**Selected sites**

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<tr>
<td>Author(s)</td>
<td>GEA</td>
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<tr>
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<td>01 May 2006 – 30 April 2011</td>
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Executive Summary

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

During the first 18 months of the project there has been an information exchange between the cities in the Reference Group and the project partners. This has resulted in a better understanding of the needs of widely differing cities that wish to implement different types of automated systems. It has also led to a better understanding of the possibilities of the CityMobil consortium to help these cities forward on their way to implementing innovative transport systems.

This exercise has led to a proposal on how to continue the efforts of the Reference Group after the first 18 months. The status of the decision process is as follow:

Showcases

The main goal of the showcases is to demonstrate to city authorities and the public the new mobility concepts offered by CTS and dual mode vehicles. For this purpose a small fleet of 3 cybercars and 3 advanced city vehicles has been prepared which can be brought to various cities such as those of the reference group of cities or to specific ITS or Urban Transport events.

The activities will be basically divided into two subtasks: one concerning the development of this fleet and the demonstrations it can perform (first 18 months), the other concerning the demonstrations themselves in various locations. These demonstrations are not meant to last very long (a maximum of two weeks in general).

In the selection of showcases the focus has been on the cities of the Reference Group. The first selection of candidates was made on the basis of the results of a questionnaire that was issued in November 2006. Discussions with the selected cities (Genova, La Rochelle, Daventry, Hyvinkää) will still lead to either a confirmation of the showcase in that city or to the selection of another city.

City studies

4 cities (Almere, Genova, Vienna and Gateshead) have been selected for city studies. In these studies available models will be evaluated and a new generic model developed. A series of comparable tests of a common set of advanced technology options will then be undertaken to help answer the question of the potential role of such technologies when applied at a city-wide level.

The city of Limeil-Brevannes is selected for a city study. Limeil-Brevannes, close to Paris has plans for a new suburb that should meet high levels of sustainability. Since all plans are still in preparation Limeil-Brevannes offers an excellent opportunity for a general study into the possibilities of integrating an advanced transport system into an urban environment.

Small demonstrations

The purpose of a small demonstration is to show the efficiency and reliability of CTS, the PRT in real conditions of use. This means a full commitment of most authorities and operator. It also means a one year demonstration with deployment of the system and at the end of the small demonstrations.

The cities of Lausanne, Clermont-Ferrand and Uppsala have been selected as cities for small demonstrations. Lausanne is creating a new cybercar path in EPFL campus (Polytechnical School of Lausanne). Clermont-Ferrand is developing an automated transport system for pedestrian areas. Uppsala is already installing a test track for a PRT system.
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Introduction

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 (London), Castellón (Valencia) 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 different types of small scale demonstrations limited in size and time called showcases.

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

The main purpose of the present guidelines is to provide a common operating strategy for the selection of sites for modelling and showcases.

These guidelines are derived from MAESTRO’s that provides a methodology for selection, design and evaluation of pilot and demonstration (P/D) projects for transport in Europe. MAESTRO is a major strategic initiative fully funded under the Transport Research Programme of the European Commission. The methodology derived has been adapted to CityMobil concept and objectives.

The document is organised in five sections: this introduction, the description of the methodological approach, the instructions for sites to take part in the selection process, the procedure to be carried on within CityMobil consortium to provide the weights to homogenise the different indicators and criteria and the selection’s results.

As all showcases are not described yet (more coordination needs), the goal of present deliverable is to give an overview, as complete as possible, of the state of the selection process. The final description of the selected showcases will be within deliverable D1.1.3 "Plan for WP1.5: Other demonstrations, showcases and city studies", planned for M20.

The “multiplication of ratio” Multicriteria evaluation technique, which is the one recommended for the selection, is described in annex A.
1 Methodology for site selection

1.1 CityMobil demonstration activities

Before describing selection process and criteria, it is important to define the types of support CityMobil is able to provide to the Reference Group. The various activities proposed to the selected cities are of 2 different kinds.

1.1.1 Modelling studies

A modelling study is a study to assess the wider implications of advanced mobility technologies in urban environments. This includes a predictive analysis of the potential impact of these advanced technologies on a broad variety of aspects like business models, safety, legislation, administration, acceptability, implementation, etc.

