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Vantaa cybercars showcase report

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The objective of the CityMobil project is to achieve a more effective organisation of urban transport, resulting in a more rational use of motorised traffic with less congestion and pollution, safer driving, a higher quality of living and an enhanced integration with spatial development. This objective is brought closer by developing integrated traffic solutions: advanced concepts for innovative autonomous and automated road vehicles for passengers and goods, embedded in an advanced spatial setting. The city of tomorrow is in need of integrated traffic solutions that provide the required mobility in an efficient, safe and economic manner. It is inevitable that automation, in all possible forms between providing information at one end of the spectrum and fully autonomous driving at the other, will play a major role.

At three sites: Heathrow, Castellón and Rome, large scale demonstrators are being set up to supply proof of concept of innovative transport systems integrated in the urban environment.

Alongside with the three demonstrations CityMobil investigates the effects of the advanced transport solutions on urban areas through modelling and small scale demonstrations limited in size and time called showcases.

Two typologies of showcase vehicles are made available in the CityMobil framework: advanced city cars and cybercars. The showcase organised with the first typology of vehicles aims at demonstrating how enhanced manoeuvrability (i.e. safe turning around tight corners in narrow streets), automated access/exit from parking, and platooning can make car-sharing service cheaper and more attractive through easier vehicle relocation and enhanced accessibility. The cybercar showcase aims at showing how fully autonomous road vehicles can be effectively used in public transport, especially in low to medium demand areas and periods, to make the public transport service more reliable and frequent where conventional collective public transport cannot meet the mobility needs of the population in a environmentally and economically sustainable manner.

Vantaa was the second cybercar showcase to be executed. A cybercar showcase alongside a conference and an exhibit prepared in conjunction with the CityNetMobil project was held in May 2009 and this deliverable reports on its results.

1 Introduction

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Many European cities expressed their interest in investigating, either through modelling or through showcases, the possibility of addressing some of their mobility problems through these advanced transport solutions.

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Vantaa site description and reasons for selection are in section 2 of this report.

The showcase execution is described in section 3 and its evaluation in section 4. Finally section 1 reports on the press coverage and dissemination.

2 Vantaa city and site description and reasons for selection

The city of Vantaa is a municipality located north of Helsinki, the capital of Finland. The city has a surface of 241 Km^2, and a population of approximately 195 500 inhabitants. The municipality is part of the Helsinki Metropolitan area, which gathers the municipality of Helsinki and 14 neighbouring municipalities. The Helsinki airport is actually located in the municipality of Vantaa.

2.1 Vantaa mobility situation and plans

Since Vantaa is located north of Helsinki, several of the motorways going from Helsinki to the North pass through Vantaa, as well as the Helsinki Ring Road III, which links St. Petersburg at the East to the West of Finland. Two railway lines cross through Vantaa from South to North: one at the East and the other one at the West. All the rail traffic going to the north of Finland crosses through the Vantaa via the Eastern line. Because of this, the Tikkurila station, located in the city centre of Vantaa, which is the hub to the airport bus, is the fourth railway station in terms of passenger traffic in all of Finland.

Figure 1. Major transport links available in Vantaa

Despite the good rail connections, none of the existing railway lines links Helsinki directly to the airport. Therefore, the building of a Ring railway line to link the existing lines to the airport is already planned (white-red dashed line in Figure 1). The building of this line will start in 2009 and it will start commercial operation in 2014. The East end of this new line will be linked to the Tikkurila station, while the East end will pass through a new development area named Marja-Vantaa.

According to the Municipal authorities of Vantaa, the Marja-Vantaa development area is the most important housing and office development in the Metropolitan area of Helsinki. It will host around 26.000 new jobs and 30.000 new inhabitants[1]. When the Vantaa municipal authorities joined the

[1] City of Vantaa, *Welcome to Vantaa* (PDF document online), URL: http://www.vantaa.fi/redirect.asp?path=110;88611;88626&guid=E3DF4247-BB6E-4151-A34A-B4BCC5535B84&site=6&appendvoucher=true (Accessed 5 October 2009)

Reference Group of the CityMobil project, they wanted to study the implementation of an advanced transportation system based on cybercars in this new urban area. The showcase was meant to give them more awareness about this technology and let them study the acceptance of the public towards cybercars. Therefore, some questions about the possibility of implementing a cybercars service in the Marja-Vantaa area were included in the survey performed during the showcase.

Figure 2. Marja-Vantaa Masterplan design by Harris-Kjisik Oy, Architects

2.2 Reasons for selection

The selection process was based on questionnaires completed by the Reference Group member cities. These questionnaires were analyzed using the MAESTRO methodology, in order to determine the feasibility of the execution of the showcase, as well as its potential impact (GEA, 2007).

