Plan for WP 1.5: Other Demonstrations, Showcases and City Studies

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1 Executive Summary

In the future cities will need integrated traffic solutions, which provide a more effective organisation of urban transport and require mobility in an efficient, safe and economic way. The goal of the CityMobil project is to contribute to these solutions.

In the first sub-project of CityMobil concepts and tools, which are developed in the project, will be validated and demonstrated in a number of different European cities. Besides the three large-scale demonstrators, which present real implementations of innovative transport concepts additional demonstration activities like showcases, small demonstrations and city studies are conducted in various cities of different European countries.

This deliverable describes the current planning status of these additional demonstration activities. Up to the end of September 2008 the following activities are planned:

- Cybercar showcases in
  - Daventry,
  - Vantaa and
  - Trondheim

- Advanced city car showcases in
  - La Rochelle and
  - Genoa

- Small demonstrations in
  - Lausanne

- City studies in
  - Uppsala

The deliverable describes briefly the scope of each of these activities, the current status and gives an outlook about the next steps.
2 Introduction

The objective of the CityMobil project is to contribute to 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. In order to achieve these objectives advanced concepts for advanced road vehicles and passengers are developed. Furthermore new tools for managing the urban transport are introduced and barriers that are in the way of large-scale introduction of automated systems are removed.

In the first sub-project of CityMobil (SP1) those advanced concepts and tools are validated and demonstrated in a number of different European cities under different circumstances. Therefore three large-scale demonstrators have been chosen, which will present real implementations of innovative new concepts. Theses three innovative concepts will be implemented in the city of Heathrow, Rome and Castellón. The three cities were selected in the preparation phase of the project based on the assessment of technical feasibility, political support in form of Letters of Intent, a commitment to invest financially in the project and an availability of a local consortium consisting of public and private organisations, which had expressed commitment to the plans. Furthermore showcases and city studies are conducted in various cities of different European countries.

Many European cities expressed their interest in investigating, either through modelling or through showcases and small demonstrations, the possibility of addressing some of their mobility problems through advanced transport solutions. For this reason a budget was reserved for such activities. The interested cities are members of the CityMobil Reference Group, which was created for this purpose.

The members of the Reference Group took part in a selection process, which had the objective to identify the cities, whose plans meet the CityMobil objectives best. For the details and results of the site selection see deliverable “D.1.5.4: List of selected sites for studies and demonstrations”. The selected cities receive some funds or support from the CityMobil project, with which some demonstration activities, showcases or city studies can be financed and executed.

This deliverable describes the current status of the planning of these additional activities. In total the following activities are currently planned with the option to add additional activities, if possible:

- Cybercar showcases in
  - Daventry,
  - Vantaa and
  - Trondheim
- Advanced city car showcases in
  - La Rochelle and
  - Genoa
- A small demonstration in
  - Lausanne
• City studies in
  • Uppsala

The demonstration activities in Daventry and La Rochelle are already conducted and described in deliverables D.1.5.5.1 and D.1.5.5.4.

3 Plans for small Demonstrations

3.1 Small-scale demonstration in Lausanne

The city of Lausanne has been involved in Research and Development of new transportation systems for many years (Serpentine and Swiss metro are the most famous examples). It has recently developed a project of a full-automated system linking the ferry, metro and bus terminal, along the lake of Geneva.

The opportunity presents itself to experiment with and demonstrate the new technology of a fully automated transport system in a protected site: the Swiss Federal Institute of Technology (EPFL) located in the western suburbs of Lausanne. The main objective of this Lausanne-EPFL demonstration is the implementation of an automatic electric transport system connecting the different parts of the campus and using a new contact-free loading station.

The EPFL (10,000 students and employees) is an institution of public law and depends on the Federal Department of the Interior of the Swiss Government. The EPFL-site is entirely located on a private domain belonging to the Swiss Confederation. This particularity allows testing prototypes without hindering the traffic on the public road. The EPFL-site is under construction and this development will generate more transportation needs in the whole campus. The EPFL, in partnership with the city of Lausanne, member of the CityMobil Reference Group, wants to develop a small demonstration of a new automated transportation system, based on an in-house electric technology developed in a big innovative project named Swiss metro. The future development of the EPFL campus will allow a wide-scale use of this people mover system to connect the various centres of interests (campus, housing, congresses centre, hotel, scientific park etc.).

