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Implementation Status report on the Route planner for bicycles

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	WP1 Alternative fuels & clean vehicles		WP7 Energy-efficient freight logistics
	WP2 Collective transport & intermodal integration	X	WP8 Transport telematics
	WP3 Demand management		WP9 Project coordination
	WP4 Influencing travel behaviour		WP10 Project management
	WP5 Safety, security & health		WP11 Research and Technological Development
	WP6 Innovative mobility services		WP12 Impact and process evaluation
			WP13 Dissemination, citizens' engagement, training and knowledge transfer

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CONTENT

1. Summary

The route planner for bicycles is a tool for commuters, inhabitants and tourists to plan a trip along recommended and safe cycle routes in Gent. Next to providing safe and comfortable cycle routes, the tool allows cyclists to plan their own personal routes. Cyclists can select their own preferences such as cycling along green and relaxing axes, avoiding tram tracks, cobblestones, hills, heavy traffic and roads in poor condition.

The aims of this tool are improving the safety for cyclists and increasing the number of bike trips.

As the City of Gent wants to improve the communication towards the large public by providing more geographical information with a minimum effort, the development of this tool is part of the GentIS WEB project of Digipolis and the City of Gent.

The route planner for bicycles www.gentfietst.be was launched at a press conference on 3 September 2010 and demonstrated at the CIVITAS square during the Car Free Day (19 September 2010).

In the near future (January 2011), the website www.gentfietst.be will be expanded with information of all Gent cycle services. The route planner for bicycles will then be part of this website. (Expansion is part of the measure 4.5-GEN 'The House of the Bike'.) From January 2011 onwards the route planner for bicycles will be accessible for foreigners (in 3 languages) and disabled and visually impaired citizens. To keep the route planner for bicycles up to date, the visitors will have the possibility to give their remarks or suggestions (tool integrated in route planner for bicycles). This will be communicated during the large communication campaign of the website www.gentfietst.be in spring 2011. Demonstration of the route planner for bicycles (e.g. loaning bike GPS systems) will also be done during sensitization campaigns of other CIVITAS measures: mobility management for companies, schools, holistic event management, mobility dialogue…

For evaluation the following data is being collected continuously: number of visits, unique visitors, requested routes, remarks/suggestions and overview of requested routes. Also acceptance and awareness surveys are planned.

2. Timetable

The timetable for the implementation of this measure is presented in Table 1 and indicates the main deliverables and the accomplishment of Milestones and Working Documents related to the measure.

No. of M/ WD/ D	Name of M/ WD/ D	Delivery date from DoW	Achieved/ Delivered (Yes/No)	Actual/ Forecast achievement/ delivery date
8.10 – M1	Decide on safest, shortest, most comfortable cycling routes and link attributes to the existing model	15.01.10	Y	31.01.10
8.10 – M2	Test the internet based route planner	15.05.10	Y	12.07.10
8.10 – M3	Technical design completed	15.07.10	Y	12.08.10
8.10 – WD1	System specification	15.08.10	Y	15.08.10
8.10 – M4	Test the PDA	15.11.10	Y	15.11.10
8.10 – M5	Implementation of the internet based route planner	15.09.10	Y	03.09.10
8.10 – M6	Implementation of the PDA bicycle route guidance system	15.01.11	Y	15.01.11
8.10 – M7	Interviews to the target groups	15.03.11	Y	15.03.11

No. of M/ WD/ D	Name of M/ WD/ D	Delivery date from DoW	Achieved/ Delivered (Yes/No)	Actual/ Forecast achievement/ delivery date
8.10 – M8	Gathering number of users and hits	15.03.11	Y	03.09.10
8.10 – WD2	Evaluate interviews and number of users and hits	15.09.11	N	15.09.11
8.10 – M9	Website with specific information	15.09.10	Y	03.09.10
8.10 – M10	Promotion of the tool finished	15.08.11	N	15.08.11

Table 1: Timetable

3. Route planner for bicycles

3.1. Objectives and innovative aspects

The route planner for bicycles is a tool for commuters, inhabitants and tourists to plan a trip along recommended and safe cycle routes in Gent, even when it leads to small detours. The bike route planner will show the safest cycling routes or alternative routes with cycling paths and little traffic. Additionally, the system will show the availability of safe crossings by means of cycling tunnels or bridges.

At the same time, Digipolis starts with the GentIS WEB project. The aim of this project is setting up an integrated and generated tool for publishing geographical information to the larger public. The development of this route planner for bicycles is also part of the GentIS WEB project.

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- The City of Gent wants to improve the safety for cyclist by increasing the awareness of attractive and safe routes in Gent.
- The City of Gent wants to stimulate the use of bicycles by commuters, inhabitants and tourists.
- The City of Gent wants to distribute information of the recommended bicycle routes, which are now only available on paper maps, via the internet and new media.

GIS (Geographical Information System)

- The City of Gent wants to improve the communication towards the large public by providing more geographical information with a minimum effort. This will be reached by setting up an integrated and generic technical solution.

3.2. Situation before

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Today cyclists often ride along roads in poor condition (cobblestones, tram tracks) and pressure traffic. As a result there is a great feeling of insecurity among cyclists. To decrease this feeling of insecurity, currently the city of Gent provides a route map for cyclists to help in planning routes throughout the city. More and more cars are using navigation systems. Commuters are increasingly using a wide range of planners via the internet. Tools like these allow planning quick, short and safe routes. For cyclists, there are such systems available, but they rarely give information on safe routes.