Vantaa was not a member of the Reference Group by the time the selection process was completed, but a series of circumstances led to the selection of this city, even above other cities having participated in the initial process. Originally, the Finnish city selected to host the cybercars showcase was the city of Hyvinkää, with the 6th position in the selection ranking out of 10 showcase candidate cities, and 4th out of the 6 showcase candidate cities. The candidate cities that had ranked above Hyvinkää in the initial selection process were Santa Margherita Ligure and Orvieto Ciconia, both in Italy. Since Genova was already selected for an Advanced city cars showcase, the partners selected Hyvinkää in order to guarantee the geographical spread of the results of the project (GEA, 2007).

Hyvinkää's showcase site was visited on July 2007, in order to study the feasibility of the execution of the showcase. Two potential sites were presented. The first site was a commercial area near a motorway, and the application envisioned by the city was the connection of two commercial areas a few hundreds meters away from each other. The CityMobil partners considered this scenario out of the scope of a showcase and, since the local government wanted to test the cybercars under winter conditions, it was also technically unfeasible given the prototype status and the lack of doors of INRIA's vehicles. The second site was in the city centre, in an area where an urban renewal operation was planned. Unlike the first site, in this more urban site the CityMobil partners involved considered that the execution of the showcase was possible.

Unfortunately, on June 2008, the city informed the CityMobil partners that the urban renewal works in the city centre were going to start in the period in which the execution of the showcase had been planned, and therefore formally requested to cancel the showcase. However, at the same time, the local partners presented Vantaa as a potential showcase site capable of replacing Hyvinkää. Contacts were then established with Vantaa to analyze their advancement status concerning a potential cybercars application and the technical feasibility of the execution of a showcase. Vantaa also became a member of the Reference Group, and a formal decision on replacing Hyvinkää by Vantaa was made since the city met all the requirements for a showcase: low density and spread mobility conditions well adapted to a cybercars application, a strong potential for a real cybercars application in a reasonably close time frame, a strong political commitment and positive showcase site conditions (cf. 2.3).

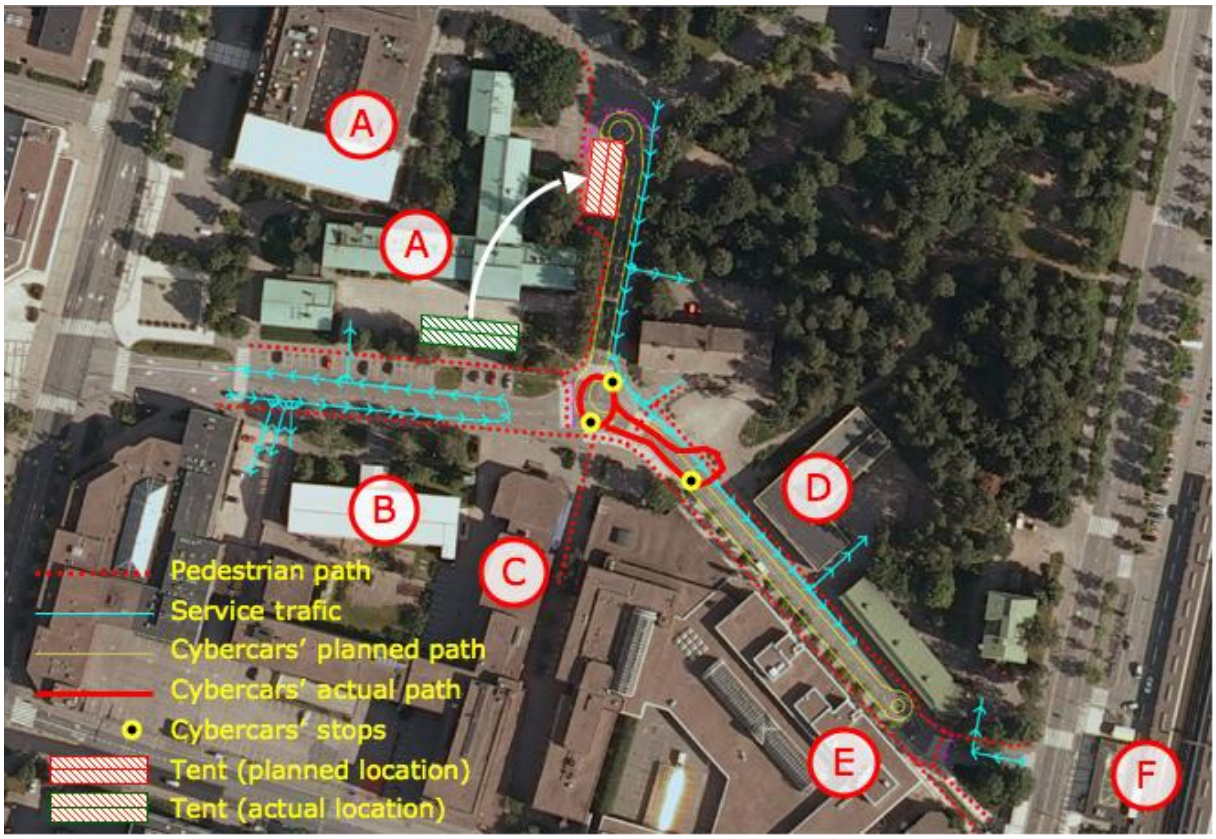
2.3 Site description

The site selected for the showcase execution is located in the Tikkurila area, in the city centre of Vantaa. The actual site was located in Asematie street, which connects the Tikkurila railway station to Vantaa's City Hall. Asematie street was selected due to the large amount of pedestrians that pass through it, since there is a commercial mall on the end of the street close to the railway station. The planned path between the Railway station and the City Hall had a length of 230 m. 3 stops were initially planned: One at the Railway station, one at the Church, in the middle of the track, and one at the City Hall at the east end of the track.

