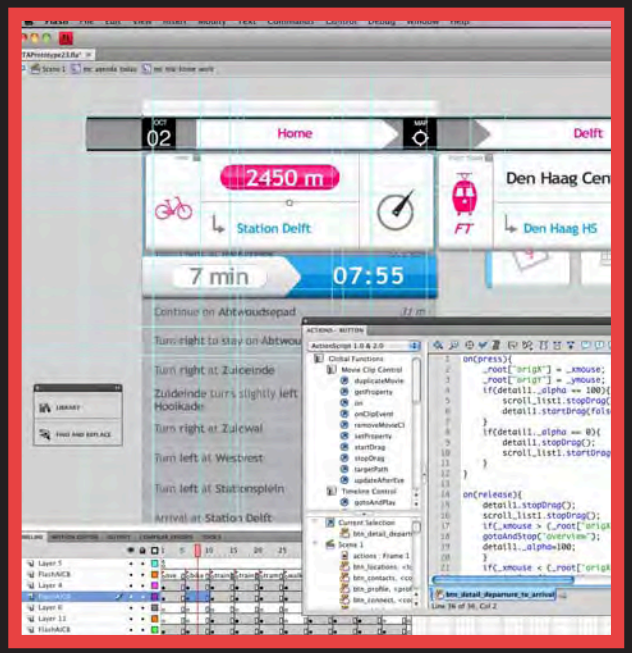
Add the option to change vehicles within the same travel advise.

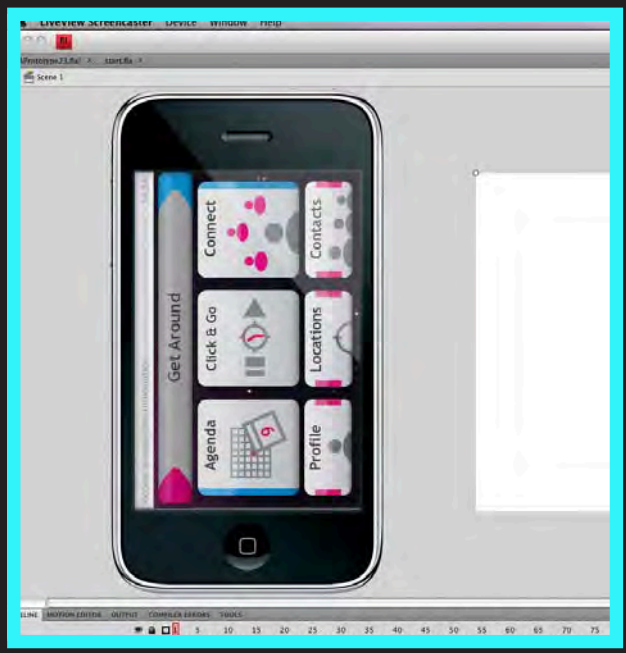


Second Prototype

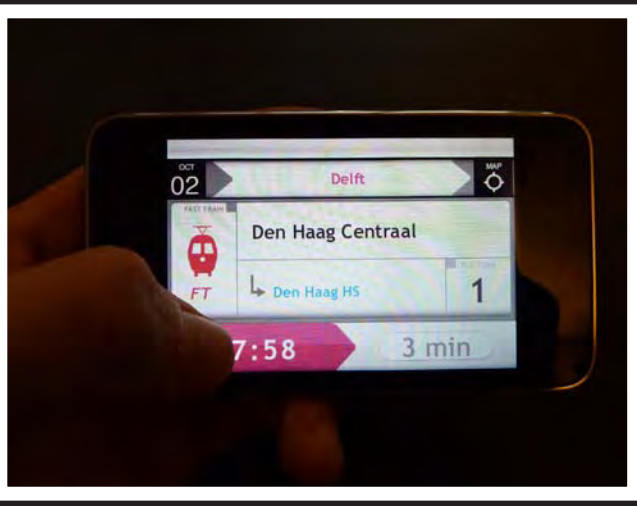
A visual impression on the creation of the prototype



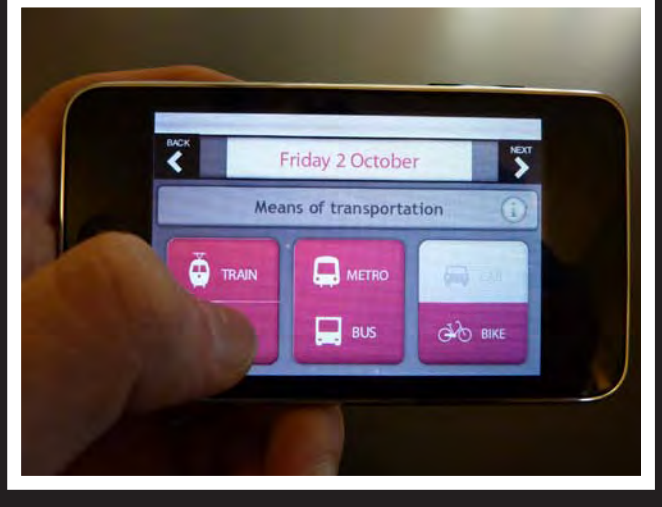


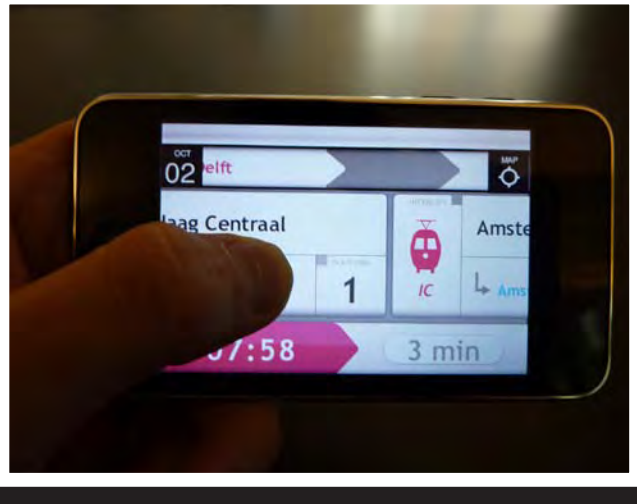


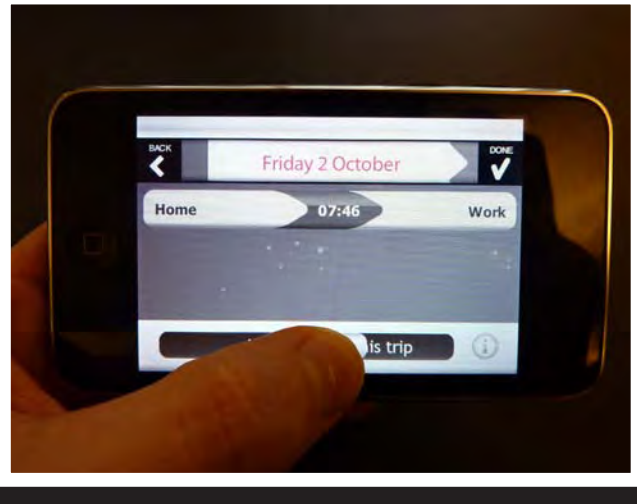

Get Around
Agenda
Click & Go
Connect
Profile
Locations
Contacts


02
Delft
Den Haag Centraal
Den Haag HS
1
7:58
3 min


BACK
DONE
Friday 2 October
Home
07:46
Work
edit
move


BACK
NEXT
Friday 2 October
Means of transportation
TRAIN
METRO
BUS
BIKE


02
1
IC
3 min


BACK
DONE
Friday 2 October
Home
07:46
Work

7

This chapter is the presentation of the final design. First the major feature of the product are presented, the design drivers. This is followed by the interaction styles. How do you navigate through the application and what were the most important points of attention influencing the final design? Finally all elements of the product are explained in a step-by-step guide.

Interaction Design

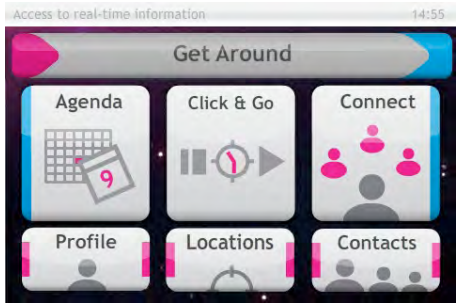
Design Drivers

The major advantages of the PTA

The PTA is named 'Get Around'. It explain exactly what it does, it supports you in getting around. From finding your way to meeting up with friends, traveling along and finding a nice bar or the closest supermarket.

Getting started

Get Around has six options to choose from in it's home screen: *Agenda, Click & Go, Connect, Profile, Locations* and *Contacts*.



PTA home screen

Agenda is for planning trips you are going to make later. You can place them on the day you wish to make them.

Click & go is for trips you want to make right away. It plans from your current time and position.

Connect is for all the social features: sharing locations, getting together and matching routes.

Profile contains all your personal settings and preferences and the overview of your traveling behaviour (price, time and sustainability).

Locations allows you to find out where you are, add locations to your library and search for interesting locations nearby.

Contacts is the place to manage your contact list.

Comparing alternatives

When planning a trip, you will have to select an option out of a list of possibilities. They can be compared on times of departure and arrival and duration as well as on number of vehicles, price and the availability of good alternatives. This paragraph focuses on the last aspect.

If there are alternative ways of getting to your destination in a similar time frame that are greener and cheaper, you'll get notified so you can change for example a tram for a walk, or your car for a train, dependent on how you feel like on that moment.

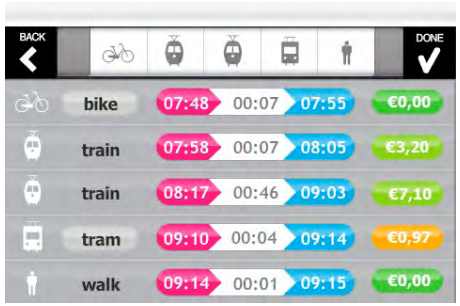
When you go by car from Rotterdam to Amsterdam, the train is a very competitive solution for the car and is cheaper and greener. In contrary, when traveling from places that are harder to reach by public transport, the car is a reasonable choice. In order to help the user making the good choices, there is a way the PTA communicates this aspect.

For example a trip that takes less than half more time can be seen as a good alternative while trips that take more than the double amount of time are less interesting alternatives.

So if there is an option available taking less than half the time more of the current option, the current options gets code red. When it is between half more and double it gets code orange. When taking more than double the code is green, meaning it is a reasonable choice.