GIS and WEBSITES GENT

Currently more and more cars have route guidance systems. Via the Internet, car drivers and public transport users can also simulate their trip with all kinds of models. They are able to look for the fastest or shortest way. For cyclists, systems like this are available but they are not giving information about the safest cycling route.

3.3. Implementation status

Within the City of Gent the idea to develop a Gent Route planner for bicycles has been present for a long time, but no budget or personnel were found. Thanks to the CIVITAS project, the route planner for bicycles is now a fact.

3.3.1. Research and development

3.3.1.1.   Approach

After discussion with the actors involved in the project, we decided to develop an own system for the on-line route planner rather than use, e.g., Google Maps.
The reasons are as follows:

- Basic routing data is the same as google maps but specific data for Gent is added (cycling net-work Gent, one-way streets open for cyclists, prohibited roads for cyclists, condition of roads, tram tracks, slopes, cobble stones, etc.)
- DIGIPOLIS wants to incorporate this knowledge in its organisation because more route planners are to be developed in the future. Gaining the knowledge in-house and creating an own tool is more cost-effective on the long term since no hosting and maintenance costs need to be paid.
- Better guarantee for exploitation after ELAN
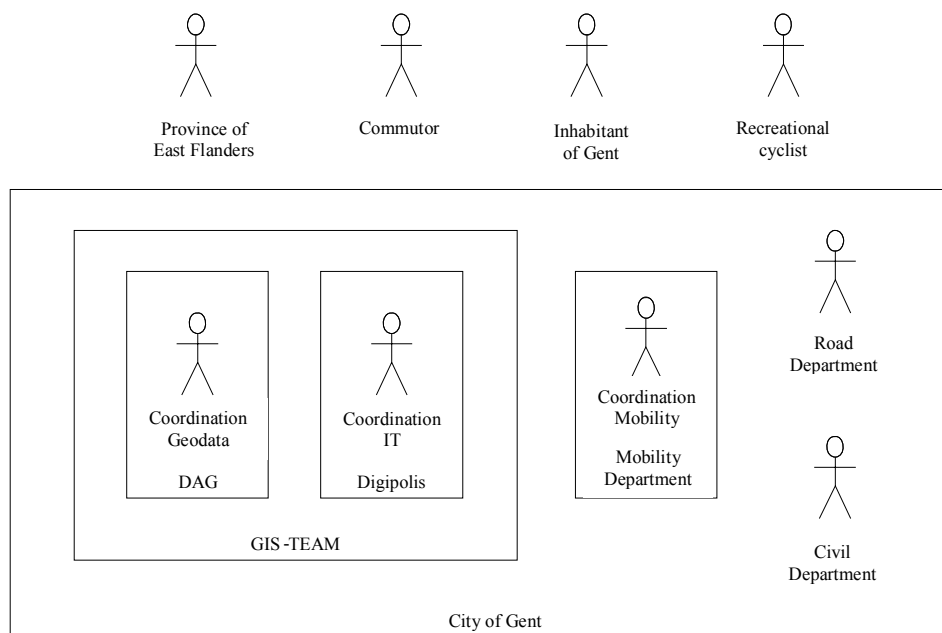

3.3.1.2.   Actors

Fig 1: Actors involved in the development of the Route planner for bicycles

In this project the following actors are involved:
- Target groups: commuters, inhabitants, recreational cyclists
- Mobility Department: project leader of Route planner for bicycles

- Data providers: City of Gent (road department, civil department, mobility department,…) and the Province of East Flanders (information on the surroundings of Gent)
- GIS team: DAG (coordination cel 'Data, Analysis and GIS' of City of Gent - coordination geodata) and Digipolis (coordination IT affairs).

3.3.1.3. Geographical area

As the mobility department of the City of Gent wants to stimulate the commuters to travel by bike to Gent, the bike route planner will provide cycle routes in Gent and suburbs. To get information of the recommended and safe cycle network in the suburbs, a close cooperation with several departments of the province of East Flanders has been established.

The municipalities of the suburbs are Zelzate, Wachtebeke, Lochristi, Destelbergen, Melle, Merelbeke, De Pinte, Nazareth, Sint-Martens-Latem, Deinze, Nevele, Zomergem, Lovendegem and Evergem.

Fig 2: Geographical area which is covered by the route planner for bicycles

3.3.1.4. Data input

Reference map

As reference map, Tele Atlas network (2009) is used. As the Tele Atlas network is set up for car navigation, the network needs to be extended with additional cycle paths, cycling tunnels and bridges. The mobility department of the City of Gent is responsible for the input of these extra links. The source of these extra links is the 'Wegen Informatie Systeem' (WIS) or road information system, set up and maintained by the road department of the City of Gent.
Within the City of Gent, an aerial map can be shown as well.

Cycling network

There are two different networks: the functional cycling route network and the recreational cycling route network.

The functional cycling route network connects the important attraction poles relating to 'functional' trips (work, school, shopping…). The functional cycling route network, with their hierarchy, is worked out in a well thought-out mobility plan of the City of Gent and in the 'bovenlokaal functioneel fietsroutenetwork', the provincial functional cycling route network of the province of East Flanders.

The recreational cycling route network is the result of the 'fietsknooppunten netwerk' of Tourism East Flanders added with extra recreational links within the City of Gent. The latest links are defined by the mobility department and the tourism department of the City of Gent.

Points of Interest

The input of cycling services such as the location of cycle sheds, cycle shops and cycle service offices will be maintained by the mobility department of the City of Gent.
The input of recreational points of interest such as museums, park, monuments, churches… is the responsibility of the tourism department.
The functional points of interest such as hospitals, campus… is to be gathered and distributed by the Data Analyse en GIS (DAG)-cel of the City of Gent.