In order to explain to the public the goals and benefits of the use of cybercars in urban transport, the Vantaa showcase featured a new exhibit, prepared in conjunction with the CityNetMobil project, which represents a "street of the future" shared in which cybercars share the street in an equal way with other "soft" transportation modes (pedestrians and cyclists). This exhibit is composed of two large printed panels (20x4 m) representing a city, which features posters, videos, and urban spaces like a Café terrace, used by the public to fill the showcase questionnaires, and a dedicated area for the City to exhibit its plans concerning cybercars. All the communication material was translated to Finnish language to make it accessible to the local audience. The exhibit was displayed inside a tent of 20 x 10 m surface and 4 m height. A surface of 5x10 m, separate from the public exhibit, was used for maintaining and recharging INRIA's vehicles.

During the planning of the showcase, the tent exhibit was integrated into the showcase scenario. It's location, in front of the City Hall, was next to one of the cybercars stops, so that the public visited the exhibit and answered the survey questionnaires in the Café terrace right after using the vehicles.

Figure 3. Showcase site map



A. Vantaa City premises; B. Church; C. Pedestrian commercial area; D. Day-care; E. Shopping centre; F. Railway and bus station.

The existence of commercial areas (points C and E in Figure 3) and a Day-care (point D in Figure 1) on the site prevented the street from being completely closed to traffic. Therefore, to prevent safety problems between cars and cybercars, but also to prevent pedestrians from crossing inadvertently, the site was surrounded with metallic fences as recommended in the corresponding CityMobil deliverable (van Dijke, 2009).

2.3.1 Site modifications

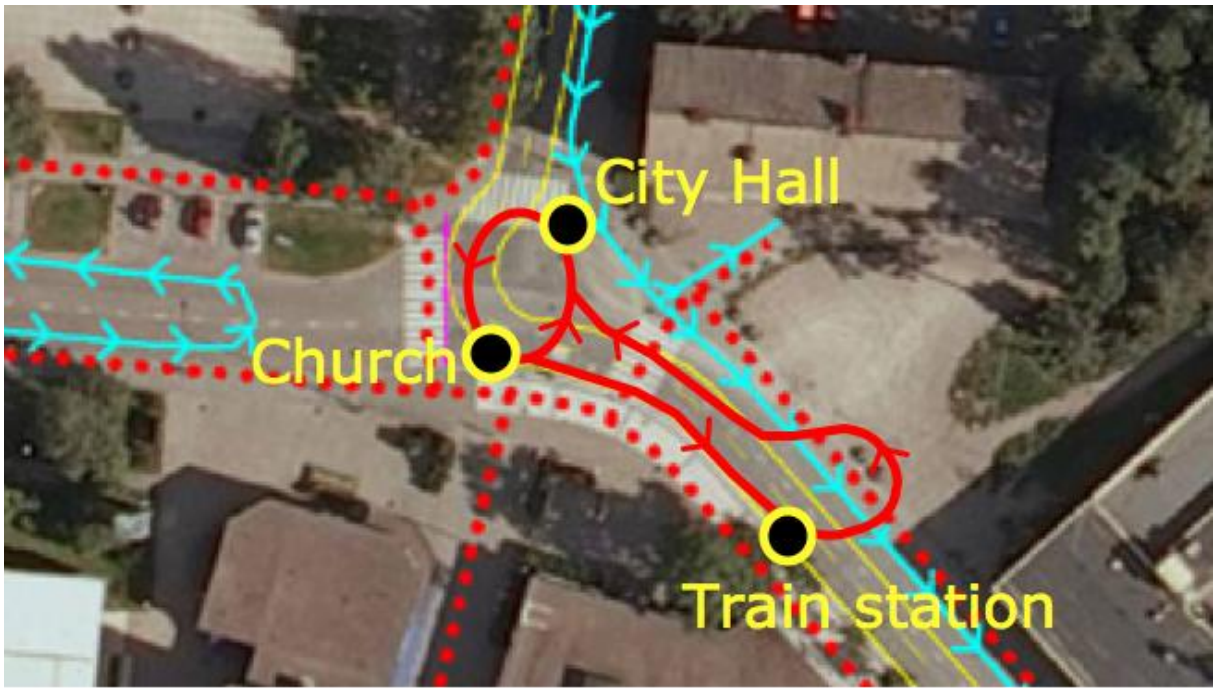
The week prior to the showcase was used for setting up the exhibit and the vehicles' guidance system. Several adjustments were made to the planned site setting.