The planned transport system is a real innovation, using a brand new electric contact free power transmission, based on research results obtained by the EPFL Labs. The power transmission units are located at the stations. Between each station, the vehicle is moving automatically, according to a preset and secure trajectory. The 4-wheel vehicles have a capacity of 10 passengers, of which 4 can be seated. The speed varies between 10 and 15 km/h (see Figure 3-1 and Figure 3-2).

The major innovation of the system lies in its energy chain, developed by Numexia, based on Prof. Marcel Jufer’s research and development work, with a contact free energy transmission, which achieves an efficiency of more than 90%. With new energy storage and electric wheel motors, this vehicle brings a perfect solution for this kind of local transportation system.
D1.1.3 Plan for WP 1.5 Other demonstrations, showca ses and city studies

Figure 3-1: General specifications of the vehicle

- Capacity: a) 10 standing persons
  b) 4 sitting + 4 standing
- Current weight: 600 kg
- Maximum weight: 1'000 kg
- Nominal speed: 10 km/h
- Top speed: 15 km/h
- Guidance: automatic
- Stop time: 10 seconds

Figure 3-2: Components of the vehicle

1. Structure: RTM body
2. Power Control: electronic
4. Energy storage: ultra capacitors
5. Security: laser detection system
6. Propulsion: motor wheel
7. Energy transmission: Litz bobine

Site description
The EPFL-site lies in an idyllic location on the shores of Lake Geneva. Located in a flat area, boarded by a national road on the south side, cantonal roads on the west side, a local road on the east side and a metro line on the north side, the campus is well served with access roads (see Figure 3-3). Given the growth of the campus simultaneously in the north and south, the north-south and peripheral connections need to be strengthened. A test track will join two important new buildings, the Life Science building and the IT Building in the southwest corner of the campus, where an important Innovation Square will be built from fall 2008. The demonstration line will join the Rolex Learning Centre, to be inaugurated in spring 2010.
which will become the new front door of the campus and the centre of campus life. In future, progressively the whole campus will be served by the new transport system. The speed limit on the campus is 30 km/h for a better cohabitation of all kinds of mobility.

The preliminary study proposes an initial test track (line 1, see Figure 3-4) and eventually a network for the whole campus. The demonstration line is the first phase of this network. Furthermore, the City of Lausanne announced its interest in a wider extension of this transport system in the direction of the city, crossing a highly used recreation zone in the lakeside. The system would then be a complement of the existing public transport.

Figure 3-3: EPFL site

Figure 3-4: Small demonstration line (line 2) and test track, 460 m and 5 stations (line 1)
End users
Even though it is always possible to walk across the campus, the need for a local transport system appears ever more clearly, in particular to link the north and the south of the campus. The construction of new buildings on the outskirts of the campus requires new means of access for students, teachers, staff and visitors. The new people mover system will encourage the users to choose public transportation more often, which should lead to a decrease of the rate of motorized traffic (25% in 2007). This project fits in all respects with the goals of EPF to become an exemplary sustainable campus. This transport system will be an example for the future generation of engineers.

The complete network, as it could be developed through the years, should offer a mobility alternative to all regular users or occasional visitors of the campus. Some sections of the network will be more important for certain types of users than others. The first line that will be built between the metro station, the heart of the campus and the learning centre will mostly attract regular users of the institute, such as students, teachers and researchers, but it will also be open to any kind of user, who will need to move between those locations. It ensures the transport system a high demand from users with varied profiles, spread throughout the day and the week.

Partners
The Lausanne-EPFL demonstration is carried out by a group of partners, 2 of which, EPFL, the Swiss Federal Institute of Technology and GEA Valloton and Chanard SA are also part of the CityMobil consortium. These two partners form the link between the CityMobil consortium and the Lausanne-EPFL demonstration.