These studies are carried out by SP2, dealing with "Future Scenario's": they don't take part of the present demarche conducted within SP1 (the cities have already been selected at the Reference Group meeting on the 16th of January 2007, because these studies had to start in the beginning of 2007).

1.1.2 Showcases, small demonstrations and wider city studies

Then another number of activities are carried out by SP1, dealing with “demonstration activities” or showcases. Of course, the three large demonstrations currently planned in Castellon, Roma and Heathrow are not taken into account in this selection process.

However, it was recognized that it was worthwhile to have three additional kinds of demonstration activities such as showcases, small demonstrations and city studies.

A showcase is a temporary display of Cybercars or Advanced City Vehicles which can and will be brought to a number of interested cities.

A showcase is transportable and temporary (typically 2 weeks) and is meant to help for decision-making of implementing advanced transportation systems.

A small demonstration is provided to demonstrate issues that are not covered by the three selected city demonstrations. CityMobil supports this kind of activity with knowledge and limited financial support. A small demonstration is organised during a longer period (from 2 months to a year) for observing quality of use, effectiveness in real conditions of operation.

A wide city study is a study to find a solution for a particular problem that exists in one or more of the Reference Group Cities. It is in appliance of VOLTair’s methodology, specially defined to dimension and guide sites by introducing new kinds of transportation systems, in accordance to existing offer.

1.2 Objectives definition

The basic requirement to any site to take part in the selection through these different showcases is that some thoughts to the proposed advanced transport system application have already been given. In other words, although a more detailed study of the site will be made in the CityMobil framework, some elementary calculations on the expected location, size, demand and supply of the new transport system has to be available. CityMobil partners can advise and help in identifying the technology best fitting with the site needs and in dimensioning it for the site but all the basic work has to come from the site.

This phase in which first thoughts are made is called, according to MAESTRO terminology, Pre-design. Although MAESTRO provides suggestions on the methodology to follow in this phase here it is purposefully left open. Any site that studied an advanced transport application did so according to its current practice which certainly differs from site to site. To avoid placing the burden to re-do the study according to the given method, the pre-design methodology is not suggested; sites are free to do it with their own methods. The only request is that they have ideas clear enough about their application to fill-in the pre-design and site selection form provided in the next section.
The site will need to be represented inside CityMobil and shall need to name a "site responsible partner" who will be the reference person for the site inside the consortium.

On the other hand, a rather strict methodology is provided for the site selection. The process is divided into the following four steps.

- Objectives definition.
- Site Classification.
- Selection Criteria.
- Site Selection.

Here follows four sub-sections describing each of the steps.

Project objectives describe what is to be learnt from the project and what is to be achieved by the modelling and/or the showcase. The definition of the objectives serves as the basis for judgement in evaluating the system being studied.

MAESTRO defined four levels of objectives according to the wideness of the range of their applicability. First three levels are the general objectives of, respectively, all transport related projects, specific transport sector (i.e. urban transport, air transport, rail transport), transport sector area of major policy interest; these objectives have been already identified for CityMobil at proposal and negotiation stage and are, by definition, common to all the proposed sites thus not an issue for site selection. The objectives of the fourth level, the site related objectives, have to be defined at this stage and will be used in the site selection process to characterise the sites.

They have to be determined on the basis of:

- site specific problems that the project is aiming to solve, and
- stakeholders' needs involved in and affected by the problem, such as local authorities or policy-making bodies.

The first step towards the definition of objectives is to identify the particular transport problems to be solved by the implementation of the project. First site-specific objectives are the site-specific problems solving.

Second site-specific objectives are the fulfilment of the needs of the different stakeholders. In order to better define stakeholders needs, it is suggested to classify them according to the three stakeholders categories listed below.

- End users: all potential system-user and those affected by the system as non-users, e.g. residents.
- Decision-makers: decide over implementation of a CTS system.
- Operators: selected representatives of transport operator and service providers, e.g. LRT operator, theme parks, etc. Operate/provide services for a CTS system.

This is the case for all applications, but in the special case of a private application (e.g. large business, theme parks, airports, etc.), though there is also a decision-making body and a system operator, they are part of the same institution.