During the planning of the showcase, it had been agreed that the City would install fences the day after the arrival of the team, place signs in order to alert the public about the changes that would take place in traffic during the showcase and provide staff to manage cars and pedestrians passing the site. The local staff was essential since no one in the showcase team spoke Finnish, and it could not be assumed the all the population would speak English. These measures were not taken as scheduled, causing delays in the vehicles' setup, since it was risky to move the vehicles without a physical barrier separating them from cars and pedestrians.

Due to a concert organized for the celebrations of the "Vantaa Day", the City decided to move the tent from the planned location, in front of the City Hall, to a side street (Esikkopolku) (as shown in Figure 1) at a very late stage. The GPS signals, required for the cybercars' guidance system, were affected by the presence of big trees in this street, but there was not enough time left before the showcase to adapt another guidance system. Therefore, the initial idea of placing one of the cybercar stops at the tent was discarded. On the other hand, the length of the track was modified due to the same problem in the guidance system, caused by the presence of very high buildings at

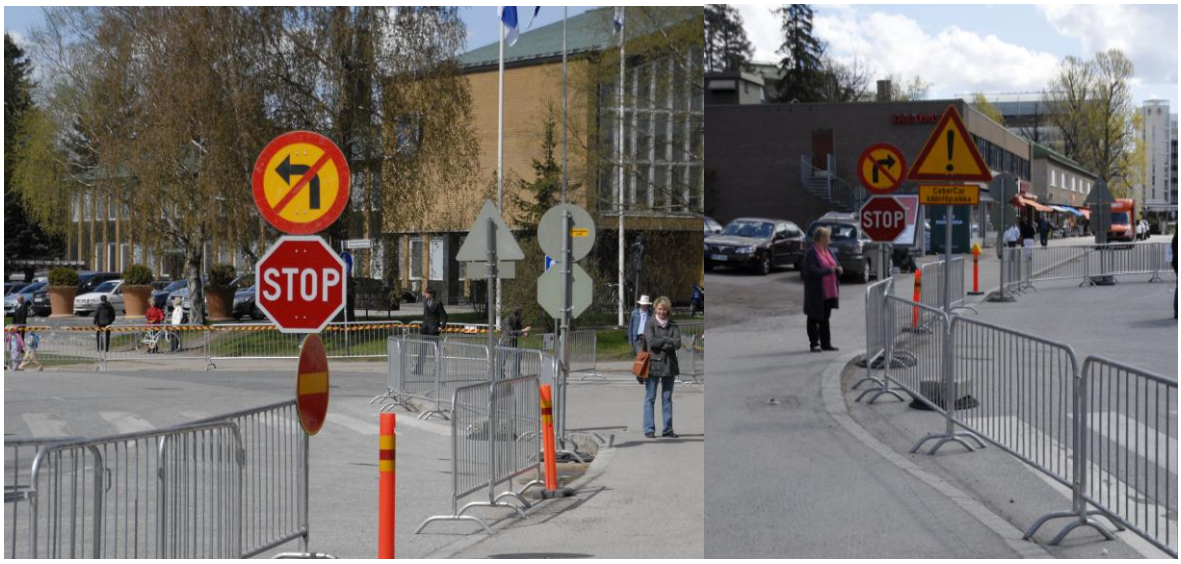
the east end on the street, near the railway station. The final setting of the cybercars track is shown in Figure 4.

Figure 4. Final track setting



The shortening of the east end of the track had several advantages. First, the vehicles set speed had to be kept very low (2 m/s) for safety reasons. If the whole track had been used, the waiting time at the stops would have been extremely long. On the other hand, this setting allowed to open the side of the street next to the Railway station for traffic going to the shopping centre and Day-care, which reduced the amount of traffic next to the cybercars track, and improved the acceptance of the shop owners. The only drawback is that the final site setting had to cross the service traffic path, and this crossing had to be controlled by staff from the City, to avoid risks with cars and pedestrians (Figure 5).

Figure 5. Crossing between the Cybercars and service traffic paths



2.4 Tent exhibit

As explained above, an exhibit, designed by the CityNetMobil project, was presented during the Vantaa showcase. The exhibit represents a “Street of the future”, where all kinds of transportation systems share the public space with pedestrians and cyclists. Figure 6 shows a 3D view of the exhibit.

Figure 6. 3D view of the CityNetMobil exhibit

The City provided the urban furniture presented in the exhibit: 2 benches, 1 bike rack, 2 trees, 5 terrace tables and 15 chairs. Figure 7 and Figure 8 show pictures of the interior of the exhibit. The bike rack was placed outside of the tent, and it was actually used by the public (Figure 9).