Barriers

Barriers such as tram tracks and hills are put on the map by the mobility department of the City of Gent (input from aerial maps).
Barriers such as cobblestones, roads in bad condition are gathered from the 'Wegen Informatie Systeem' (WIS) or road information system, set up and maintained by the road department of the City of Gent.
The barrier heavy traffic is derived from the traffic model of the City of Gent (status 2007).

3.3.1.5. Technical Conditions

The route planner for bicycles is available for all users of different operating systems and browsers (PC, Apple, Linux – Internet Explorer, Firefox, Safari, and Chrome). The development of the site is based on the A-grade browser support chart of Yahoo (http://developer.yahoo.com/yui/articles/gbs).

The data are put in the Microsoft SQL server of Digipolis; the geodata are put in the ArcSDE environment of Digipolis.
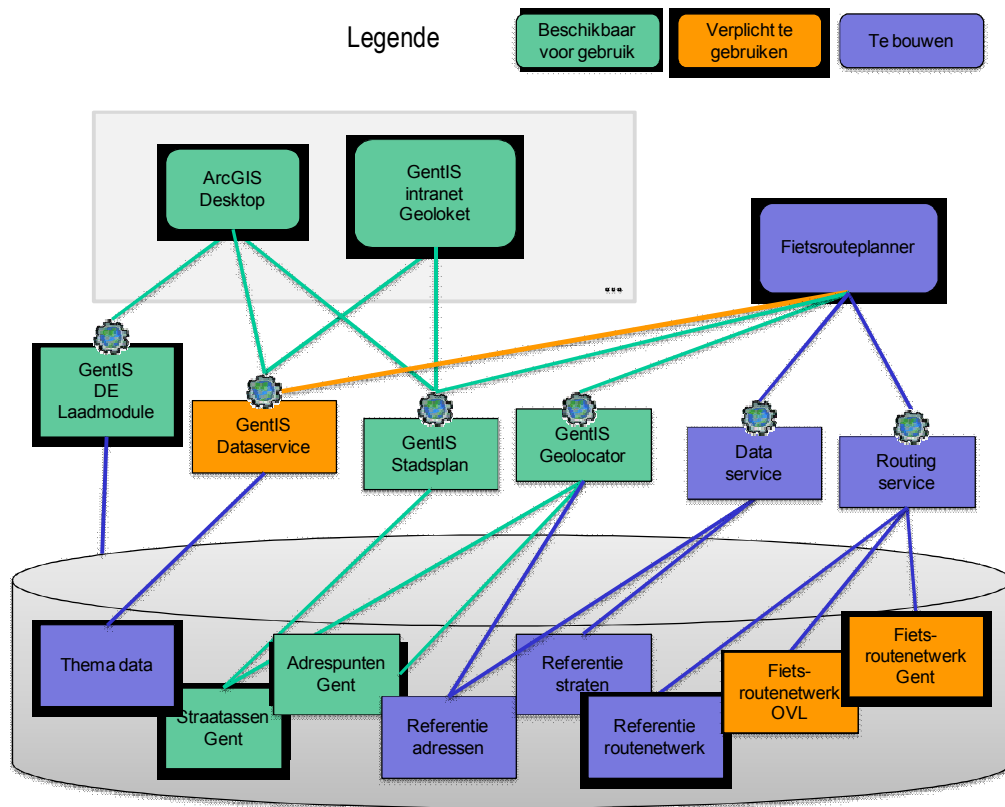
GIS-architecture

Fig 3: GIS architecture of City of Gent

The route planner for bicycles tool is integrated into existing GIS architecture of the City of Gent. The chart above shows the existing architecture.

All components are classified into three categories.

- Parts available for use in building route planner tool: these GIS components are already used and can be part of the route planner tool, when necessary. (see fig 3 - green)
- Parts obliged to use in the route planner tool: these components are strategic 'building blocs' of the GIS architecture. As the route planner tool needs to be integrated in the existing GIS architecture, these parts need to be used. (see fig 3 - orange)
- Parts built during this project. (see fig 3 - blue)