In the framework of CyberMove, an EC Project of the Fifth Framework Programme which can be considered the precursor of CityMobil, the general view of the stakeholder categories depicted below (see chapter 1.3) was defined.
In the end, each site is free to choose its best fitting classification as long as each stakeholder category expresses its needs and objectives are defined according to these last ones. One main objective is always the conflict solving between the contrasting needs of different stakeholders.

Figure 1: Example of a stakeholder classification
1.3 Site Classification

Cybernetic Transport System (CTS) applications are generally different within the CyberMove potential sites. Site responsible partners have to classify them according to the classes defined below in order to evaluate within CyberMove the widest possible range of CTS applications. The site classification on the highest level is divided in public applications and private applications and on lower levels it organises the applications according with the site characteristics.

Class A: Public applications

A.1 Citywide
A.2 City-centre
  A.2.1 For general user
  A.2.2 For special user: Tourists, Conference centre, Etc.
A.3 Periphery
  A.3.1 For general user
  A.3.2 For special user: business-park, shopping centre, etc.

Class B: Private Application

B.1 Airport
B.2 Theme-park
B.3 Large Business
B.4 Tourist Resort
B.5 University Campus

1.4 Selection Criteria

MAESTRO defined several criteria to be considered in the site selection process and clustered them in four sets of criteria:

(a) national and local transport strategies and plans;
(b) site-specific criteria;
(c) financial criteria;
(d) criteria related to the project consortium.

Among the criteria proposed by MAESTRO those fitting with CityMobil have been selected; they are listed below organised according to MAESTRO sets. Each criterion has to be measured in order to obtain a quantitative evaluation; to do this a number of indicators for each criterion have been selected. The sets of criteria, the related criteria and the indicators chosen are listed and explained below.

1.4.1 Set (a) National and local transport strategies and plans

(a.1) Consistency between local, regional and national plans for transport

Description. The criterion assesses the consistency between the project and national, regional and local plans. The project implementation needs to align with the local transport strategy. The relative importance of the consistency with plans at different geographic levels will be set in defining the weight of the three indicators in the criterion. This criterion will be applied to both showcases and modelling selection.

Measurement method. The site responsible partner has to compare problems identified and the planned strategies, objectives and initiatives at local, regional and national level with the objectives of the project. The indicator is measured checking, for each transport plan (national, regional and local), what follows.
• If the plan does not mention the problems, the objectives or the technology at all the index has to be set to 0.

• If the plan identifies the same specific problems (on the site or at a general level) that motivated the implementation of the project the index has to be set to level 1.

• If the plan, other than the problem, identifies as the methodology to solve the problem the installation of a transport system with characteristics (capacity, frequency and commercial speed) similar to the chosen transport system designed the index has to be set to level 2.

• If the plan, other than highlighting the problem and forecasting a similar transport system as a possible solution, makes specific reference to a transport system based on fully or partially automated vehicles the index has to be set to level 3.

• If the plan budgets funds specifically for the project the index has to be set to level 4.

<p>| Table 1: Indicators to measure consistency between project, local regional and national plans |</p>
<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency at national level</td>
<td>Level of consistency between national plans and project objectives and technologies</td>
<td>Index</td>
<td>0 to 4</td>
<td>Rating</td>
</tr>
<tr>
<td>Consistency at regional level</td>
<td>Level of consistency between national plans and project objectives and technologies</td>
<td>Index</td>
<td>0 to 4</td>
<td>Rating</td>
</tr>
<tr>
<td>Consistency at local level</td>
<td>Level of consistency between national plans and project objectives and technologies</td>
<td>Index</td>
<td>0 to 4</td>
<td>Rating</td>
</tr>
</tbody>
</table>

(a.2) Legal framework

_Description_. It measures the possibility for the specific application to fit with European, national, regional and local regulation. This criterion applies to showcases only. CityMobil has to help in overcoming the legal framework barrier therefore even transport systems not permitted by law today can be modelled but to have successful showcases it is necessary that the vehicles will be allowed to supply some transport system in a way or another. For showcases, the fulfilment of such criterion is so important that it has to be inserted in the mandatory ones.