Figure 7. View of the CityNetMobil exhibit

Figure 8. View of the CityNetMobil exhibit

Figure 9. Bike rack outside of the showcase exhibit

A series of posters and a video were made for this exhibit. All this material was translated in Finnish language. The posters and the video are included as an annex.

3 Showcase execution

The site and vehicle setup were made from May 2nd until May 6th 2009. Several events were organized in parallel in order to advertise the showcase among the public. A press conference was organized on May 7th. A conference titled *CityMobil – Future Mobility Solutions*, directed to urban planners, was organized on May 8th at the Heureka Science Centre, one of Vantaa's landmarks. The programme of this conference included a visit to the showcase. Finally, a conference directed to the public was organized at the City Hall on May 9th. The showcase public operation started on May 9th, and it ended on May 17th.

The showcase operation was planned to represent an on-demand cybercar service running over a network. The track consisted of 3 stops linked by a one-way path, as shown in Figure 4. The users had the possibility to choose between two possible destinations on the vehicle's touchscreen. When the destination was selected, the vehicle travelled non-stop to the selected destination. Before starting the trip, the users were also requested to indicate the number of passengers per trip. This data was recorded in a log file to produce statistical information about the use of the vehicles during the showcase. During the trip, an audio recording explained the function of the vehicle in Finnish language. At the end of the trip, a recording requested the passengers to visit the tent in order to answer the survey, to which most of the people agreed despite the distance between the cybercars track and the tent. 490 questionnaires were completed.

Figure 10. Pictures of the showcase execution

The guidance system used during the showcase was based on GPS recordings of trajectories that link three stations, upon demand of the passenger on a HMI (Human-Machine Interface) inside the vehicle.

This system was composed of the following equipment:

- A GPS antenna and a Real-Time Kinematics (RTK) GPS base station installed on the roof of a neighbouring building. The exact GPS position of this antenna is known by the system and the correction data was sent to the vehicles using a mesh network.
- On-board the vehicle, a (RTK) mobile GPS, and a Wireless router allowing communication via Wi-Fi.

The trajectories between the different stops are recorded driving the vehicle manually. They are then stored in a file. A trajectory planning system was designed in order for the vehicle to select the specific trajectory required to reach the destination selected by the user. These systems were integrated to the Human-Machine Interface (HMI) in the vehicle. Each specific trajectory is regenerated by the control system when the user selects a specific destination. Then, the vehicle executes the GPS recording and stays as close as possible to it. While the vehicle is running, the GPS corrections are received in real-time on the vehicle to keep a centimetre accuracy to guarantee a safe control. The GPS position is also fused (using an extended kalman filter EKF) with a gyroscope and with the wheels coders to continue moving during a short time even when the GPS signal is lost. To guarantee safety, the vehicle stops when the GPS signal is completely lost.

An obstacle detection system based on laser scanner data was demonstrated as well. A laser scanner placed in front of the vehicle provides information about distance and position of objects in the vehicle's environment using a 4-layers beam laser that rotates at a frequency of 20 Hz (20 times per second). The objects' positions are compared to the vehicle path, and if an object is in the vehicle's path, the supervision system stops the vehicle.

In order to guarantee the continuous operation of the showcase, only one vehicle was available at a time, since the vehicles' batteries do not provide enough autonomy to operate the whole day.

Safety incidents during the operation

Besides one or two confused drivers who entered the cybercars' track, and that were managed by the City staff, no safety incidents occurred during the showcase operation.

4 Evaluation of users reaction to the showcase

4.1 Indicators

For the Vantaa showcase all the User Acceptance indicators ("usefulness", "ease of use", "reliability", "user satisfaction for the on demand system", "integration with other systems") were included in the questionnaire, both in terms of importance and performance; the willingness to pay was also rated as the ticket price people would be willing to pay for one trip.

As for the Quality of Service indicators "perceived comfort", "perceived level of privacy", "perception of safety" and "fear of attack"), all of them were measured as for their importance and performance, except the "information availability" and "information comprehensibility", which were not investigated at all.

The whole situation is reported in the following Table 1. The surveyed indicators are marked with a "✓".

Evaluation Category	Impact	Indicator	Importance	Ex-post performance rating
Acceptance	User acceptance	Usefulness	✓	✓
		Ease of use	✓	✓
		Reliability	✓	✓
		User satisfaction for the on demand service	✓	✓
		Integration with other systems	✓	✓
	Willingness to pay	User willingness		✓
Quality of service	Information	Availability		
		Comprehensibility		
	Comfort	Perceived comfort	✓	✓
	Privacy	Perceived level of privacy	✓	✓
	Perception of safety and security	Perception of safety	✓	✓
		Fear of attack	✓	✓
Transport patterns	System performance	Average journey time		
Social Impacts	Service accessibility	Access (times) for mobility impaired users		

Table 1 Indicators dealt in the User acceptance survey of the Vantaa showcase

"✓"= indicator quantified through specific question;

= no rating available

To summarize, the interviewed people were submitted to 16 questions subdivided as in the following:

- 5 questions were related to the evaluation of the system: 3 of these referring to the system **performance**, 2 to the **importance** given to the different performance indicators
- 2 questions were about the users habits (use of transport means, use of private car)
- 6 questions were related to the users main characteristics (age, gender, education, occupation, income), including also the reason for attending the showcase. These provided the opportunity to analyze the answers by distinguishing different user profiles.
- 2 important questions regarded the general acceptance of the system, while they were not reported to the general set of indicators (questions number 5 and 6).