The Lausanne-EPFL demonstration leadership is shared between the city of Lausanne and EPFL which will provide its expertise in the coordination of the consortium. GEA Vallotton et Chanard SA will assume the liaison with the CityMobil project and with the City of Lausanne. GEA will advise EPFL in all aspects of integration of this kind of innovative transport system. Transitec ingénieurs conseils SA (TIC) will plan and dimension the demonstration line within
the whole final network. LEITNER TECHNOLOGIES (LEI) will be the prime contractor for the transportation system. LEITNER TECHNOLOGIES is active worldwide with its Ropeway, Snow Groomer, Urban Transport and Wind Power divisions, in the fields of mobility, tourism, energy and environmental protection. Leitner will subcontract with two companies: NUMEXIA SA (NUM) for the Energy Chain and DANAHER (DAN) for the automation (ev. Bluebotics, EPFL spin off). TL, Transports publics de la région Lausannoise SA will be the partner for the operation of the transport system.

**Current Status**

The small demonstration in Lausanne has been approved by the CityMobil Board and General Assembly. The work plan has been defined. The partner EPFL will join the consortium and the demonstration will be included in the CityMobil activities in the next contract amendment.

### 4 Plans for other Showcases

#### 4.1 Executed Showcases

The showcases in Daventry (cybercars) and La Rochelle (advanced city car and cybercars) have been executed in September 2007 and September 2008. A detailed description of these showcases can be found in the deliverables D.1.5.5.1 and D.1.5.5.4.

#### 4.2 Cybercar Showcase in Trondheim

The objectives for the city of Trondheim are to diminish (or eliminate) private and truck traffic through the city and provide clean transport accessible to all. Thanks to a toll scheme implemented a while ago (and now finished), the city has collected enough funds for building a ring road, which could eliminate most of the traffic going through the city. This ring road will be opened in 2009.

The execution of a showcase in Trondheim will show alternatives to conventional transport concepts and aims for raising the awareness of citizens, stakeholders and local authorities. Three potential sites are evaluated for the implementation of automated transport. The first potential site is a link between the harbour and the city centre. A canal separates these two areas, and the only passage is through a small two-way bridge. This causes a strong congestion as trucks and private cars move across the city centre. The new ring to be opened in 2009 will solve the through traffic problem, but the city wants to improve the mobility for commuters and tourists who come from the harbour. The distance between the harbour and the major attraction point, the Nidaros Cathedral, is about 1,8 km. The tourists coming in the coastline ships have only a very small timeframe (3 hours) to visit the city, and the walk to the Cathedral takes the most of it. The harbour is also a strong attraction point with office buildings, a pool complex, a research centre and, in the near future, a hotel and a conference centre. The city plans to build a new bridge only for pedestrians and cyclists to shorten the link between the city centre and the harbour. This bridge could be adapted to an automated shuttle service for commuters and tourists. Even if this distance may be short depending on the destination, the harsh local weather conditions may sometimes discourage tourists from visiting the city.

The third site that might be served by an automated shuttle is the hospital renewal project and the university, which occupies a surface of around 600 by 400 meters. This hospital will only provide a small parking area for employees, so a new parking area is planned across the Nidelva River, where a train depot is currently located. A small two-way bridge that currently supports very little traffic links the two areas. The whole hospital and parking area
will be closely linked to the future ring road, bringing a big portion of traffic to the hospital. Therefore, the municipality considers linking the parking area to the hospital with an automated shuttle service across the bridge. This would be the only service allowed inside the hospital area. The system might be partly financed by the hospital, which is said to be the highest investment in the mid-Norway area ever. The longest linear distance between the extremes of the parking and the hospital entrance is about 0.5 km.