_Measurement method_. The site responsible partner has to investigate the legal framework, at national, regional and local level, to assess if and how his own specific application is allowed.

• If the legal framework expressly forbids the application, the index has to be set to level 0.

• If the legal framework allows the applications with special clearances and under specific limitations (e.g. a “driver” is requested to be always on board even if the vehicle are fully automatic), the index has to be set to level 1.

• If the legal framework allows applications as they are with special clearances, the index has to be set to level 2.

• If the legal framework allows the designed application, the index has to be set to level 3.

<p>| Table 2: Indicators to measure consistency between the proposed project and legal framework |</p>
<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application consistency with legal framework</td>
<td>Level of consistency of the particular application with the actual regulation</td>
<td>Index</td>
<td>0 to 3</td>
<td>Rating</td>
</tr>
</tbody>
</table>
1.4.2  Set (b) Site-specific criteria

(b.1) Project progress

*Description.* It defines the actual advancement stage of the project within scheduling. The entire project life is divided into 10 consecutive phases plus a Phase 0 that considers the case of nothing done. The last three phases of the project life are the system construction, the test phase and the opening to public. They have to be developed during CityMobil for the inclusion of the project in the CityMobil framework. Thus only projects being in the first seven phases can be included in the site selection process.

*Measurement method.* A standardised project-life-cycle is proposed here; several phases are defined. The progress of the project is measured counting the completed phases as indicated in the following list.

- Phase 0: no activities performed yet.
- Phase 1: problems identification / objectives definition.
- Phase 2: network definition.
- Phase 3: demand forecasting.
- Phase 4: system pre-design completed.
- Phase 5: initial evaluation completed / impacts forecasted.
- Phase 6: system detailed design completed.
- Phase 7: expected impacts evaluation / operating simulation.

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progress level</td>
<td>Level of implementation advancement related to the predefined scheduling</td>
<td>Index</td>
<td>0 to 7</td>
<td>Rating</td>
</tr>
</tbody>
</table>

(b.2) Integration opportunities

*Description.* It assesses how much the introduction of the advanced transport system is integrated with the other transport system and networks in the areas, is in line with policies and other measures and if the opportunities of re-qualification of public spaces is going to be taken.

*Measurement method.* The integration opportunities are measured by three indicators: integration with other transport modes (continuity of mobility chains); integration with other policies and accompanying measures; public spaces re-qualification.

First is measured with an index ranging from 0 to 3 from a totally isolated transport service to a system fully integrated in the city mobility systems like described below.

- If the new system is a totally isolated line and in no connection with other transport modes, the index has to be set to level 0.
- If the new system is not a network but at least a flexible line (e.g. on demand), close but not integrated with other transport modes, the index has to be set to level 1.
- If the new system is either a small network per se or has traditional interchanges with conventional transport modes (e.g. close stops from which users can transfer on foot to the other mode), the index has to be set to level 2.
• If the new system is an entire network with an high degree of flexibility (e.g. fully on-demand itineraries and times) or has advanced and integrated interchanges with conventional transport modes (e.g. the new system vehicles can bring the users directly to the car-park slot where he left his car or on the train platform), the index has to be set to level 3.

Second is measured through an index ranging from 0 to 3 which quantifies the changes in the policies and the measures adopted to integrate at best the new transport system being 0 when the system is inserted without any special policy or accompanying measure and 3 when all the possible accompanying measures to make the system work better are adopted.
• If no accompanying measures are adopted to favour the new system, the index has to be set to level 0.
• If the new system usage (e.g. ticketing) is integrated with the other transport modes, the index has to be set to level 1.
• If the new system is favoured by a range of “soft policy measures” (e.g. an advertisement campaign is made, parking fees are changed accordingly, private vehicle access is rationed), the index has to be set to level 2.
• If the new system is favoured by a range of “hard policy and accompanying measures” (e.g. road circulation modification, pedestrian bypass building, car banning), the index has to be set to level 3.