Totally, 9 indicators were quantified. Moreover, questions 5 and 6 gave extra information on the privacy aspect ("If Cyber-Cars would be in used in your area, how would you like to travel? Only alone with friends you know or with any passengers?), and on the general acceptance of cyber cars as private means of transport[2] (could Cyber Car replace your private car?).

4.2 Results

A total of 487 interviews were performed for this showcase. In the following pictures the distribution of the sample is shown, according the different available characteristics of the interviewed people (age, education, employment).

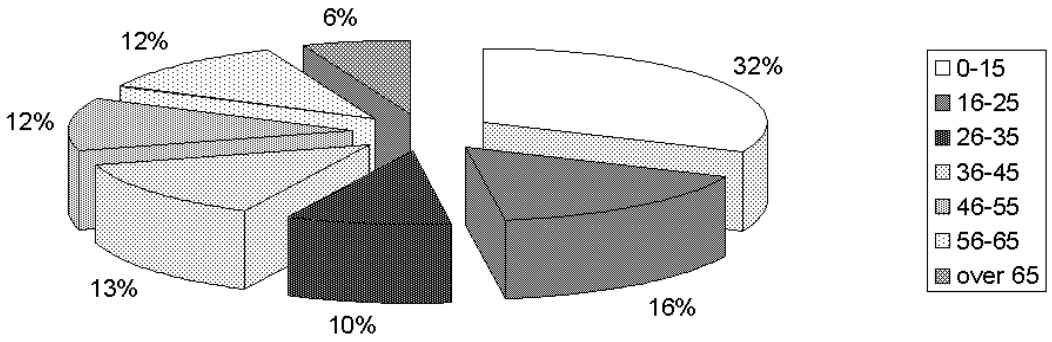


Figure 11 Vantaa interviewed people divided per age

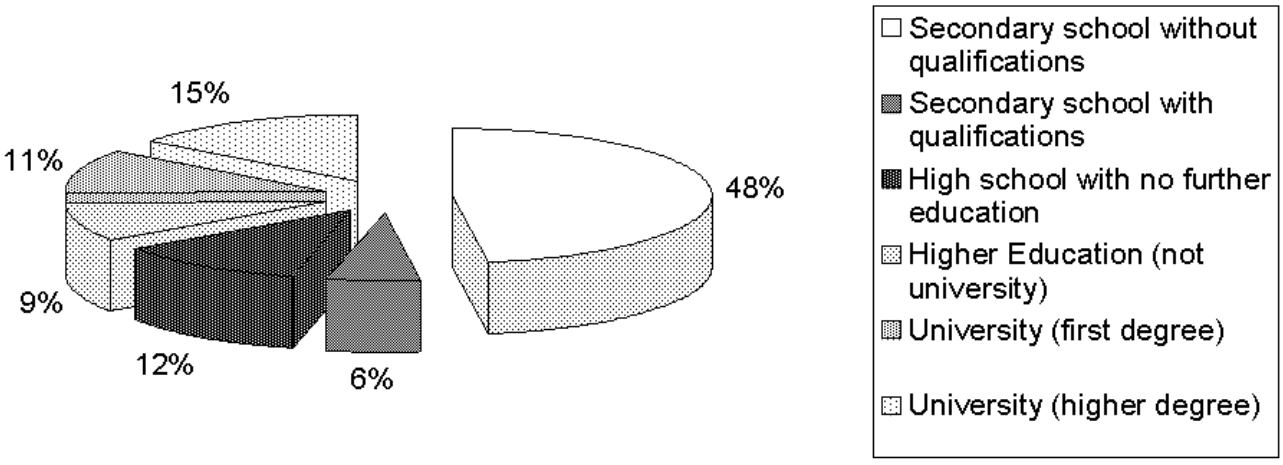


Figure 12 Vantaa interviewed people divided per education

[2] however this second aspect investigates the private use of the ATS which is rather extraneous to the project purposes.