Analysis of the context model
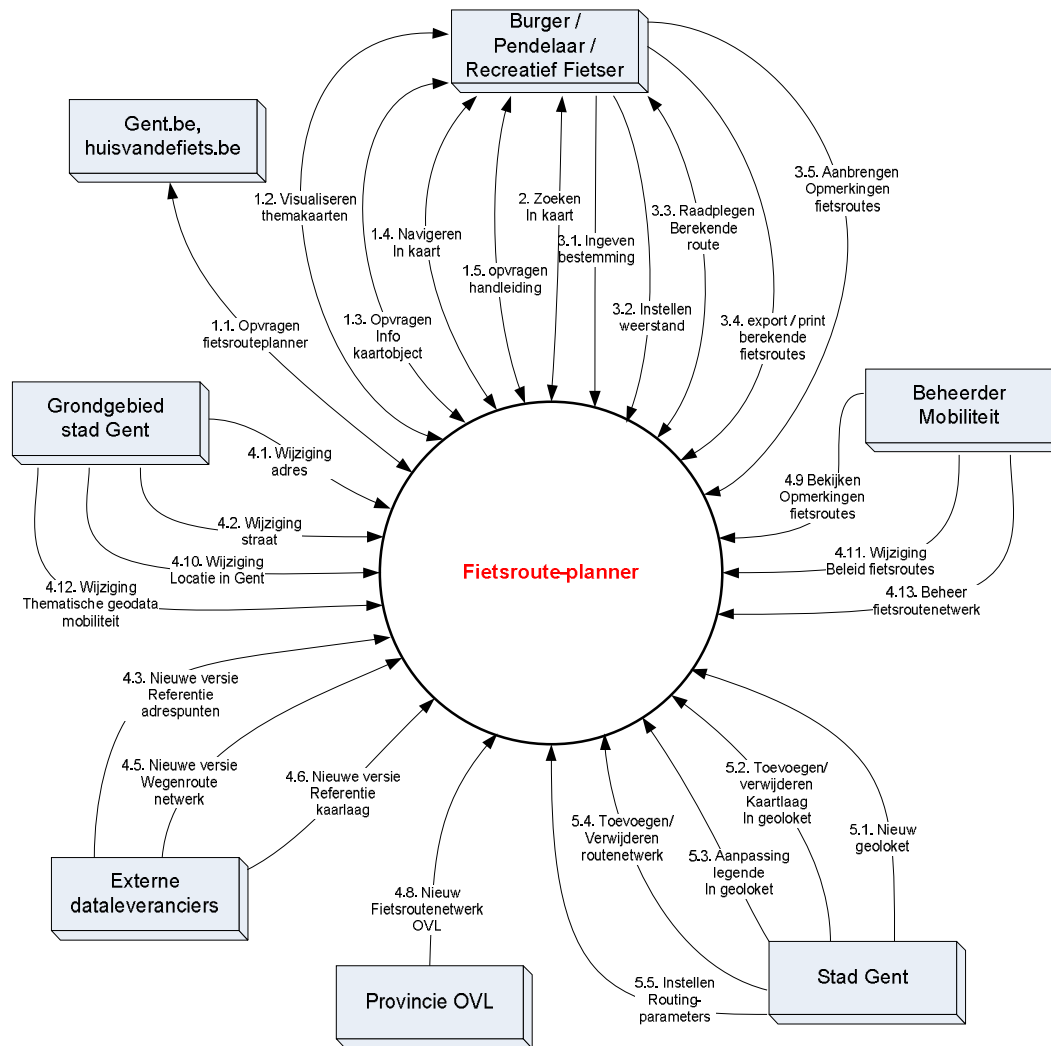
Fig 4: Context model

The figure above contains the context model for this analysis. The circle contains all elements that have an impact when setting up a route planner tool. The arrows leaving and going to the circle show the interactions with the tool and are called processes.

All interactions from the context model are divided into five processes:
- Interface of the route planner for bicycles
- Searching
- Routing
- Maintenance geodata
- Maintenance tool

3.3.1.6.   Interface

The interface of the route planner for bicycles uses the ArcGIS Server image services.

Extra information

Overview map

Results of search engine

Calculate routes

Overview of the (avoiding) barriers

Search engine for addresses or locations

Standard map

Aerial map

Pick location on map
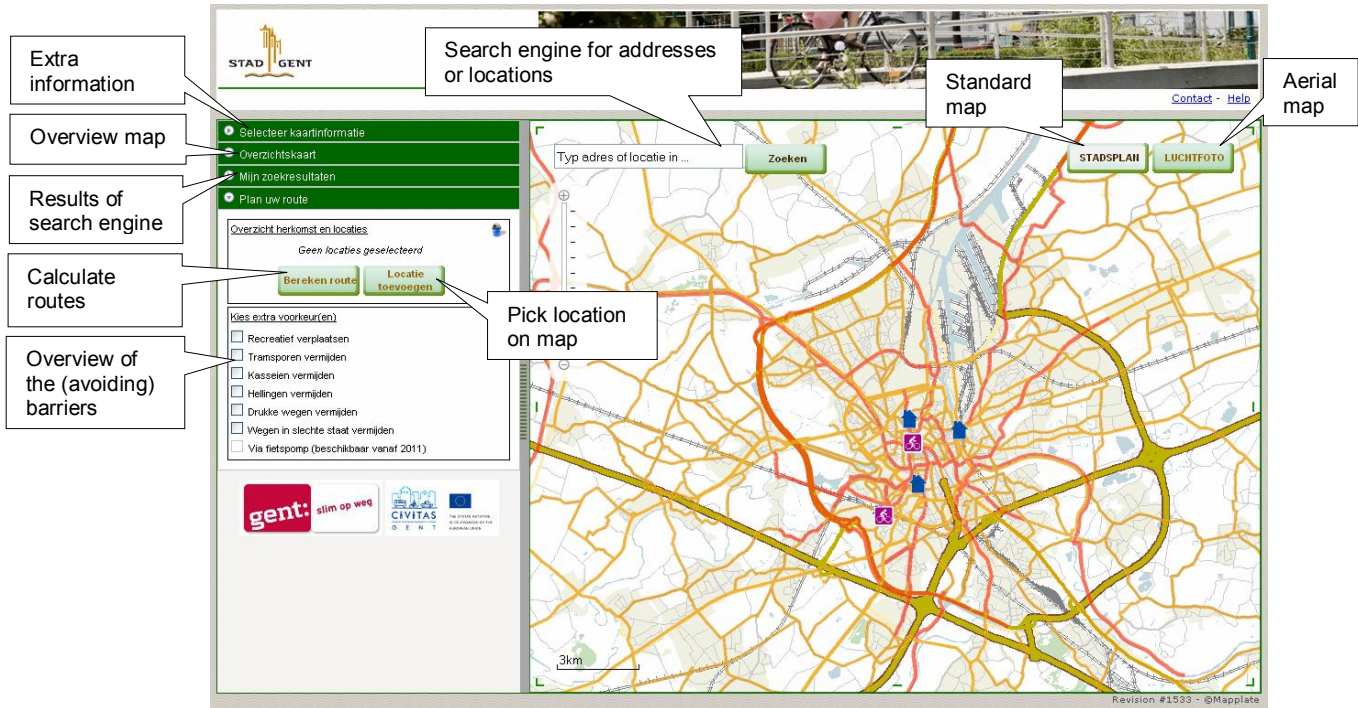
Fig 5: Interface of route planner for bicycles in City of Gent