The reason why duration, price and sustainability are seen relatively to each other is that it should support the user in the decision making. If a car would always be red, because it is the least sustainable solution, the user would not learn a lot, but just be confronted with his/her behaviour. Because of the differentiation in colour, even when always traveling by car, it should evoke curiosity in the user to go and check what alternatives he/she has.

The following trip is an example where an orange code is used. Even though the tram only takes 4 minutes, the time between arriving at the train station and at the final destination is 12 minutes. When choosing to walk, it would take 20 minutes, what is less than double of traveling by tram. If the tram would leave earlier or the walk would take longer, the code would be green, if it would leave later or the walk would be shorter, the code would be red.

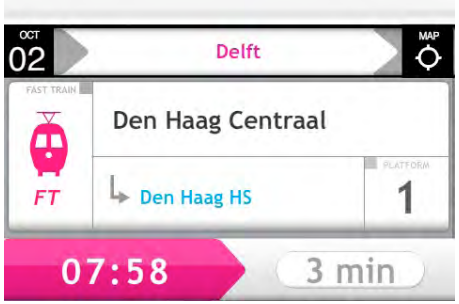


List of sub trajectories

So to conclude you could say that the PTA gives the user the freedom of planning the trip how he/she wants, and that this feature offers the possibility to optimise the trip to a greener and cheaper solution.

Focus on what is relevant

When you are underway on a trip and you open the PTA, their is a high probability you want to know about the next step you have to take. Because the PTA knows where you supposed to be on that specific moment as well as it has access to you location, it knows what information to show. So when opening the PTA on the train station, you'll get to see where and when to take which train. This is probably the only thing you care about on that specific moment. So instead of having the whole trip in a table on one screen in small font size, the PTA screens are designed to be understood from a very first second, even when holding the screen far from your eyes and being in motion.

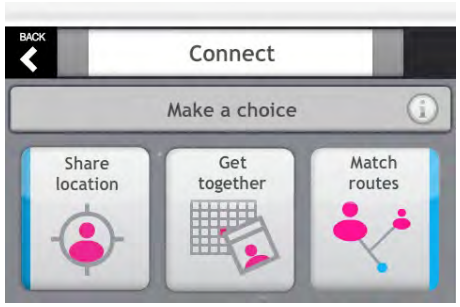


detail view of a train trajectory

Get connected

An important reason why people travel around is to meet up with others, both in private as professional situations. In these situations the user is not an isolated dot traveling over the map, but there are several, moving towards each other or into the same direction, trying to get together.

The connect feature of the PTA is designed to offer the user insights in this process and give him/her the opportunity to interact with it. There are several ways to do so. They will be illustrated with some examples in this paragraph.



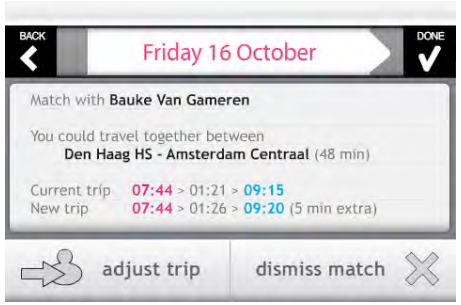
social features

The first option is to share your location. This is possible in a certain time frame set beforehand. You can send an invitation to your friends. If they accept, you can see each other location and be able to get together at any time during the set time frame.

The second possibility is to plan a meeting and invite others to join. In this way you'll know each other's expected arrival times at the meeting point. Besides meeting at a specific location you can also meet in a zone, providing every participant present in the zone to find each other using the share location feature.

defining a meeting zone

The third option is route-match. With this feature you can find out about friends that are traveling on the same route in a close time frame than yourself. It allows you to adjust your trip to the one of your friend so you can travel together.



adjusting a trip to travel together

Privacy

A crucial element in the acceptance of products that let you share information is privacy. If you are not able to fully understand and control privacy settings, it can be a hassle not knowing who knows what.

For the PTA this issue is well thought out: All the people that have access to your location are listed under Share location. You have the option to disconnect from anyone in that list at any moment, in order to protect your own privacy. When using route-match, you can make a trip private by choosing the option private in the options menu of the agenda.

private button enabled

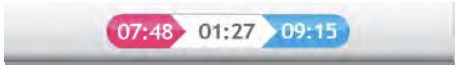
Interaction Principles

The different elements of the application

In this part you will find out all the reasoning behind why things are designed the way they are. Some of them survived it from the beginning, but many were optimised or sometimes radically changed along the way due to finding of own experience, discussions with other interaction designers and testing with users.

Colour coding

There are two major colours that are used throughout the app: Magenta and Cyan. It are two bright very distinguishable colours. They are used consequently connected to a meaning. All **times and places** for **departure** are magenta, for **arrival** cyan. The colours are also used in other situations, but once you are dealing with times or places the colours do contain this meaning. Especially when browsing through a trip in both overview and detail view this is important in communicating the information.



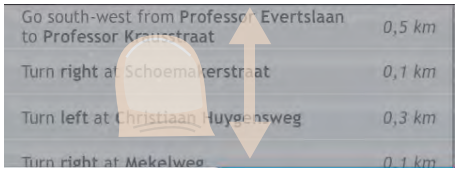
relationship between time and colour

The colours on the background of the prices communicate the **possibility for greener and cheaper alternatives**. Green means it is the **best option available**. Orange means there are cheaper and greener alternative options worth considering, but **taking some more of your time**. Red means the **time difference is so small** that it is wise to check the alternatives.

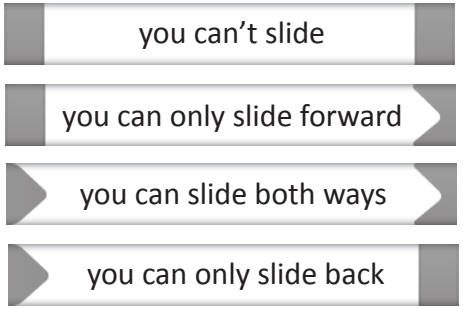
colour-coding for alternatives

Scrolling & Sliding

Scrolling and sliding are important interaction for navigating the application. Sometimes you can scroll vertically, other times you can slide horizontally. Scrolling vertically through a list is an interaction people are more familiar with than sliding horizontally. Under you see an example of a scroll list, on the right of sliding windows. The title beam on the top of the screen communicates how you can slide.

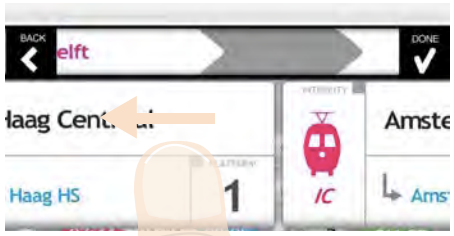


scroll-list



title beam showing how you can slide

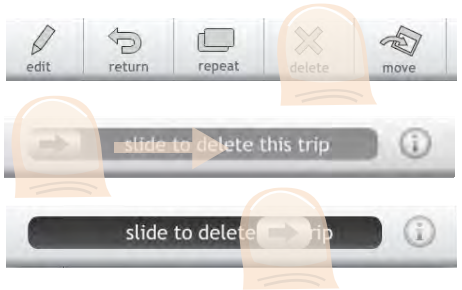
Sliding is possible on the whole screen, also on the title beam. During the sliding action the arrow will slide over the beam as feedback.



sliding from one screen to the other

Avoid unwanted actions

Sliding is also used as a way of confirming actions. Where on computers pop-ups are used for asking things like 'are you sure you want to delete this trip?' In the PTA you have to slide a button to confirm your action, making sure you don't make undesired action by mistake.

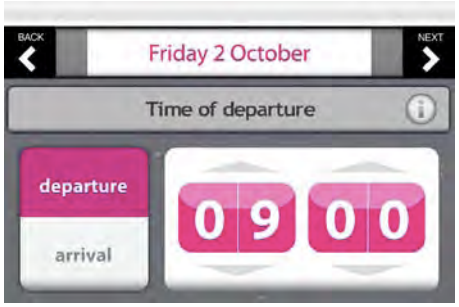


sliding to confirm an action

One task per screen

When putting a lot of settings on one screen, the user has to concentrate to find out what the things are he/she can do in that screen and preferably be in the possibility of keeping the screen stable and close to the eyes to operate the device and avoid errors.

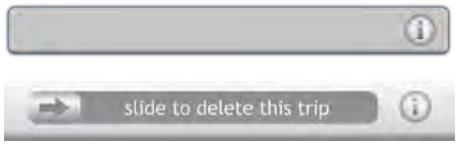
To me it is not the amount of screen that counts, but rather the time it takes to accomplish the job and a low error ratio. So why not focus on only one aspect at a time, making use of all the screen's 'real-estate' for just that one task. This takes away the need of preciseness and stability of the hand.



setting the time for a trip

Always know what to do

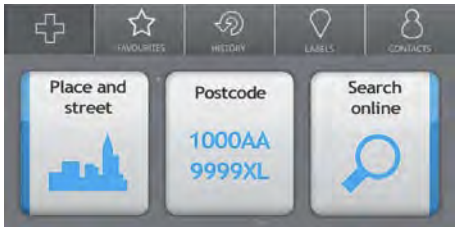
While using the application, the instruction of what to do are presented in a grey title beam. On the right it has an information button, providing the user with more explanation when needed. Also the confirmation sliders are provided wit this button. Of course it is not a way to compromise for poor interface design, but rather a way to give the user the feeling of trust and comfort. It should avoid the user can feel him/herself too stupid for the app or blaming the app for being hard to use and understand.



information buttons

Unambiguous buttons

Even the best designed icons can be misinterpreted by people. In order to avoid ambiguity, all icons are accompanied by a text label.



option for defining a location

Encourage exploration

A vision of Fred Beecher in the article *The iPhone is not easy to use: a new direction in UX design* (Beecher, 2009) says that learning how to use a product can come from playing with it. Encouraging and rewarding play is another approach than the classic 'ease of use'.

"You swipe and pinch and tap and shake your way to familiarity instead of pressing awkward buttons and navigating byzantine menu structures."

The PTA is designed in the same philosophy, making sure people can interact with it as if it was a game and just tap and slide around to find out what's possible. The landscape mode, big buttons and clear visuals are there to support game feeling and encourage explorative behaviour and a fun experience.

Even in a system like this, we could quickly be dissuaded from doing so if wrong actions had negative consequences, such as getting online or sending messages accidentally."

For this, the sliders for confirming action are implemented, so you'll never send out an invitation or delete a trip, etc. by just playing around without paying close attention to what the consequences of every action will be.

The iPhone goes further than encouraging play; it rewards play. If you explore the phone's applications, you will often find them anticipating your needs.