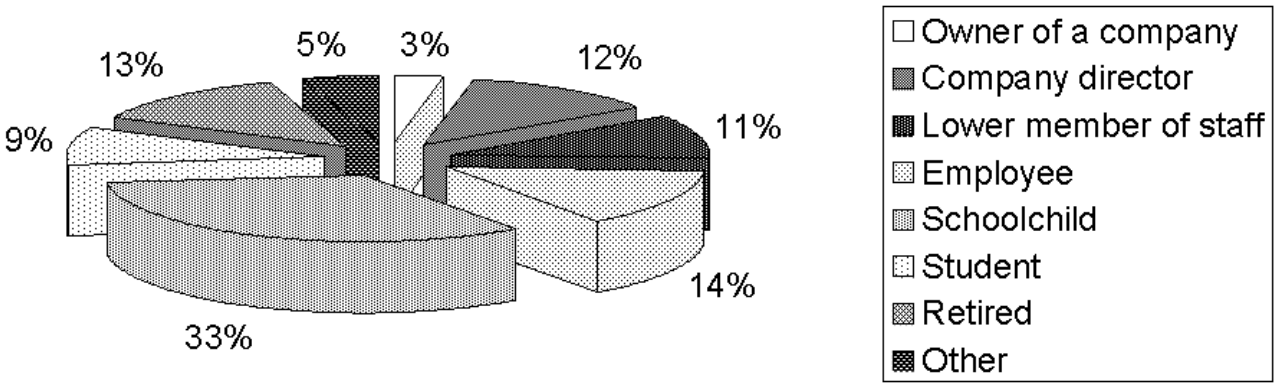


Figure 13 Vantaa interviewed people divided per employment

The following Table 2 reports the ratings averaged on the whole interviewed population.

Evaluation Category	Impact	Indicator	Importance (1=most, 5=less)	Ex-post performance rating
Acceptance	User acceptance	Usefulness	2.7	3.3/5
		Ease of use	2.7	4.0/5
		Reliability	2.4	3.3/5
		User satisfaction for the on demand service	3.8	3.3/5
		Integration with other systems	3.8	3.3/5
	Willingness to pay	User willingness		1 to 2€
Quality of service	Information	Availability		
		Comprehensibility		
	Comfort	Perceived comfort	2.4	2.9/5
	Privacy	Perceived level of privacy	3.2	2.8/5
	Perception of safety and security	Perception of safety	2.0	2.7/5
		Fear of attack	2.7	3.0/5
Transport patterns	System performance	Average journey time		
Social Impacts	Service accessibility	Access (times) for mobility impaired users		

Table 2 Average values for indicators dealt in the User acceptance survey of the Vantaa showcase

The resulting average ratings show the following:

- Within the “Acceptance” evaluation category, Reliability results to be the most important indicator, with an average position of 2.4. The performance on this indicator was evaluated in average as good (3.3/5 being 1 Completely dissatisfied and 5 completely satisfied). Travellers felt in average that the less important aspects are instead the Integration with other transport systems and the On-demand service performance (both of these got an average level of importance of 3.8). However both indicators were scored quite positively (3.3/5, same value as Reliability and Usefulness). Ease of use and usefulness lay in the middle as for importance

within this evaluation category (2.7 for both). The performance got a quite good score for usefulness (3.3/5); for the ease of use indicator the score was definitely good (4.0/5). Globally all the average ratings show an acceptable performance rating (if we assume that 3/5 is the minimum positive level) except the Ease of use, which apparently impressed somehow more the travellers.

- Within the “Quality of service” evaluation category, performance was instead appreciated not quite as much as in the previous one: three indicators out of four were rated below 3 in average (comfort, privacy, safety) and the perception of security got a weak 3.0. As or the weights, a great importance is given by the respondents to safety. The weight was rated with an average 2.0; the second rated was comfort (2.4), then security and finally security.
- “Extra” question number 5 obtained a 51%/49% on the preferred private/public use, while question number 6 showed quite promisingly that approximately two thirds of respondents would be ready to change their travelling habits and move to the use of cyber cars instead of private car.
- Finally, the travellers expressed an average willingness to pay in a range of 1 to 2€ per journey.

The most relevant result here is on safety, which got a very high importance and, in contrast, the lowest performance (2.7/5).

Also for Vantaa the results were grouped according to certain correspondents profiles: the following categories were considered:

- users with lower school education (primary and secondary school),
- users with higher school education,
- people up to 30 years old,
- people over 30 years old.

The ratings distinct for the four categories are reported in Table 3; differences compared to the global values are highlighted in yellow, lower differences in green.

In general, the distinctions by education and age did not raise high discrepancies; Reliability is always rated as definitely important within the Acceptance indicators, but in the Under 30 category it is surpassed by the Usefulness indicator; in this case the discrepancy with the Over 30 category rate is very high (0.8). As for the other indicators, lower differences are recorded and in all cases the same order of importance as in the overall average is kept. Concerning the perceived performances, the disaggregated situation is even more flat: some minor differences are recorded for the “Integration with other systems” aspect, that was better rated by people with higher education and age.