The following information can be shown:
▪ By selecting boxes in the window 'Selecteer kaartinformatie (Select map information)', the follow-ing information will be viewed on the map:
  ▪ Bicycle services: offices of bicycle services, bike pumps, (secured) bicycle sheds, bike traders.
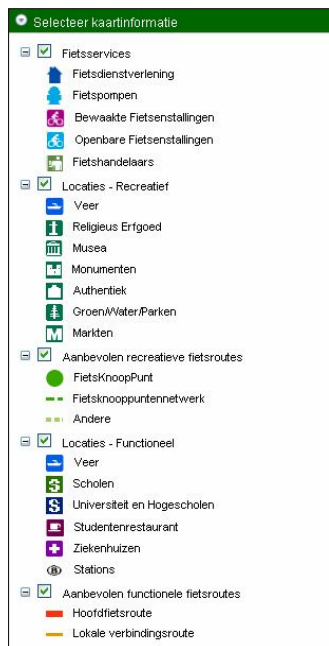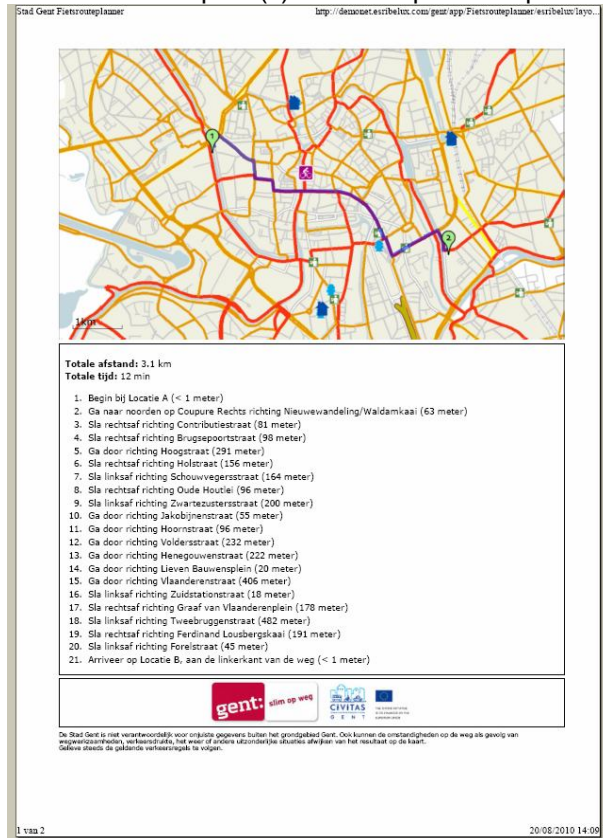
  ▪ Recreational Point of Interest: churches, museums, monu-ments, parks, markets, authentic places.
  ▪ Recreational bike routes network.
  ▪ Functional Point of Interest: schools, campuses, restaurants for students, hospitals, railway stations.
  ▪ Functional bike routes network.
▪ By moving the cursor over the map.

Fig 6: Overview of the extra information which can be shown on the route planner for bicycles

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The route description(s) can be exported to print format.

Fig 7: Printable bicycle route description

3.3.1.7. Searching

The route planner for bicycles provides door-to-door routes, using either address points or points of interest, with the option to personalise the routes by selecting criteria as cycling along green and attractive roads or avoiding tram tracks, cobblestones, hills, heavy traffic or roads in bad condition. The requested routes are given in a textual or a graphical form.

The users can select the start, end and via locations in 3 different ways:
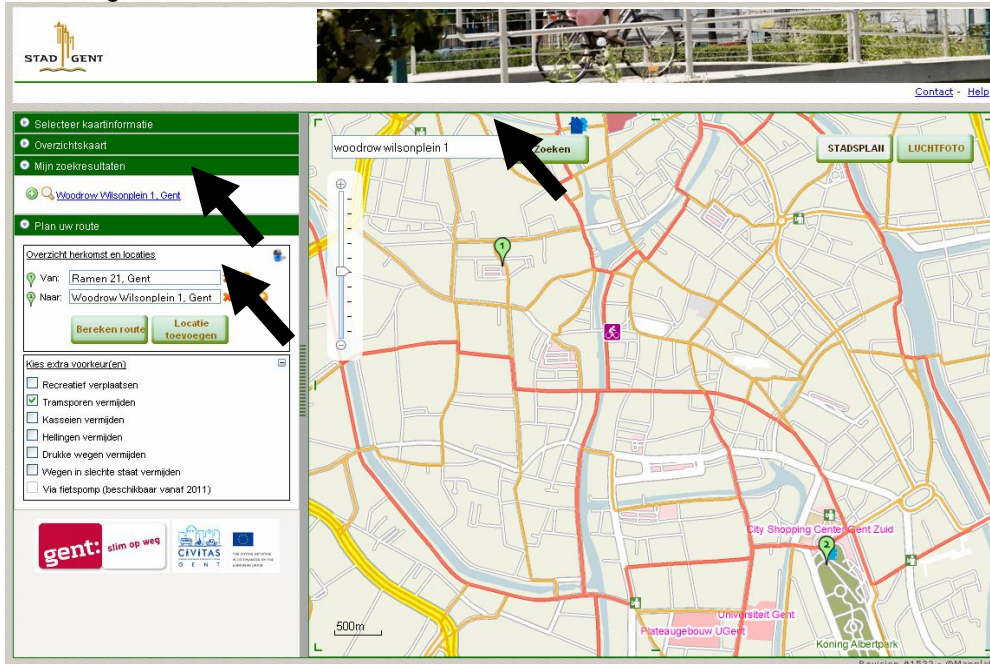
- Searching on address information.