Next to the happy-path, a straightforward sequence of actions to accomplish the core functionality of the product that is essential for every user to grasp easily, the user can discover nice features by playing around and tapping where he/she didn't tap before.

A good example for this is that when you are on a bus or train , you can set an alarm telling you that you are almost at your destination.

alarm for arrival at destination

Or when you check the location of a contact using the share location feature, you can plan a trip to get to that person.

Plan a Trip

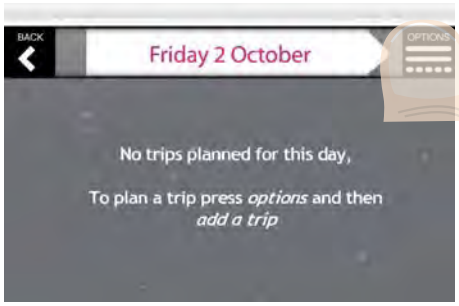
How to plan trips into your agenda

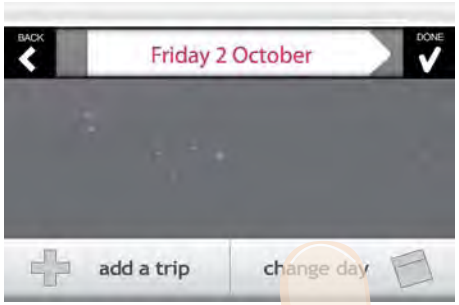
Adding a Trip

The following sequence shows how you can add a trip to the agenda.

STEP 1: *Select a day on which you want to make the trip*

You can slide day per day or click *options* and *change day* to pick a day where you want to jump to.

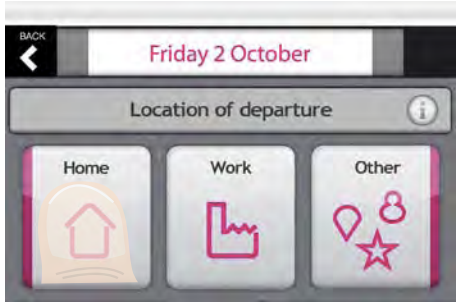


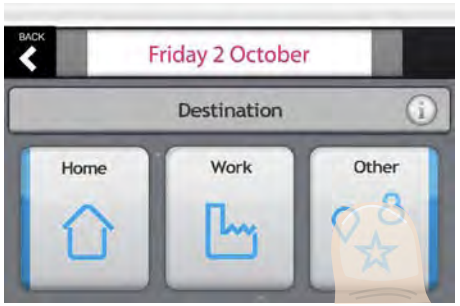


STEP 2: *Select locations of departure and arrival*

Home and Work have quick-selection buttons because they are involved in the majority of the trips one makes in a day.

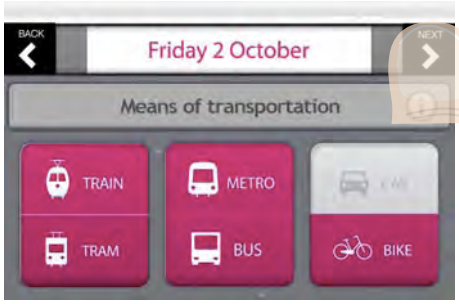
By clicking others you have the possibility to fill in a place and street, a postcode or search online as well as choose one from different lists like favourites, trip history, labels (see later) and contacts. The map icon let's you select a location nearby.





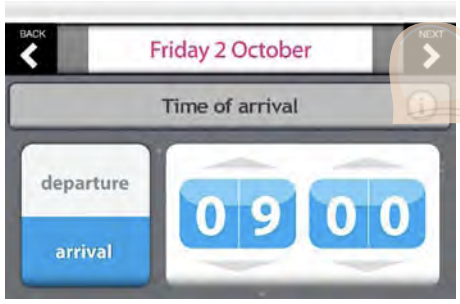
STEP 3: *Select the means of transportation you want to use*

This screen always opens in the state it was used last time, so you can usually click next straight away, unless you prefer to travel differently.



STEP 4: *Choose a time of departure or arrival*

By pressing the toggle on the left you can switch between departure and arrival. To set the time you can scroll or press the arrows attached to the numbers.



STEP 5: *Choose one of the options*

When you have accomplished the steps before, the PTA will connect to the server and present options approximate to the selected time. By pressing one of the circles on the left you can select a different option.

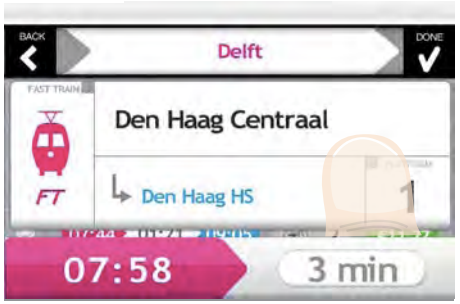
Previewing a trip

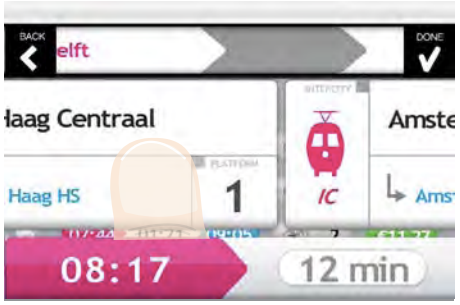
The beam on the top shows the type and amount of vehicles involved in your trip.

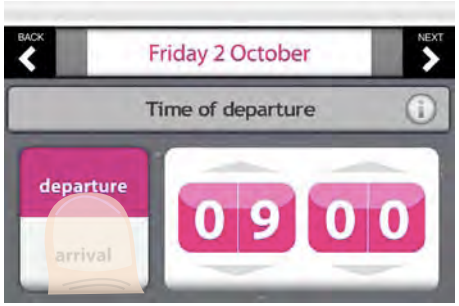
To find out more details like stations and departure times you can select one of the vehicles in the beam to open the trip preview.

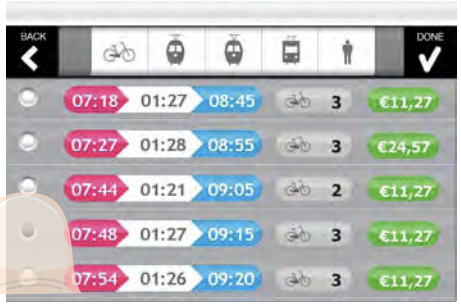
Once you are in the preview mode you can slide between the different parts of the trip.

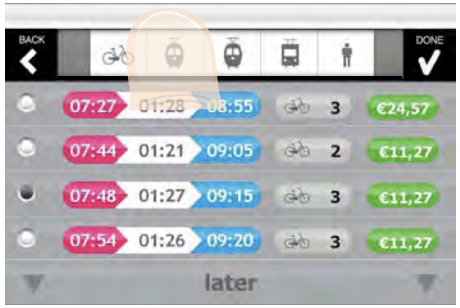
When ready with previewing you can press anywhere on the screen to go back to the overview.

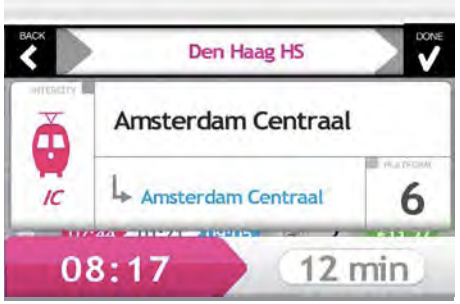






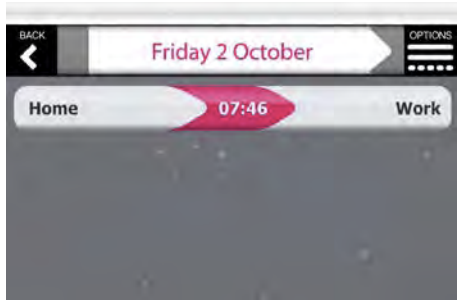


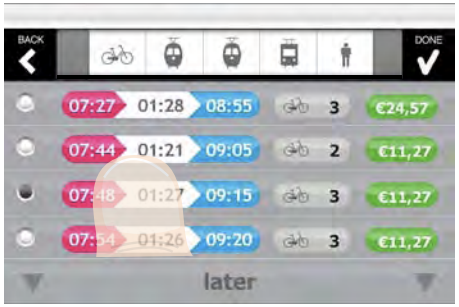




Changing vehicles

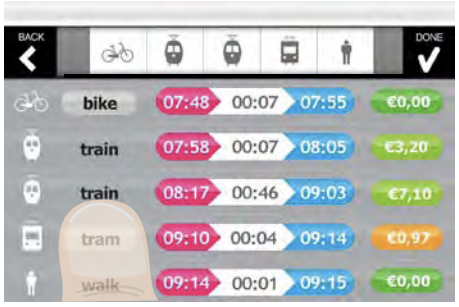
By pressing one of the trips in the list, you will get to a screen in which all parts of the trip are presented in a list. Here you can make some changes like changing a bike for a bus or a tram for a walk.

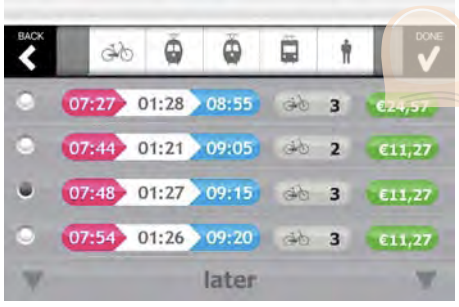




STEP 6: *confirm your selection*

When you made your choice you press *done* to confirm your choice and you get back to the agenda view where you started to plan the trip.



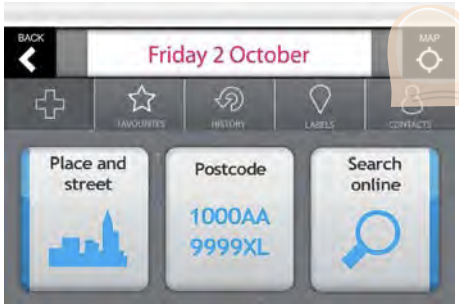


Using maps and labels

Maps & labels

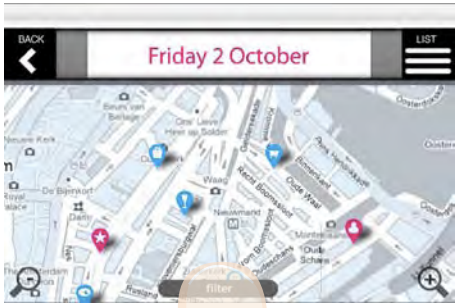
Next to saving locations as favourites or contacts, you can also give them a label. Labels stand for categories of locations. You can choose between grocery, shopping, drinks, food, fun, sights and important. (Later on in the section *Locations* you will find out how to save locations as labels).