Third indicator is measured against an index, ranging from 0 to 3, that qualifies the actions related to public spaces re-qualifications.
• If no public space re-qualification is done in conjunction with the new transport system installation, the index has to be set to level 0.
• If the system is inserted in an already re-qualified area without affecting it negatively, the index has to be set to level 1.
• If the new system is introduced alongside with measures to smooth its insertion in the area (e.g. ornamental plants are used as barriers, new advanced pedestrian crossings are made), the index has to be set to level 2.
• If not only the space alongside the new system path is re-qualified but the entire area is, the index has to be set to level 3.

Table 4: Indicator to measure the level of integration with urban planning measures

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of integration with in the city mobility network</td>
<td>Measures how integrated the new system is with the overall transport system of the area</td>
<td>Index</td>
<td>0 to 3</td>
<td>Rating</td>
</tr>
<tr>
<td>Level of integration with other policies and accompanying measures</td>
<td>Measures how integrated the new system is with the overall transport policies of the area</td>
<td>Index</td>
<td>0 to 3</td>
<td>Rating</td>
</tr>
<tr>
<td>Level of public spaces re-qualification</td>
<td>New integration in regard with public spaces re-qualification measures</td>
<td>Index</td>
<td>0 to 3</td>
<td>Rating</td>
</tr>
</tbody>
</table>

(b.3) Technical feasibility

**Description.** It rates the technical feasibility of the proposed system in terms of driving difficulty for the vehicles. The easiest driving conditions means the most feasible solution thus it has the highest score. This criterion applies only to showcases since modelling is supposed to investigate technologies which will be available in the next future.
**Measurement method.** The level technical feasibility of the system is mostly related to the operational environment of the vehicle and to the presence or not of the driver. Five operational environments for automatic vehicles and one for manual vehicles are defined below. The technical complexity of the system is rated accordingly with its operational environment.

- If the system is based on automatic vehicles running in a not restricted access environment, the index has to be set to level 0.
- If the system is based on automatic vehicles running on shared tracks with restricted car traffic access, the index has to be set to level 1.
- If the system is based on automatic vehicles running in car traffic protected environment with intersections at grade, the index has to be set to level 2.
- If the system is based on automatic vehicles sharing its tracks with pedestrians, cyclists and car in low speed manoeuvre for parking, the index has to be set to level 3.
- If the system is based on automatic vehicles running in a totally protected site or the vehicles are manually driven, the index has to be set to level 4.

**Table 5: Indicator to measure the technical feasibility**

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of technical feasibility</td>
<td>Technical complexity of the CTS application installed</td>
<td>Index</td>
<td>0 to 4</td>
<td>Rating</td>
</tr>
</tbody>
</table>

(b.4) **Stakeholder acceptance**

**Description.** It measures the acceptance and the support of the site users in the projects (derived from site user needs analysis).  

**Measurement method.** In the section 1.2 three stakeholder categories have been defined: end users, operators, and decision-makers. It was also said that each site can use its own classification. Here, following the classification given in 1.2, three indicators, one for each stakeholder categories, have been defined to measure the “user acceptance” but if the site defines different stakeholder categories, it is free to measure one indicator per category, being sure to provide the relative weight of each category.

The level of acceptance of each category is assessed on the basis of their aptitude to support or oppose the project. The level of acceptance has to be estimated providing a value from 0 (category strongly opposing the project) to 5 (category strongly supporting the project).

**Table 6: Indicators to measure stakeholder acceptance**

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>End user acceptance</td>
<td>Level of acceptance of end user</td>
<td>Index</td>
<td>0 to 5</td>
<td>Rating</td>
</tr>
<tr>
<td>Decision-maker acceptance</td>
<td>Level of acceptance of decision-makers</td>
<td>Index</td>
<td>0 to 5</td>
<td>Rating</td>
</tr>
<tr>
<td>Operator acceptance</td>
<td>Level of acceptance of operators</td>
<td>Index</td>
<td>0 to 5</td>
<td>Rating</td>
</tr>
</tbody>
</table>
(b.5) Data availability

**Description.** It assesses the data availability for evaluation purposes.

**Measurement method.** The data availability is measured by rating the aptitude of the site responsible to collect requested data following the indicated way and the given schedule. The indicator level has to be rated as described below.