Fig 8: Selecting locations by searching streetnames, adresses or locations through the search engines.

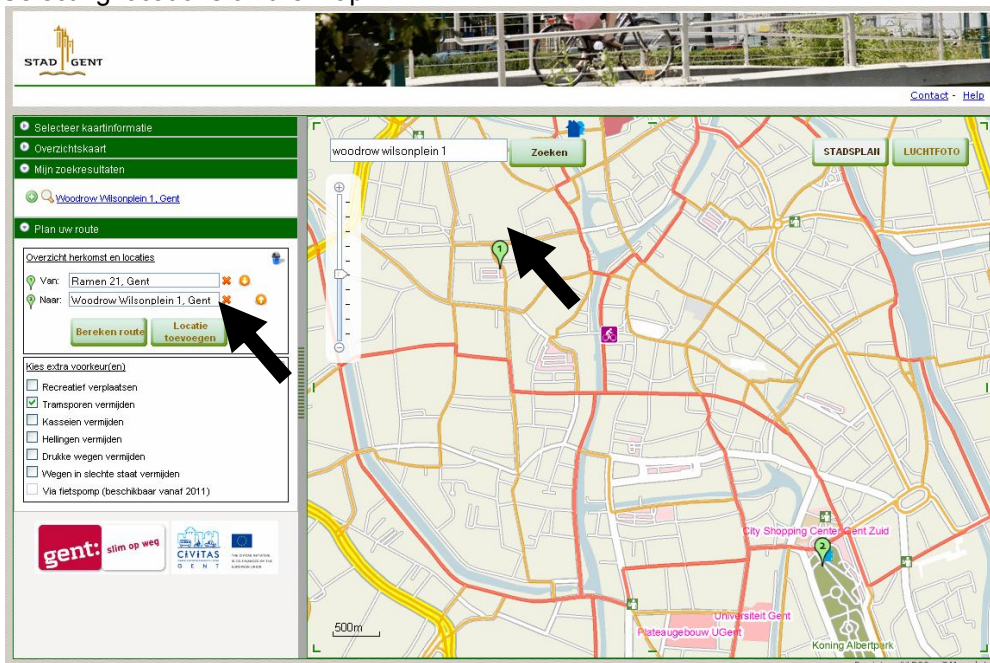- Selecting locations on the map.

Fig 9: Selecting locations by 'picking' locations on the map.

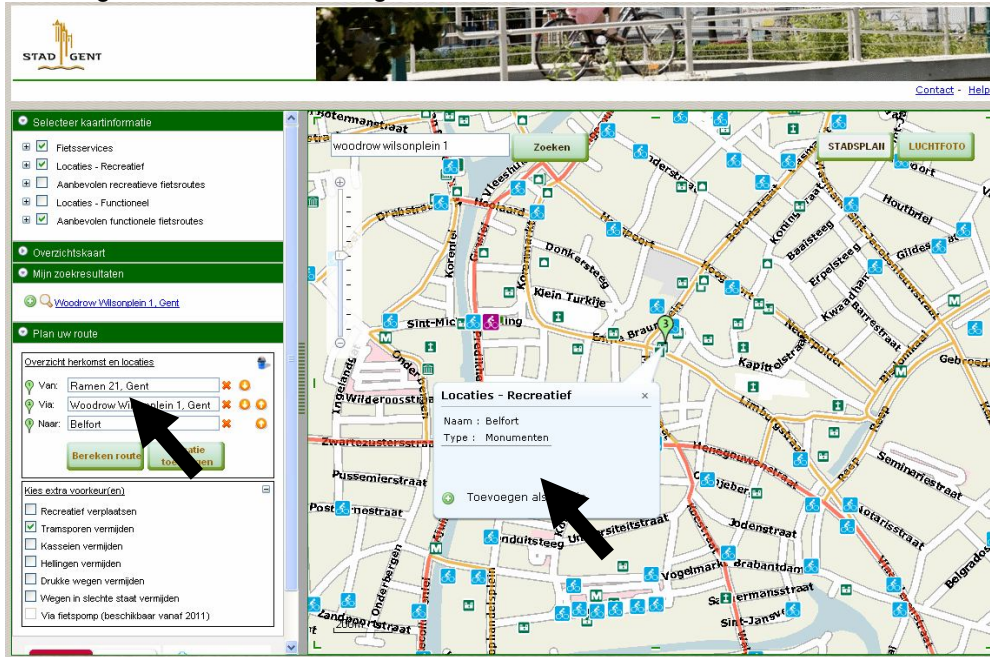- Selecting Point of Interest through information chart.

Fig 10: Selecting locations through the identification information on the map.

3.3.1.8. Routing

The route planner for bicycles automatically plans a trip along recommended and safe cycle routes in Gent. To personalise the route planner for bicycles, the user can select one or more criteria as cycling along green and attractive roads or avoiding tram tracks, cobblestones, hills, heavy traffic or roads in bad condition.