You can access these labels when planning a trip. You can see them listed per category if you choose labels in the options beam or you can see them on the map when pressing *map* in the upper right corner. With *map*, you'll see the locations around the place of departure, in the beam they are listed alphabetically.



Browsing through the map

You can slide and zoom in and out on the map while looking for a location, You can filter your search by pressing filter and putting off places you are not interested in. This is especially useful when there are many options.



Selecting a location

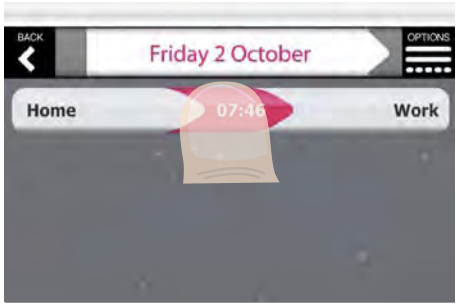
When you select a location on the map you will get the name of the place in an information beam. You can press this beam for more info like user ratings and reviews or you can press done to confirm the selection.

View a Trip

All the info you need to get to your destination

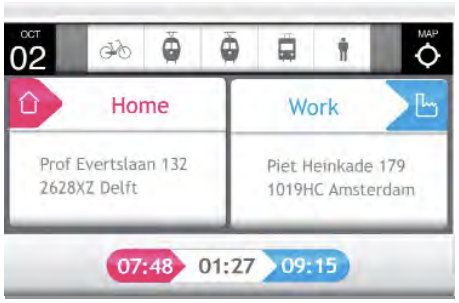
Viewing a trip

The following sequence shows how you can browse trough a planned trip, what information you can see and changes you can make.



Overview

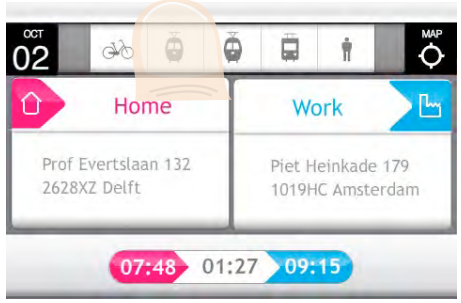
By selecting a trip in the agenda you get an overview of the trip. It shows your locations of departure and arrival (middle), the means of transportation to use (top) and departure, travel and arrival time (bottom).

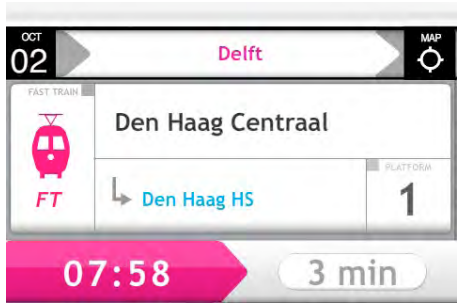


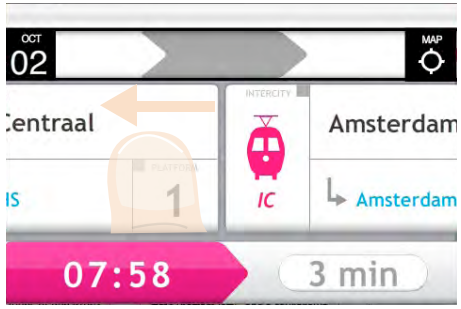
Essential details

To see more details you can select a vehicle in the top beam and slide between the different parts. You can also just start sliding in the middle and it will start with the first vehicle.

In this detail mode you have all the essential information you need to accomplish your trip. It shows the place of departure (top), the destination of the vehicle (middle, black), where you have to get out (middle, blue), where you have to catch the vehicle (middle, right), the departure time (bottom left), and a countdown showing how much time you have to catch it (bottom right).

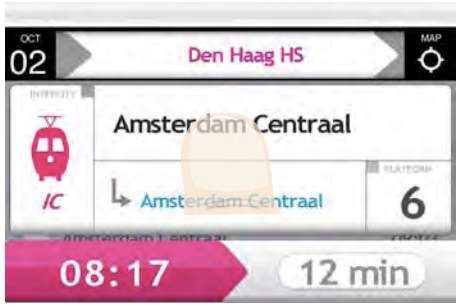


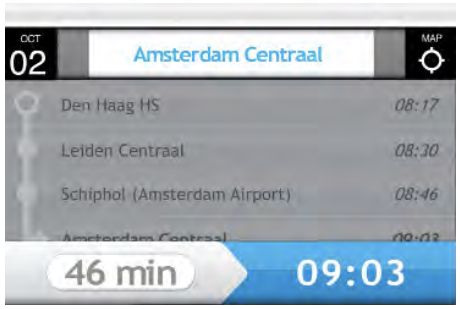




More details

By tapping in centre of the screen you get more information about the sub trajectory. It shows the destination of the vehicle (top), all the station on the way (middle), a countdown and arrival time (bottom).

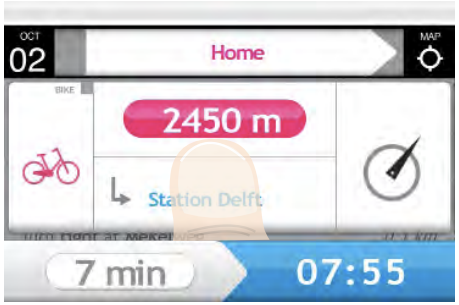


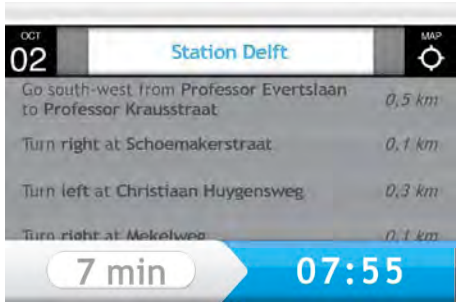


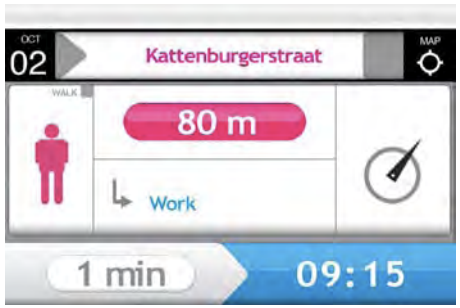
Details for own transportation

When making use of a bike, a car or walking, there is not such a thing as a scheduled departure and arrival time. Furthermore you have to find your way yourself. In order to assist you in this, the PTA uses different ways that can help you to get to your destination.

The distance and compass are a way to guide you in a quick way so you don't have to follow step by step instructions. If you think you do need these instructions, you can just tap in the middle of the screen. To see your route on the map you can press *map* in the upper right corner.







In-car navigation

Because in the car a compass will not work, it only uses step-by-step guidance. It shows the distance to the next turn (magenta) and an arrow explaining the nature of the turn.

Step-by-step guidence

Since the step-by-step guidence of the car is much clearer than the one of the bike, it is advicable to have the option as well for bike and walking. This could easily be achieved by toggling between the two modes when tapping the compass or the arrow. The text that is now in every element of the scroll list can be put under the distance (like in the case of the car). In this way the user would have every way of navigation at hand.

Sound

Just like with in-car navigation systems the PTA could also guide the user by sound. This can be a voice saying what to do every step, or in a more subtle way playing a beep or changing the music volume in the earphone on the side the person has to turn. In the last case it needs to be sure the user has the earplugs in the right ears, so it can't be the opposite of what the user has to do.

Agenda Options

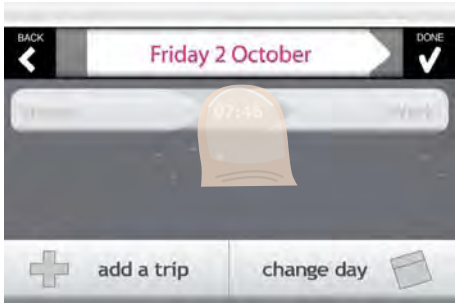
Everything you can do with trips in the agenda

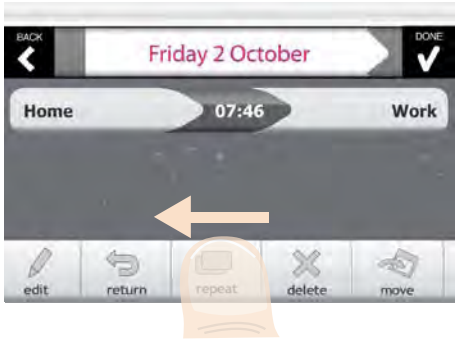
Options

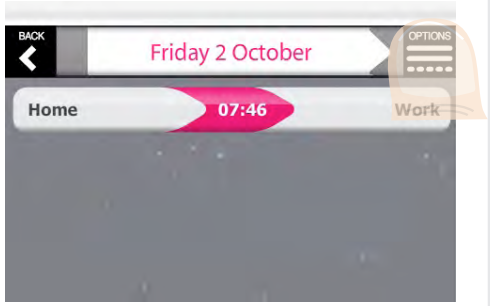
There are several things you can do with a trip once you planned it in your agenda.

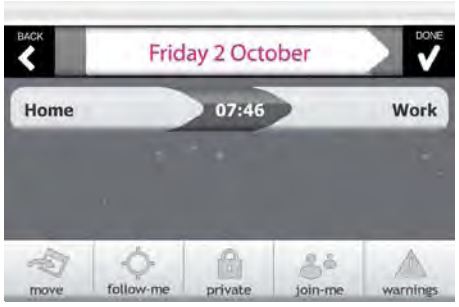
- edit location and/or time
- plan a return trip
- repeat on other days
- delete it
- move to another day
- let other people follow you
- make it private
- invite people to join
- activate warnings

What they exactly mean and how to use them will be explained in the next pages.



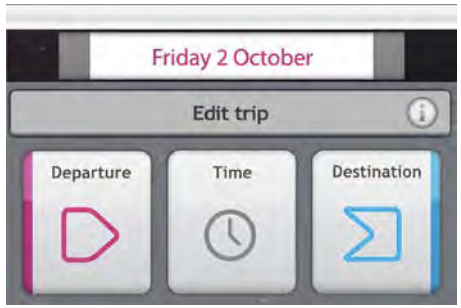






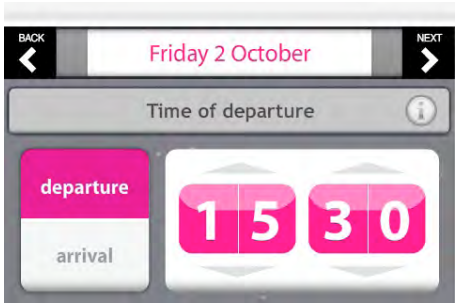
Edit

With the edit option you can change the location of departure or arrival or change the time for the selected trip.