The three pre-selected sites, which present a strong potential for specific applications of automated systems, were analysed and the choice was made for the third site. However the scope of the showcase has been modified according to the current needs. The cybercars should act as a feeder service and link the bus station with the hospital (Figure 4-1). Currently there is no regional bus service from the city centre to the hospital. The Shuttle service with a conventional bus would be too expensive. The objective of the city of Trondheim is to have a cybercar shuttle in periods of low demand instead. The showcase intends to demonstrate a seamless link between the main bus lines and the hospital area. In a second phase the cybercars could also serve the area of the University of Trondheim (in front of the hospital area).

Figure 4-1: Showcase site in Trondheim (yellow circle)

Current Status
The CityMobil Board and the General Assembly have approved the showcase in Trondheim. The execution of the showcase is foreseen for the last week of August 2009. In parallel a conference on more sustainable road transport solutions is planned to be organised.
4.3 Cybercar Showcase in Vantaa

This showcase was originally planned to be executed in Hyvinkää. However, the sites proposed in Hyvinkää were not suited for a demonstration of innovative transport solutions as they were out of the sight of the public.

For this reason, it was decided to move the showcase to Vantaa, where the showcase fits very well in the scope of the plans of the city. The showcase site demonstrates a real potential application of cybercars.

Vantaa is the fourth biggest city in Finland with about 192,500 inhabitants located in the north of Helsinki. Vantaa’s objective with regard to the cybercar showcase is on one side to show with the help of the new potential showcase site (Figure 4-2) that a link between the Jokiniemi residential area and the Tikkurila station could be served by cybercars. Furthermore, Vantaa wants also to experience this type of innovative transport solution as a sort of feasibility studies for the implementation in the new a large development area Marja-Vantaa, which is currently under planning.

The showcase can be either executed on a large free area in front of the Jokiniemi residential area or explicitly as a link between the station and the residential area. In the latter case, the cybercars would have to cross the rails through a tunnel with an inclination of about 5%.

Figure 4-2: Potential showcase site in Vantaa
Current Status
It is planned to have a meeting in Vantaa as soon as possible in order to discuss the scope of the showcase and the detailed arrangement. The showcase is currently foreseen for mid of 2009. However this will be topic of the discussion with the city of Vantaa.

4.4 Advanced City Car Showcase in Genova
Genoa is the Ligurian chief town with about 800.000 inhabitants. Its historical centre is considered humanitarian patrimony (UNESCO) since July 2006. The town has a glorious history, strong traditions and is well known as “La Superba”. Significant events took place recently, so giving the opportunity to promote its urban renewal: the Columbus Five Centennial Anniversary in 1992, the G8 in 2003 and the nomination as Cultural European Capital in 2004. The new Genoa based its rebirth by recovering its hinterland green areas, the ancient harbour and the historical centre.

The Genoa Historical Centre is one of the largest in Europe (400.000 m²), spread in a labyrinth of dark and narrow “carruggi” creating a sort of “casbah” by the architectonic structures of great historical and aesthetic value (}
Figure 4-4).

Palaces, streets and piazzas are now brought again to the previous splendour, with renewal works concerning also large pedestrian area, followed by mobility and streets new planning. Nevertheless, this gradual recovery if by one side increases the town glamour, on the other side the historical centre still presents serious problems of pedestrian and public- private cars access, so compromising the delicate environmental balance and increasing the risk for its decay. When the distance between private and public conveyance exceeds 200 metres, it’s burdensome to carry heavy bags for both old and young people. Such a labyrinth consisting of narrow streets keeps the manoeuvring areas for the smallest vehicles impassable. This causes inhabitants and commerce activities to move house. It’s a pity for the housing and urban values, which could be desirable to large population strata and commercial activities (present housing value, in theory 1 milliard euros; after renewal: 4-5 milliard euros) by a complete renewal and easy access.

For all these reasons, the Genoa historical centre is a stimulating case study. The investigation of instruments and organizing models is vital not to upset this existing rigid system: on one side the vehicles have to move in this streets’ tight reticulum easily, on the other side the research of an organizing model must allow the vehicles mobility without problems for pedestrians. A dual mode drive vehicle is thought fit to enter into the town most impervious ways. This vehicle is not exclusively dedicated to the historical centre, but it may compare the ordinary town roads, outside the historical centre.