Sometimes the personalised route leads to a large detour, for this reason both routes (with or without personalised preferences) will be shown on the route planner. The user himself can decide which route he or she wants to take.
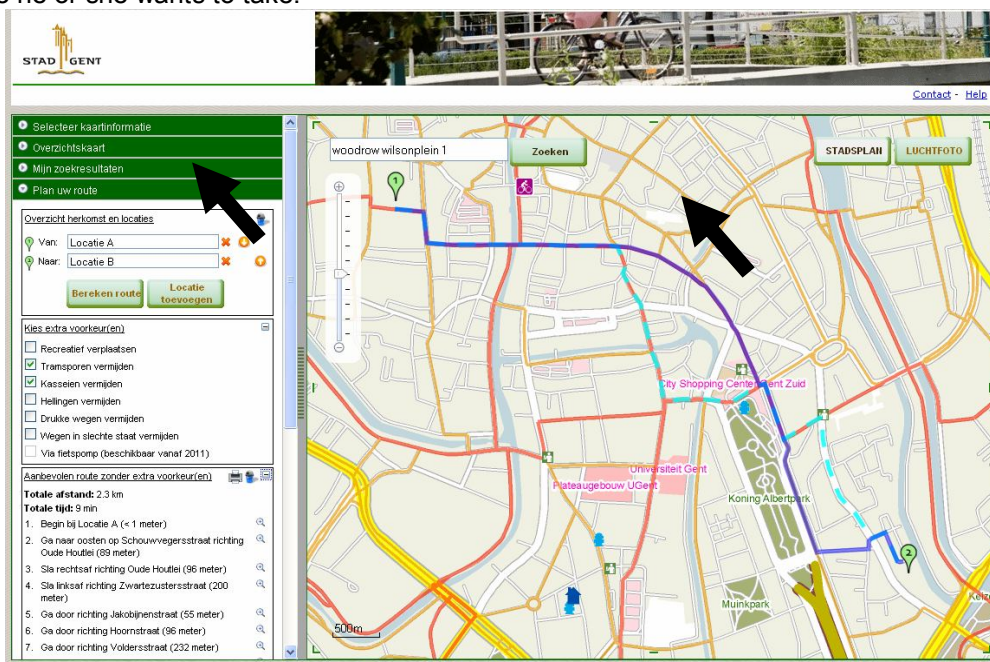

Fig 11: 2 different routes after selecting personal criteria (here: avoiding tram tracks and cobblestones)

3.3.1.9. Maintenance geodata and tool

The data providers of the City of Gent (road department, civil department, mobility department…) and the Province of East Flanders (responsible of the information on the surroundings of Gent) will update their geodata on a yearly basis. This guarantees that the route planner for bicycles will be kept up-to-date.

Digipolis is the owner of the bike route planner tool. When required, extension with extra functionalities is possible.

3.3.2. Test and implementation

The stakeholders, namely the mobility department, the cyclist union, friends and families of colleagues, were invited to test this route planner tool after each (beta) release.
140 persons have tested the tool, especially the members of the cyclist union ands some colleagues of the mobility department have given a lot of constructive feedback.

Although improvement is always necessary, generally all involved actors and stakeholders are pleased with the route planner for bicycles.

Server	Release version	Date
Demo	0.1	12.07.10
Demo	0.2	5.08.10
Demo	0.3	11.08.10
Demo	0.4	18.08.10
Production	1.0	23.08.10

Table 2: Implementation time table

The route planner for bicycles went online on 23 August 2010 at www.gentfietst.be.

3.4. Route planner for bicycles in the near future

Following topics will be implemented in January 2011:

- Expansion of the website www.gentfietst.be.
  The City of Gent wants to increase the number of cyclists through various sensitization activities and offer better information. Therefore, the information of all Gent cycle services will be centralized and distributed through the website www.gentfietst.be. The expansion is described in the measure 4.5-GEN 'The House of the Bike'. The route planner for bicycles will then be part of this website.

- Accessibility of the route planner for foreign cyclists (foreign students or tourists):
  it will be possible to consult the route planner in 3 languages: Dutch, French and English.

- Accessibility of the bicycle route planner for the disabled, visually impaired and colour-blind citizens: to improve the accessibility of the route planner for bicycles the developer needs to reach an Anysurfer label by adjustments after an Anysurfer audit. The Anysurfer is a Belgian quality label for accessibility of websites. Websites with the label are accessible for everybody - also for visually impaired, blind, colour-blind, old people and people who have an aural or physical handicap. In addition, accessible

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sites are generally better suited for small screens like that of a cell phone or PDA, and can be used with any web browser. Finally, they score better in search engine results.

- Stimulate use of bike GPS systems:
    - By exporting the planned routes to GPX format.
    - By loaning 4 bike GPS systems to several target groups. A closed cooperation with the other measure leaders is required.
- Citizens' participation: a GIS-environment will be developed where visitors can insert their feedback. This environment will be integrated in the route planner for bicycles. (Research on this issue is still ongoing.)