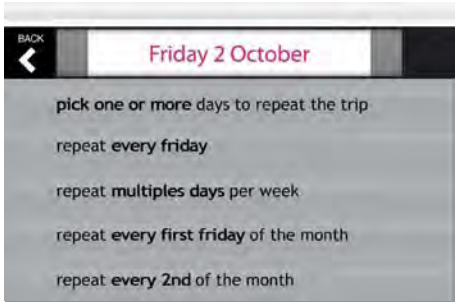
Return

The return option lets you plan the trip back. So you only have to indicate the time of departure or arrival for your return trip before you can request a travel advise.



Repeat

Trips you make more often can easily be copied to other days. You can select a day yourself or make use of repetitions during a certain period. E.g. every week, multiple days per week, every month, etc.

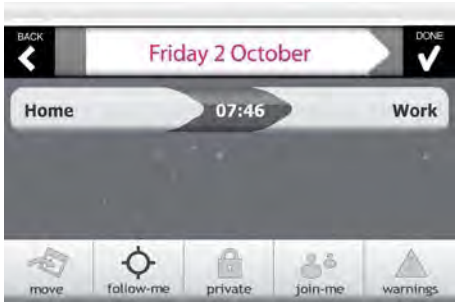


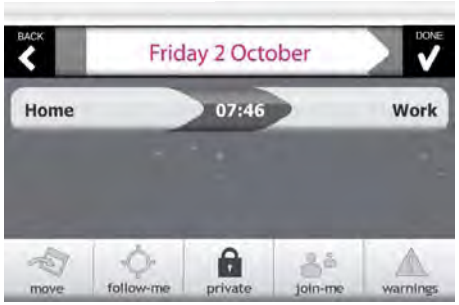
Delete

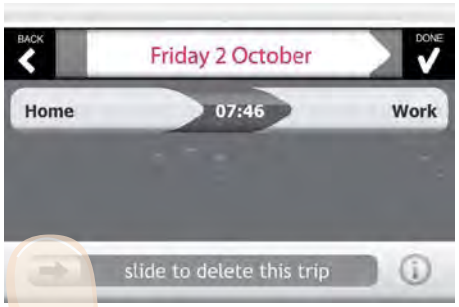
This function doesn't need a lot of explication. Slide the button delete the trip.

Follow me

With the *follow me* option you can share your trip with others. By letting the follow you, you give them the permission to see where you are in the trip and whether you are on track or not.







Private

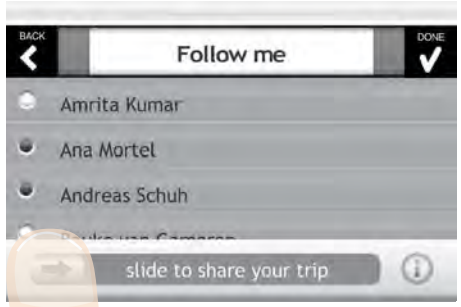
The option *private* is only useful when you make use of the *route-match* function. It is a privacy over-ride for the settings used for sharing your trips. In this case no one will know about this trip.

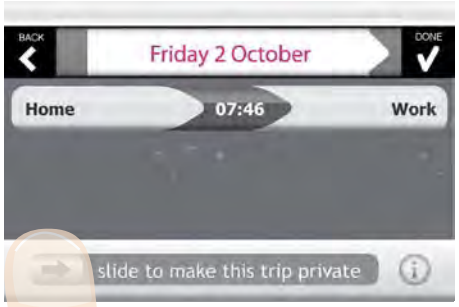
Join-me

With the join me feaure you can invite people at the destination of your trip. More details you can find under *Get Together*, later in this tutorial.

Move

Choose a day to which you want to move the trip. A change in travel advise is possible when for example moving from a weekday to a day in the weekend.





Warnings

In warnings you can adjust the way you want to be alerted when problems occur. This feature isn't worked out in this stage of the design process, but it shows where the preferences can be set.

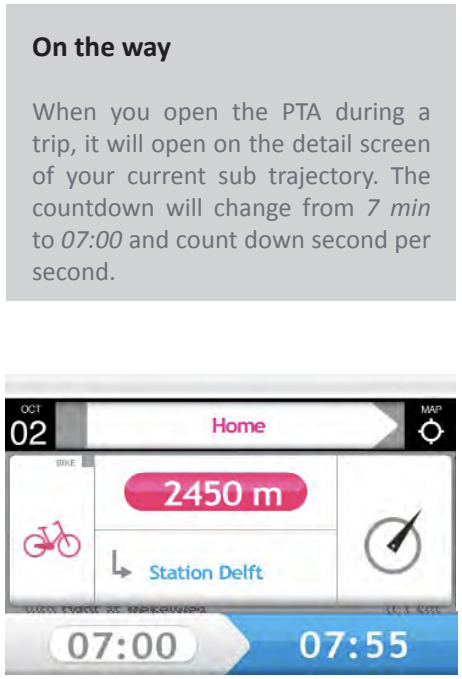
On the Way

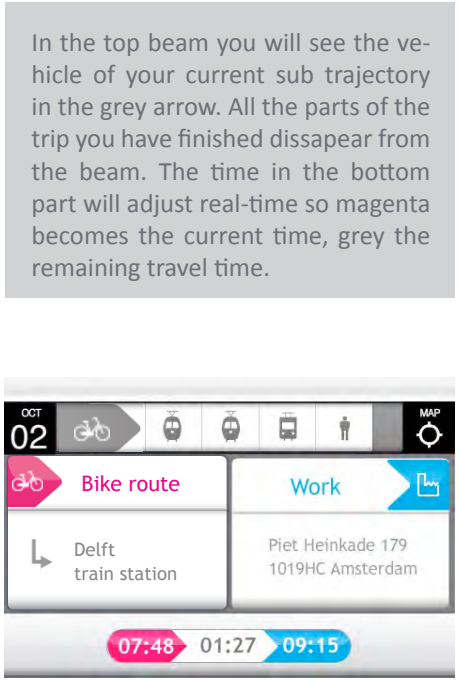
How you can interact with the PTA when traveling from A to B

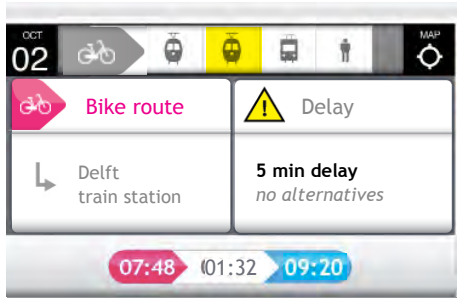
On the way

When you open the PTA during a trip, it will open on the detail screen of your current sub trajectory. The countdown will change from *7 min* to *07:00* and count down second per second.

In the top beam you will see the vehicle of your current sub trajectory in the grey arrow. All the parts of the trip you have finished dissapear from the beam. The time in the bottom part will adjust real-time so magenta becomes the current time, grey the remaining travel time.







In the detail screen you can see the delay next to the time of departure or arrival. The countdown adjusts to the new time of departure.

Push notification

When a problem occurs and you are not using your PTA at the time, you will get a push notification. This means the server sends you a message telling you there is a change in your trip and giving a brief explenation like *"10 min delay, no alternatives available".*

When the user selects the notification, the PTA will be opened automatically so the user can get to see the details and has the ability to adjust the trip. The image below is an example of a push notification on the iPhone.

Overview screen

When you go to the overview screen, the place where you normally see the location of depature (middle, left) is replaced by your current sub trajectory. By tapping this area you go back to the detail view.

Problems and delays

When a problem or delay occurs, you get a notification in the overview (middle, right). By tapping the notification you can adjust the trip when alternatives are available.

Click & Go

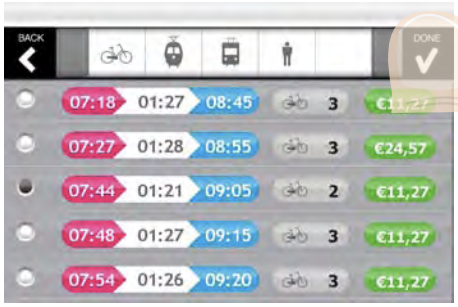
Traveling from here and now

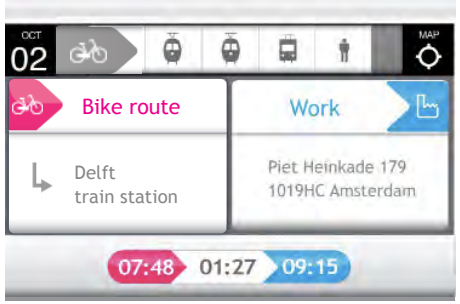
Click & Go

Click & Go is a fast way to plan a trip form here and now. By using your current location and time as departure information, you skip some steps in the process.

Alarm

If, after planning the trip, it seams that you don't have to leave straight away for the chosen option, you will be alerted 10 minutes before the time of departure. The trip will also be put in the *agenda*.



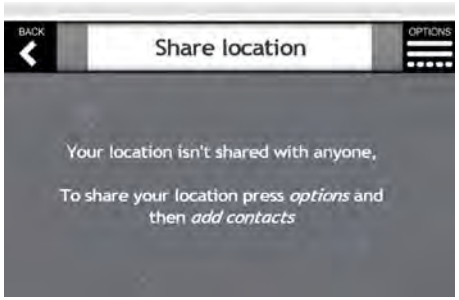


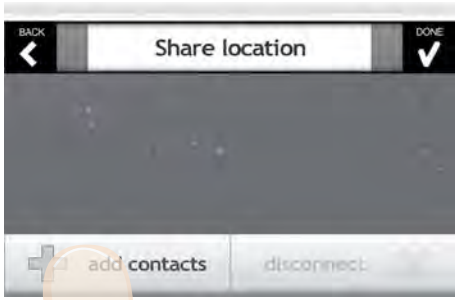
Share Location

Find each other by sharing your location

Share location

With this feature you can share your location with friends. When you press *share location* you see the overview of the people with whom you are currently sharing your location.