Evaluation Category	Impact	Indicator	Importance					Ex-post performance rating				
			All	**Primary and secondary school**	**Higher education**	**Under 30**	*Over* **30**	**All**	**Primary and secondary school**	**Higher education**	*Under* **30**	*Over* **30**
Acceptance	User acceptance	Usefulness	2.7	2.7	2.6	2.3	3.1	3.3/5	3.3/5	3.2/5	3.2/5	3.3/5
		Ease of use	2.7	2.8	2.5	2.7	2.6	4.0/5	4.1/5	3.9/5	4.1/5	4.0/5
		Reliability	2.4	2.5	2.2	2.5	2.3	3.3/5	3.3/5	3.2/5	3.3/5	3.3/5
		User satisfaction for the on demand service	3.8	3.7	4.1	3.7	3.9	3.3/5	3.3/5	3.4/5	3.3/5	3.4/5
		Integration with other systems	3.8	3.8	3.8	3.8	3.8	3.3/5	3.2/5	3.5/5	3.2/5	3.5/5
	Willingness to pay	User willingness						1 to 2€	1 to 2€	1 to 2€	1 to 2€	1 to 2€
Quality of service	Information	Availability										
	Comfort	Perceived comfort	2.4	2.4	2.5	2.3	2.5	2.9/5	2.9/5	2.8/5	2.8/5	2.9/5
	Privacy	Perceived level of privacy	3.2	3.1	3.5	3.1	3.3	2.8/5	2.7/5	2.9/5	2.7/5	2.8/5
	Perception of safety and security	Perception of safety	2.0	2.1	1.7	2.0	1.9	2.7/5	2.8/5	2.6/5	2.7/5	2.8/5
		Fear of attack	2.7	2.8	2.5	2.8	2.5	3.0/5	3.0/5	3.1/5	2.9/5	3.1/5
Social Impacts	Service accessibility	Access (times) for mobility impaired users										

Table 3 Average values for indicators dealt in the User acceptance survey of the Vantaa showcase distinct by two age categories

= no rating available

= difference between Under30 vs. Over30 or Lower vs. Higher education is >0.5

= difference between Under30 vs. Over30 or Lower vs. Higher education is >0.2

5 Press coverage

As explained above, a press conference was organized on May 7th in order to advertise the showcase among the public. The Minister of Economy, as well as the local authorities and the CityMobil Project Coordinator participated in this conference, which was followed by a visit of the showcase. Both written and television journalists from national media assisted to the conference, including Finland's main newspaper, *Helsingin Sanomat*, which published information on the printed version and on its website. On May 7th, all the evening news shows in national TV presented the showcase.

The City of Vantaa collected press information until September 2009. Table 4 summarizes the press coverage results. The press clippings are included as an annex.

Table 4. Press coverage summary

Total published	Media's countries			Type of publication						Audiovisual	
	Europe	America	Asia	Local news	Nat/l news	News website	Technical news	Government	TV	Photo	Video
55	6	2	2	14	8	8	11	3	2	26	7

6 Conclusions and recommendations

On the base of previous showcases experiences, the Vantaa showcase was planned around a local event, in a central location, and a press conference was organized before the showcase start date in order to advertise the event among the public. All this factors guaranteed a large number of passers-by. This planning organization has proved to be successful and must be maintained.

On the other hand, a showcase is a small-scale transportation system implementation in itself, both in time scale and size. One of the main difficulties in its preparation is to follow remotely the fulfilment of the requirements by the local partner (city), and the short time frame left to take corrective actions during the showcase preparation on-site when misunderstandings and problems are identified. Therefore, it is necessary for the upcoming showcases to have a closer and more detailed follow-up of the cities' contributions, especially when the showcase date approaches, since a requirement list can be ambiguous given the specialized nature of the cybercars requirements, and the strong impact that any modifications to the site or to the scenario can have. This was the case in Vantaa with the displacement of the exhibit tent, which hampered the impact that this exhibit could have had.

An element to remark is the importance of the political engagement of the host city. Despite not being an initial member of the Reference Group, and therefore not eligible to host a showcase, the City of Vantaa showed a strong interest and support to the showcase organization, which ultimately reflected in the investment of time and manpower.

Finally, the prototype nature of the showcase vehicles is a limitation to the actual scenario that can be demonstrated. Despite having an interesting site for a real transportation demonstration, the limited speed of the prototype vehicles does not provide sufficient transportation offer to respond to the site's demand. This could be solved by modifying the demonstration scenario and adapting it to the vehicles' capabilities and limitations, while still conveying the showcase message: automated on-demand vehicles running over a network are an available transportation technology. The survey's results show that users understood the concept and qualified it positively. However, the showcase impact would certainly be higher if the vehicle's performance could be improved.

7 References

1. City of Vantaa, *Welcome to Vantaa* (PDF document online), URL: http://www.vantaa.fi/redirect.asp?path=110;88611;88626&guid=E3DF4247-BB6E-4151-A34A-B4BCC5535B84&site=6&appendvoucher=true (Accessed 5 October 2009)
2. GEA, DITS, 2007. Selected sites. CityMobil project deliverable 1.5.4. March 2007.
3. Van Dijke, J.P. (TNO). CityMobil project deliverable 1.5.2.4: Safety recommendations for the Vantaa showcase. April 2009.

8 Annexes

8.1 Showcase posters

Separate file

8.2 Press clippings

Separate file