4. Dissemination

4.1.1. Participation and Communication

The following activities were conducted/are planned during the period of September 2010 – January 2011:

- Stakeholder participation during the test phase of the route planner for bicycles (mobility department, cyclist union, friends or families of colleagues). They gave remarks and suggestions to improve the quality of the route planner for bicycles.
- Launch of route planner for bicycles at a press conference by the alderman for mobility, Karin Temmerman, 3 September 2010. The launch was successful, the rout planner for bicycles is shown on local television AVS, newspapers, …
- Demonstration of Route planner for bicycles at the CIVITAS square on the Car Free Day, 19 September 2010.
- Design of flyer finished (10,000 flyers ordered) on 16 August 2010.
- Distribution of flyers in Baudelopark (CIVITAS square) and Sint-Pietersplein (start bicycle tour on ring road) during the Car Free Day, 19 September 2010.
- Distribution of flyers at the university and at high schools planned in October 2010. The result of the Integrated Package 'Stimulating Cycling and Walking'-survey towards students (Nov 2009), indicates that the students are an important target group for the Route planner campaign: 83.6% of the 65,000 students do have a bike in Gent and ± 67% agreed that the development of a route planner for bicycles is a positive initiative of the City of Gent.
- Mailings

Fig 12: Flyer Route planner for bicycles (postcard format)

Fig 13: Demonstration Route planner for bicycles at CIVITAS place during Car Free Day (19th of September)

4.1.2. Participation and Communication in near future

The following activities are planned from March 2011 onwards:

- During the second test phase, stakeholders (mobility departments, cyclists union, friends or families of colleagues) will be invited again to give remarks or suggestions to improve the quality of the route planner for bicycles.

- Stimulate citizens' engagement by setting up an integrated tool where anyone can give any remarks or suggestions on the route planner for bicycles.

- The promotion campaign for the route planner for bicycles will be an integrated part of the communication campaign of the website 'House of the Bike': www.gentfietst.be

- The Tourist Office of the City of Gent wants to promote Gent as a Bike Town, for this reason it is agreed that they will promote our route planner for bicycles through their communication channels as well.

- Distributing flyers, demonstrating route planner for bicycles or loaning bike GPS systems during sensitization campaigns of other CIVITAS measures: mobility management for companies, schools, holistic event management, mobility dialogue…

- Presentation on regional television (AVS).

- Mailings.

- …

When the route planner for bicycles will be available in English, the tool will be presented within CIVITAS-ELAN, especially to Measure Leaders of the measures involved with improving cycling conditions and facilitating cycling in other ELAN cities. It is also considered to present the tool to a larger audience, e.g. at a CIVITAS Forum or other sustainable urban transport related conferences.

5. Data Collection for evaluation

On Integrated Package 'Stimulating Cycling and Walking' level, it is planned to conduct some surveys towards several target groups, namely students, inhabitants of Gent living in the surroundings of the main train station area and cyclists/pedestrians.

- The before surveys were done in November 2009 and March 2010.
    1. Students: through mailings – sample size: all students.
    2. Inhabitants of Gent living in the surroundings of the main train station area: mail survey – sample size: 360 (95% confidence interval).
    3. Cyclists/pedestrians: on-street survey – sample size: 400.
- The after surveys are planned in 2011 and/or 2012.

With use of Google Analytics following figures will be collected continuously:
- Number of visitors.
- Number of unique visitors.
- Number of requested routes.
- Number and kind of remarks/suggestions.
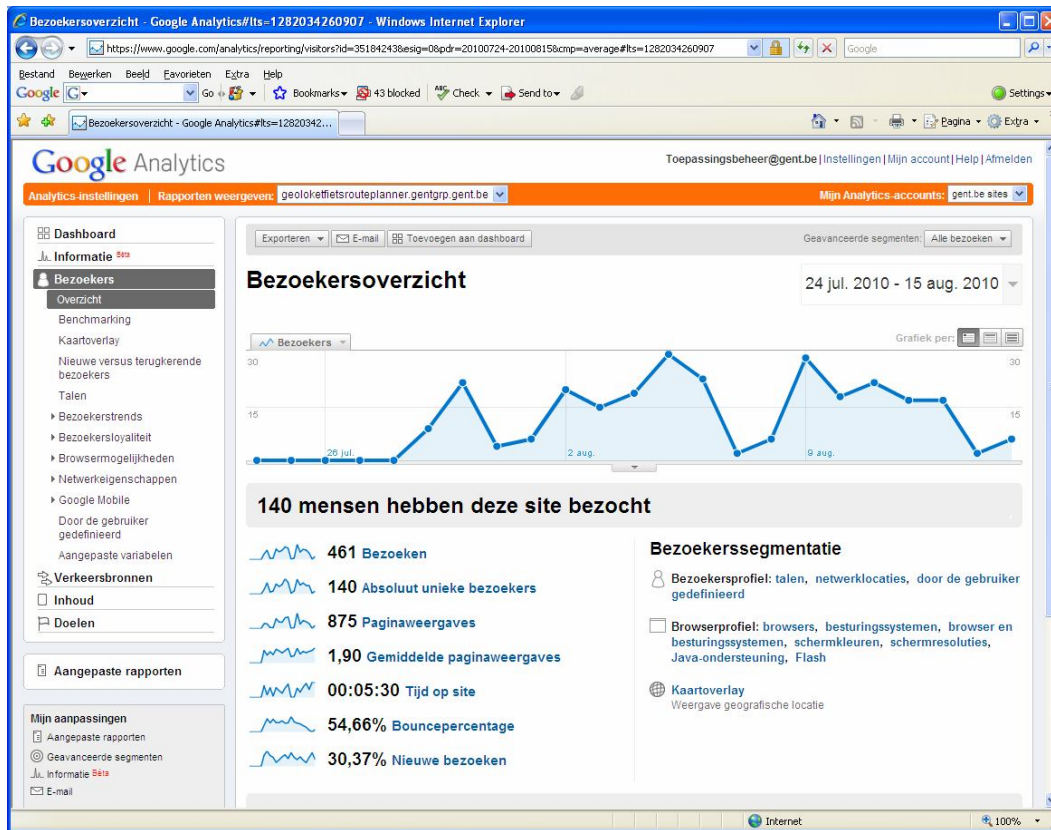- User acceptance of the Route planner for bicycles.

Fig 14: Data collection with use of Google Analytics