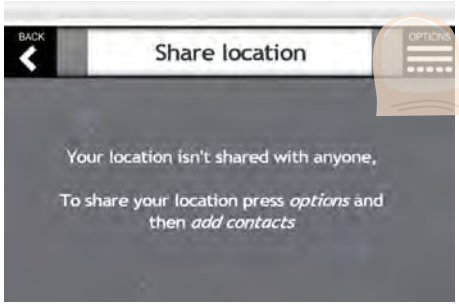


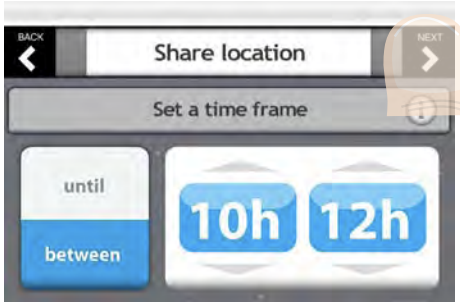
STEP 2: *set a time frame*

After selecting the people you have to set a time frame in which you want to share your location. You can set *until*, meaning you will start sharing right away, or you can choose *between* to set a time frame later on.

STEP 1: *select people*

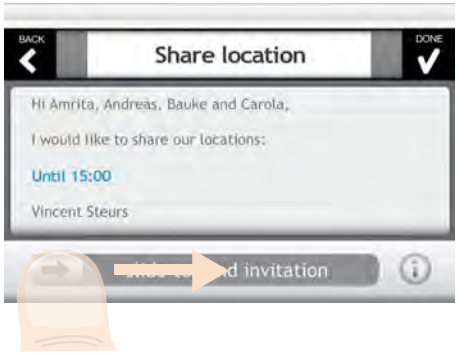
By pressing *options* and *add contacts* you can add people to the list of people with whom you are sharing your location. With the circles on the left of the names you can select the people.





STEP 3: *send an invitation*

The last step to do before you can start sharing is sending an invitation to the people you selected. To prevent you from sending out messages accidentally, you have to slide a button to send it.

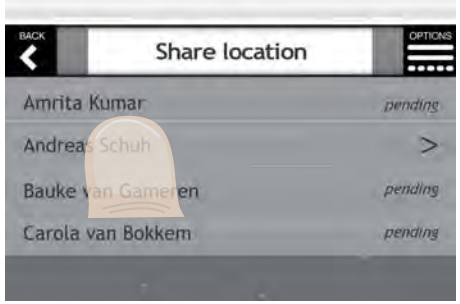


STEP 4: *wait for acceptance*

When you sent out the invitations, you just have to wait for your friends to accept it in order to find out their locations. When someone didn't accept it yet you'll see *pending*, otherwise an arrow.

STEP 5: *finding your friends*

By tapping on the name of the person, you get to a screen showing his/her location the map. When you tap the icon of the person, you can get directions to get to him/her from where you are.



Get Together

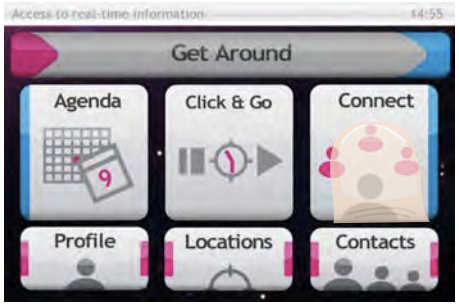
Meeting up with your contacts

Get Together

With this feature you can manage your trips to all your meetings. You can add meetings and get invited at meetings planned by others.

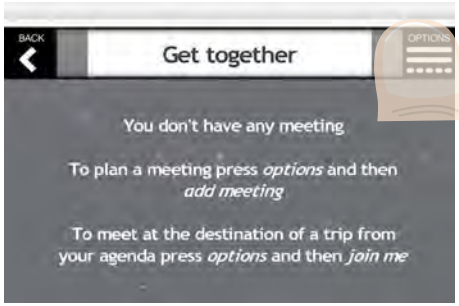
It allows the participants to plan their trip very quickly into their agendas without having to go through the process of selecting a day, place and time frame. The only thing left to do when accepting an invitation is to say from where you will be coming and how you want to get there.

Furthermore you have the ability to see the expected arrival time of every participants.



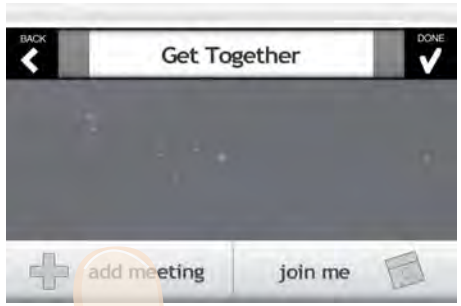
Options

In the options menu you have two possibilities. One is planning a new meeting *(add meeting)*, the other is inviting people at the destination of a trip in your agenda *(join-me)*.



1: Add meeting

To add a meeting you press the option *add meeting*. You'll first have to create a meeting invitation before you can plan your own trip. You must set a date, place, time (frame) and select the attendees.



Meeting point

Next to setting a specific location for a meeting *(exact)*, you can also meet in a *zone* or *place*.

With *zone* you choose a location and a radius, with *place* you just say the city. When attendees arrive at the meeting point, they'll get to see the location of the other ones present in the selected zone or place via the *share location* function.

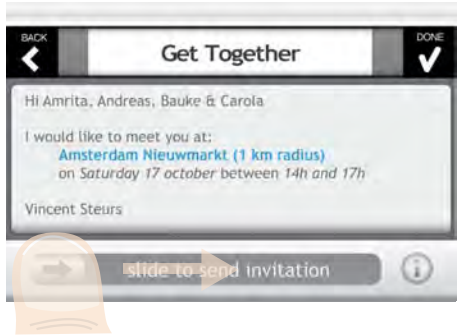
To set a *zone* you'll first have to select a location and then you can specify the radius. To set a *place* you just type the name of the city or village.

Meeting time

Next to setting a specific moment, you can also choose to set a time frame. With a time frame you'll give the attendees the possibility to join whenever they want within the selected period.

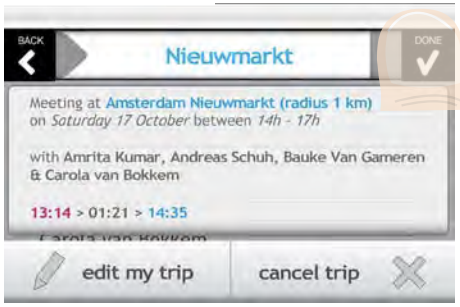
Invite people

When you've set all the details about the trip you'll have to select people from your contact list you want to join the meeting. When ready you can send the invitation by sliding the slide bar at the bottom.



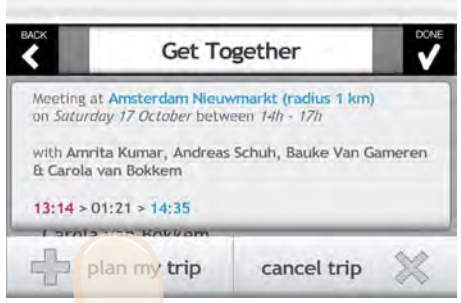
Plan your trip

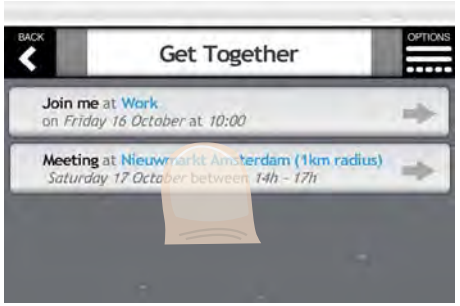
After sending the invitation you can plan your trip straight away, or you can do it later. To plan the trip you have to indicate your location of departure and the means of transportation you want to make use of.

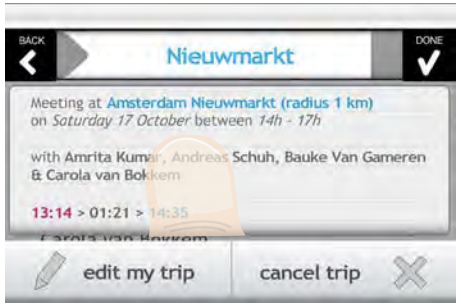


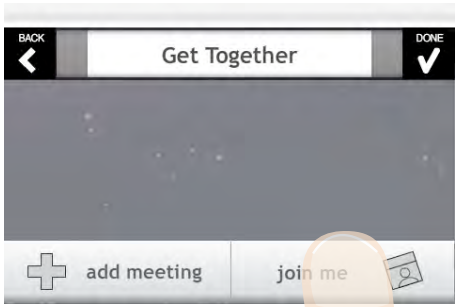
Check arrival times

After the trip is planned, the meeting is stored in the overview screen. By tapping the meeting you go to the detail view. When you tap the middle area you'll see the arrival times of the attendees of the meeting.



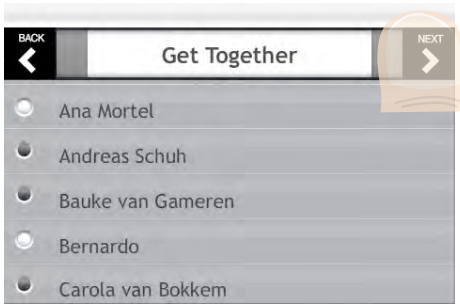


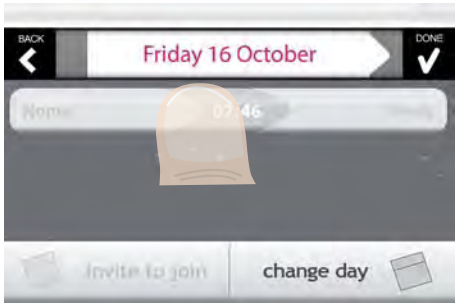


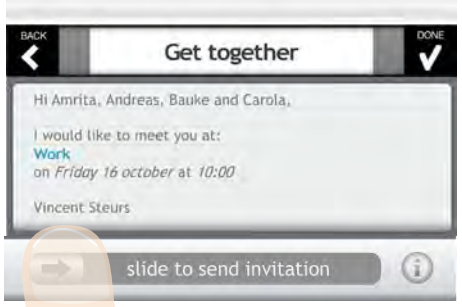


Meeting time

The meeting time is set standard at your arrival time. You can adjust it if you want the other people to arrive on another moment, later than yourself. If you are flexible, you can invite them within a time frame.