Therefore Genova was chosen for an advanced city car showcase. The showcase site is in Piazza Sarzano area and about 200 meters long (see Figure 4-3). The piazza is occupied by the base ground and is at the same time a “terrazza” where the public may observe the route from the above. The route presents differences in level, and various difficulties; among others the possibility to park in a small dimensions garage with reduced manoeuvring space. The peculiarity of this route is to be right in the heart of the old Genoa, a place where buildings create scenic sides, so enriching the showcase further on.
Figure 4-3: Showcase site in Genova
Current Status

The Genova showcase was originally planned for October 2008, but then moved in agreement with the city authorities to October 2009, which gives the CityMobil partners more time to develop all the functionalities for the dual mode vehicles for this complex environment. The CityMobil Board and General Assembly have approved the showcase. The date for the showcase was chosen to be in parallel to the science festival, which is being hosted in Genova annually during autumn.

Instead of the originally planned showcase a workshop with CityMobil representatives and local stakeholders will be held in the beginning of November 2008.

5 Plans for City Studies

5.1 Uppsala City Study

The Uppsala City Council has adopted a vision of economic, social and environmental sustainable development, which includes sustainable and competitive urban transport. Uppsala is a medium sized city with a fairly low density. The economic preconditions to build competitive (to car) tram or express bus systems are not good and the covered area is too small. Analyses and comparisons have indicated that a PRT-system could be a solution. Therefore the objective of the city study in the Swedish city Uppsala is a feasibility study of a
pilot Personal Rapid Transit System at the Boländerna District. The Boländerna District is an old industrial district in fast transition into a modern commercial area.

The main advantages of a PRT system in this area are the easy commuting for employees, customers could park once and use PRT inside the area, liberty to design parking areas and no conflicts with urban cultural assets. The following main elements are included in this study:

1. Network Design
2. Demand Analysis
3. Dimensioning of the Vehicle Fleet
4. Calculation of Costs
5. Other pre-conditions
6. Meetings and appointments with stakeholders

The work plan is based on following activities:

- Compilation of input material (land-use, plans, traffic forecasts and commuting data etc)
- Design of the personal rapid transit network (location of tracks and stations)
- Creation of common understanding of track location in dialogue with concerned stakeholders
- Carrying out a demand analysis concerning the number of trips
- Dimensioning of the vehicle fleet
- Calculation of costs
- Analysis of financial prerequisites to run Personal Rapid Transit (Public Transport Authority (PTA) Fares, EU contribution, etc)
- Participation in meetings (steering group meetings plus meetings with the Planning Committee and City Executive Board Working Committee) and separate meetings with concerned stakeholders
- Production of a report and presentation material (project management included)

A comparison of the PRT system will be carried out against today's bus network with respect to the number of trips and costs. On the basis of the track lengths, the number of stations and the size of the vehicle fleet, it will be possible to calculate the costs of investment and maintenance. With guidance from these experiences calculation of costs will be carried out, including investment costs for tracks, stations and vehicles, as well as running costs, all of this discounted to an annual total cost.

**Current Status**

The CityMobil Board and General Assembly have approved the city study in Uppsala. The work plan has been defined. The partner City of Uppsala will join the consortium and the city study will be included in the CityMobil activities in the next contract amendment.
6 Other demonstration activities

Besides the already planned demonstration activities and city studies some budget is still available for more potential other activities. However additional cybercar showcases will be not executed within the framework of CityMobil, as these are now in the scope of the FP 7 European project CityNetMobil. The focus of additional CityMobil demonstration activities is thus on small demonstrations, advanced city car showcases and city studies. For this purpose the Reference Group is addressed again and ideas for other activities are currently under discussion.

7 Sources

7.1 Reference List

CityMobil Project, 2008, updated description of work

CityMobil Project, 2007, Selection of the city sites for detailed studies and demonstrations, deliverable D.1.5.4