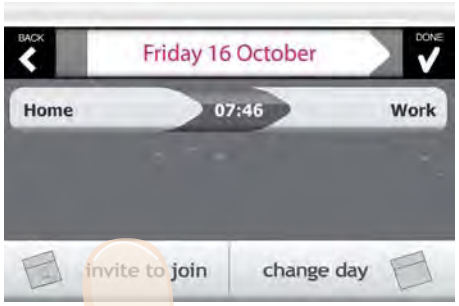


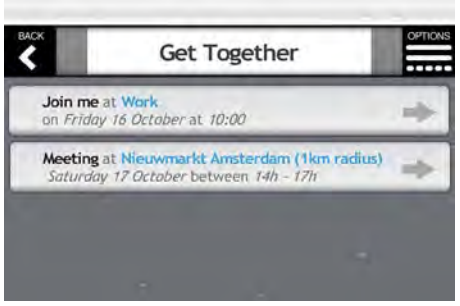




2: Join me

With join me you can invite people at the destination of a trip you already planned. In the agenda you can pick the trip of your choice. You only have to select a time and contacts to create the invitation.





Route-match

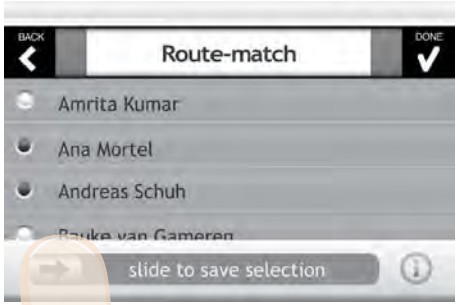
Match routes with your contacts

Route-match

This feature is meant to match your trips with the ones of your contacts. When you and a contact of yours are traveling on the same route with no or a small time difference, it could be convenient to find out and adjust your trip if necessary.

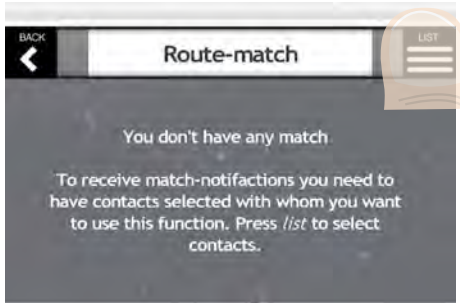
Route-match lets you choose the contacts for whom you want to use this feature. If a contact selected you as well, you will get match-notifications.

If you want a trip to be invisible for your contacts, you can put it on *private* using the options in the agenda.



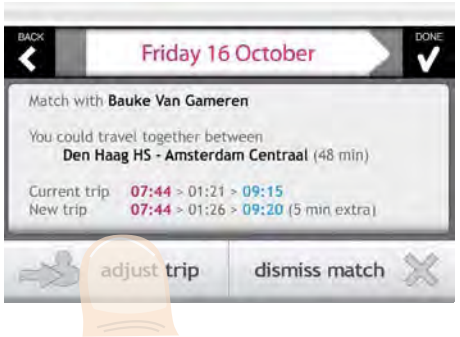
Adjust your trip

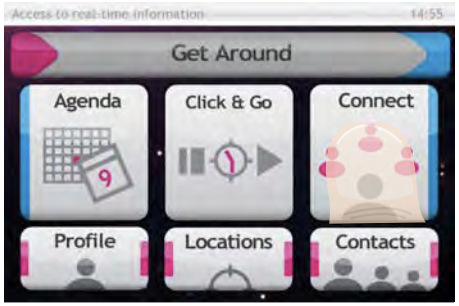
By tapping a match-notification in the overview you'll get to see the details about the match. Press *adjust trip* to change the trip in your agenda to the new trip suggested by the match-notification.

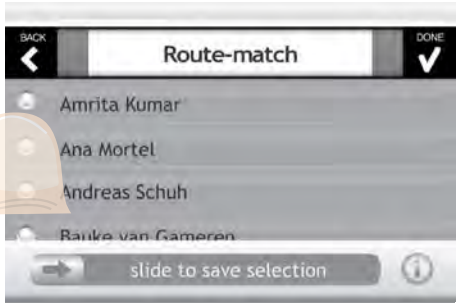


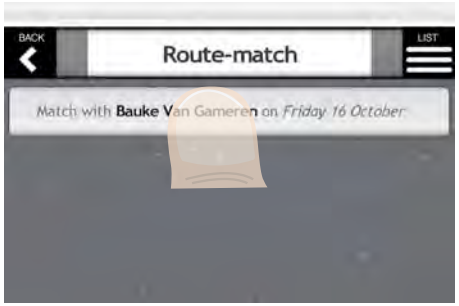
Overview

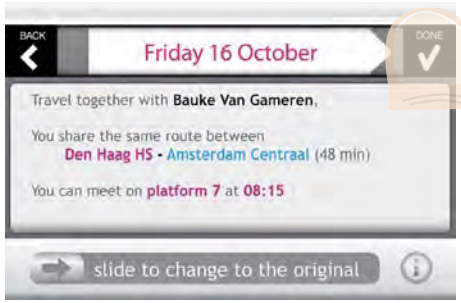
When you go to the *Route-match* feature and you have one or more matches, you get them listed vertically on chronological order.

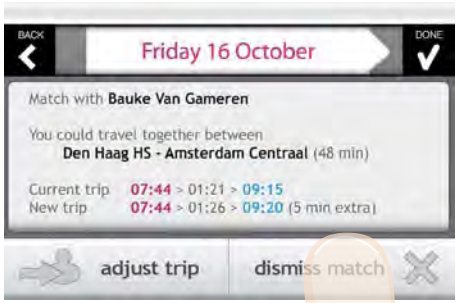


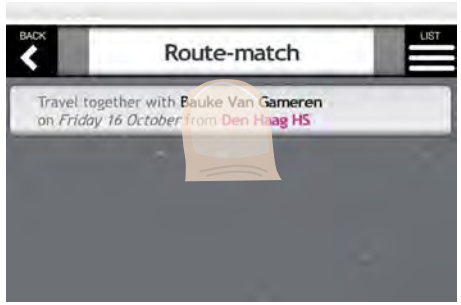


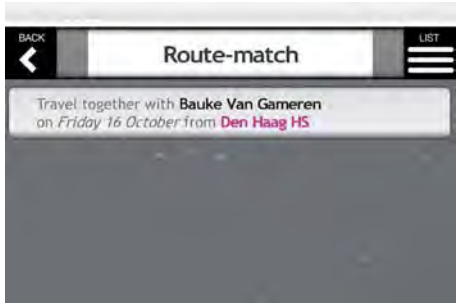


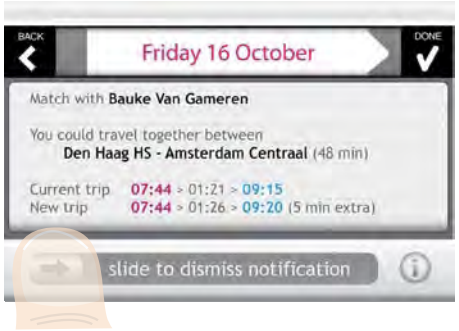


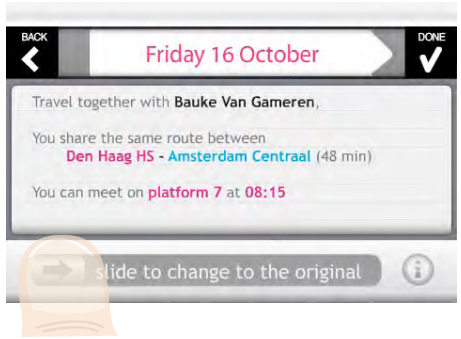










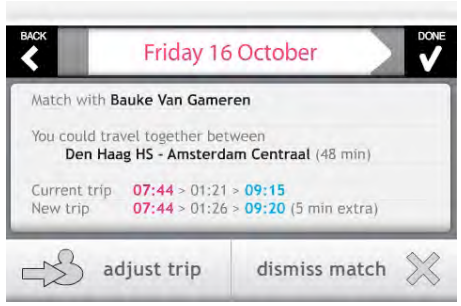


Dismiss a match-notification

If you are not interested in a suggested match, you can dismiss it by pressing dismiss match and then slide the bar at the bottom. The notification will disappear from your list.

Back to the original

When you changed your trip to match with another person, you can always undo it by changing it back to the original trip. First select the match of your choice and then slide the bar at the bottom.

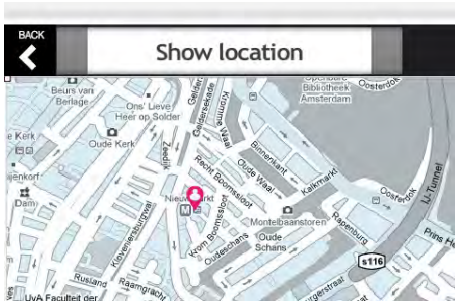


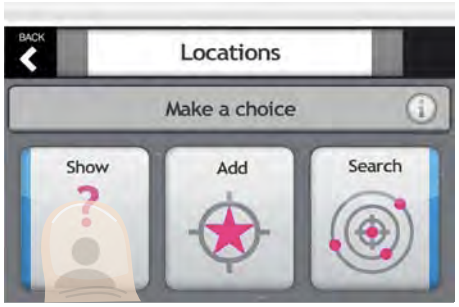
Show Location

Find your current location on the map

Show

When you select show, the PTA will show you your location on the map.



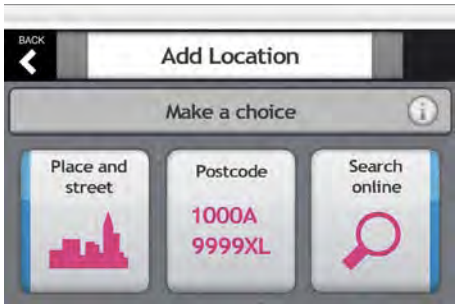


Add Location

Add a location to your library

Add

When you want to add a location to your library, you first have to select the approximation of the place. You can choose to add your *current location*, a *location nearby* or *other location*.

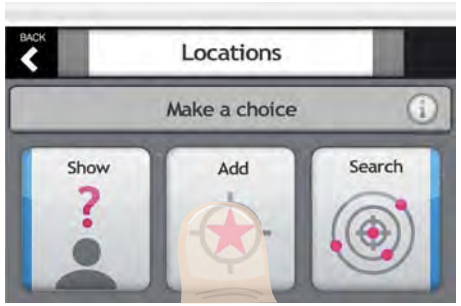


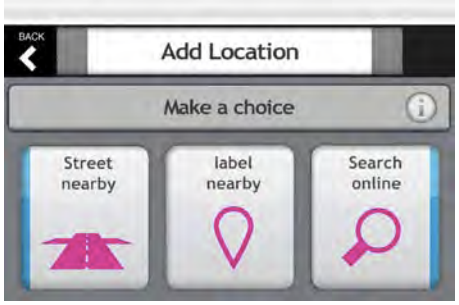
Location nearby

With *streets nearby* you get a list of all streets within a radius, with *labels nearby* you see all labels saved by PTA users around. With *search online* you can search on any subject you are looking for.

Save

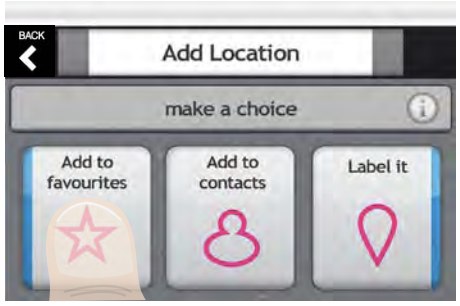
When you finished defining the location you can add it to your favourites, contacts or give it a label. A labelled location is public and can be viewed by any PTA user. Labels are an open way to tag the world around you.





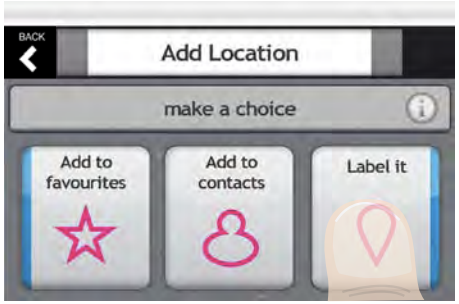
Other location

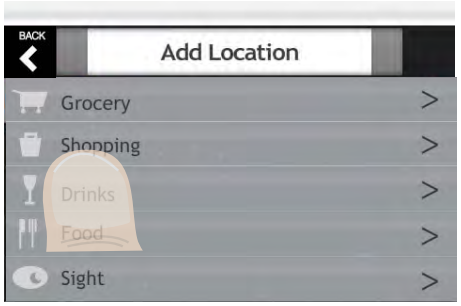
When you are adding a location that is not in your approximation you can define it by its *place and street*, *postcode* or *search online*.




BACK
Add Location
save as
favourite
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M DEL
?123


BACK
Add Location
label as
Drinks
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M DEL
?123


BACK
Add Location
make a choice
Add to favourites
Add to contacts
Label it


BACK
Add Location
Grocery
Shopping
Drinks
Food
Sight

Search Location

Search for locations in your approximation

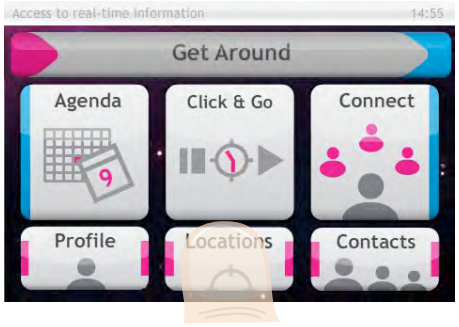
Search

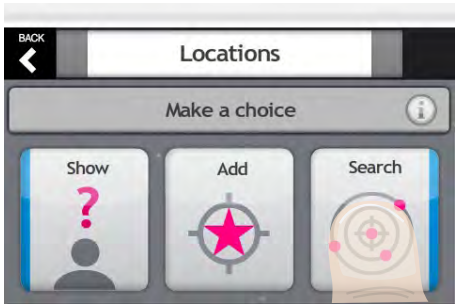
With Search you can look for interesting locations in your approximation.

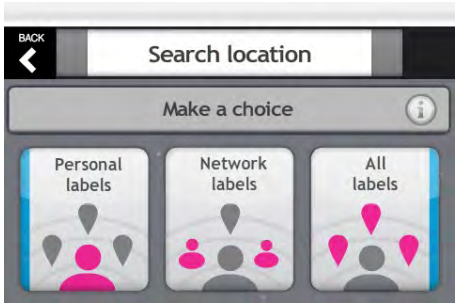
Personal labels are places you have added to your locations library.

Network labels are all the labels of the people you are connected to within the PTA system. This can be interesting when you are looking for places people in your network like, like a nice bar or restaurant.

All labels are all the labels from all PTA users, and thus the most complete list of locations available.

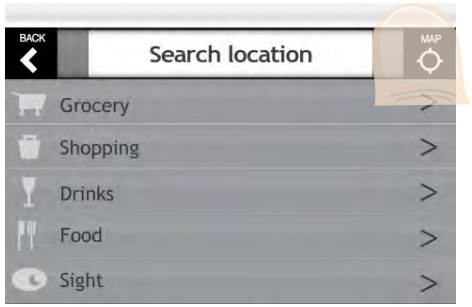


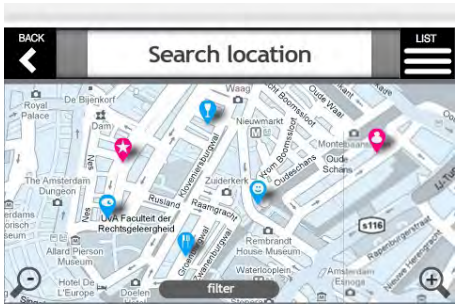




See all locations on the map

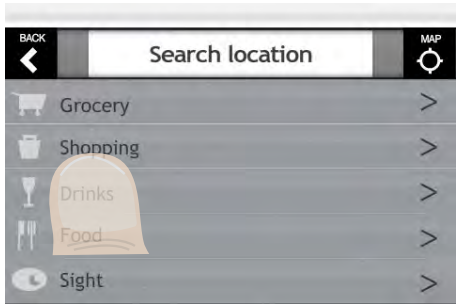
You can see all the locations on the map by pressing map in the upper right corner.





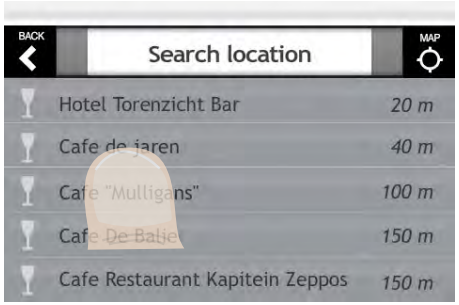
Looking for a type of location

When looking for a specific type of location like a supermarket or a bar, you can select the category. All the options will be ranked on approximation. You can select one in the list or see them on the map.



Looking for a specific location

When looking for a specific location you can select the place you are looking for in the list. When you select it you will get more details about the place. By pressing map you can see the location on the map.


BACK
Search location
MAP
Hotel Torenzicht Bar 20 m
Cafe de jaren 40 m
Cafe "Mulligans" 100 m
Cafe De Balie 150 m
Cafe Restaurant Kapitein Zeppos 150 m


BACK
Friday 2 October
DONE
Cafe “Mulligans”
filter

Profile

Everything the PTA needs to know to assist you

Profile

To create a profile for the PTA platform, you can do it via a website on your desktop computer. The section profile in the mobile app is mainly meant for getting an overview of your travel behaviour and make little adjustments.

With ***My behaviour*** you can see statistics about how much time you have been traveling, how ecological you travel and how much you spend on traveling per month. It should give you insights in how you travel and let you optimise your way of traveling.

With ***My locations*** you can set your addresses of your home and work, or choose for another option as second location like university (for students) or another contact (e.g. a family member for an elderly person).

My vehicles lets you indicate which types of vehicles you have and where you use them. You can tell if you have a car and/or bike and their specifications.

Contacts

Manage your contact list

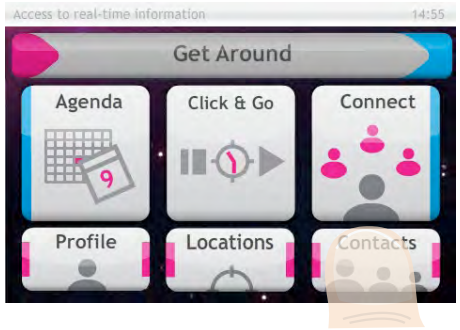
Contacts

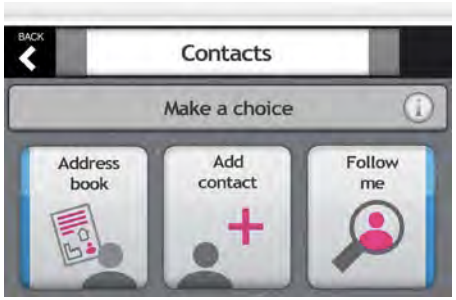
With *contacts* you can manage your PTA network. You can invite PTA users to connect, find their addresses in the address book and follow people or be followed.

The ***Address book*** contains the home and work addresses of your contacts as well as their labels.

With ***Add contact*** you can connect to other PTA users. When you are connected you can use the social features like share location, get together and route-match.

With ***Follow me*** you can see where others are when traveling on a route they share with you. You can also see whit whom you are sharing your own routes. This works similar as the other social features under *Connect.*





8

Final Thoughts

With my graduation project I intended to make a big step forward in the design of mobile services. I tried to create a product that could play an important role in people's life and be a tool that can help us enjoy more the act of getting around.

Because of the nature of my project - a demonstrator - I had the chance to really focus on the user and the future, rather than be limited by short term objectives and budget and programming limitations. I worked it out like an ultimate personal travel assistant in order to inspire people working in this field, what is still in its fuzzy front end, with no prior examples to compare with.

With my design I intend to show all stakeholders involved in the development of ICT in transportation what is possible and let them imagine that future world.

In order to create an application like I envisioned, a lot of work is still needed. Next to all the back-end issues, much more user-research will be necessary. I didn't have the chance to test the application in real life situations. During the design research and design process I tried to get close to these real life situations by creating personas, scenarios and idea charts, in which I created my own fictive world. By sharing this fictive world in my report I hope it offers some inspiration to readers working in this area. Still, I would love to see some of the ideas tested so I could get a view on the user experience. The Flash prototype can help people to imagine how it would work, but it can never have the same effect as using it in their daily life.

My design is just one of the uncountable number of possibilities for creating a personal travel assistant, but it is one that is made explicit. I hope it will be used in the *Connected Urban Development* program so it can reach a relevant audience and be a topic of discussion.

During the 6 months of my project I really got motivated about the subject and I feel it is an interesting emerging field I would love to keep designing for.

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www.infrasite.nl/news/news_article.php?ID_nieuwsberichten=7287&language=nl&refresh=1 (accessed on March 17th 2009)

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http://www.radio1.be/programmas/pepi/1020333/ (accessed on March 24th 2009)

http://en.wikipedia.org/wiki/Persona_(marketing) (accessed on September 4th 2009)

http://nform.ca/tradingcards/wireflow (accessed on September 15th 2009)

Thanks for reading and I hope you enjoyed it.

Vincent Steurs