- If the site responsible is not going to collect data the index has to be set to level 0.
- If the site responsible is going to collect requested data but not following the indicated way and the given schedule the index has to be set to level 1.
- If the site responsible is going to collect requested data following the indicated way but not the given schedule the index has to be set to level 2;
- If the site responsible is going to collect requested data following the indicated way and the given schedule the index has to be set to level 3.

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of data availability</td>
<td>Aptitude of the site responsible to collect requested data in the indicated way and following the given schedule</td>
<td>Index</td>
<td>0 to 3</td>
<td>Rating</td>
</tr>
</tbody>
</table>

1.4.3 Set (c) Financial Criteria

(c.1) Funds

**Description.** It assesses the financial feasibility of the project by measuring which parts of budget have been already funded and which parts are expected but not yet received.

**Measurement method.** It is measured by collected the percentage of received funds and the percentage of expected funds. This last value will be weighted on the basis of the values of indicators importance arranged and then summed with the first. The result constitutes the criterion performance. For example if the received funds value is 20% and the expected funds value is 60%, considering that the indicator importance within the criterion is respectively 5 and 4, it has to be multiplied 60 for 4/5 and then summed to 20 thus the criterion reaches an overall value of 68%.

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received funds</td>
<td>Percentage of the estimated budged already funded</td>
<td>%</td>
<td>0 to 100</td>
<td>Collection</td>
</tr>
<tr>
<td>Expected funds</td>
<td>Percentage of the estimated budged expected but not yet received</td>
<td>%</td>
<td>0 to 100</td>
<td>Collection</td>
</tr>
</tbody>
</table>

1.4.4 Set (d) Criteria related to the project consortium

(d.1) Consortium partner involvement within the site

**Description.** It measures the level of involvement in the project of the CityMobil partners.

**Measurement method.** The level of involvement in the project of the CityMobil partner, especially that responsible for the site, is measured according to the scale below.
- Level 0: not involved.
- Level 1: involved in the project as an external advisor or consultant.
- Level 2: actively involved in the project as system provider.
- Level 3: actively involved in the project at decision-making levels.

### Table 9: Indicator to measure consortium partner involvement within the site

<table>
<thead>
<tr>
<th>Name of indicator</th>
<th>Description of indicator</th>
<th>Unit of measure</th>
<th>Scale</th>
<th>Method of obtaining measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CityMobil partner involvement in the project</td>
<td>Level of involvement of the CityMobil partner responsible for the site in the project</td>
<td>Index</td>
<td>0 to 3</td>
<td>Rating</td>
</tr>
</tbody>
</table>

1.5 Selection process

The selection process is divided into the following four steps.
- Site classification.
- Exclusion of those candidate sites not exceeding the threshold level in the mandatory criteria.
- Ranking of the candidate sites via application of the “Multiplication of Ratios” Multicriteria Evaluation technique.
- Site selection.

To include in the CityMobil evaluation framework the widest possible range of system applications the sites will be divided in classes according to the classification described in section 1.3. Albeit the site ranking performed in the third step will allow defining the most suitable site of the all lot for inclusion in the CityMobil evaluation framework, the site selection will be made choosing the first sites in the list from different application classes.

To perform the second step the following criteria, with their associated indicators, were defined as mandatory and the threshold level were fixed. Albeit some of the mandatory criteria for feasibility studies are the same of field trials, the threshold levels are different. Table 10 shows the criteria, the indicators and the threshold levels for the showcases while Table 11 does it for the demonstrations.

### Table 10: Mandatory Criteria, indicators and threshold levels for showcases

<table>
<thead>
<tr>
<th>Mandatory criterion</th>
<th>Indicator</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal framework</td>
<td>Application consistency with legal framework</td>
<td>Minimum 1</td>
</tr>
<tr>
<td>Data availability</td>
<td>Level of data availability</td>
<td>Minimum 2</td>
</tr>
</tbody>
</table>

### Table 11: Mandatory Criteria, indicators and threshold levels for demonstrations

<table>
<thead>
<tr>
<th>Mandatory criterion</th>
<th>Indicator</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal framework</td>
<td>Application consistency with legal framework</td>
<td>Minimum 2</td>
</tr>
<tr>
<td>Data availability</td>
<td>Level of data availability</td>
<td>Minimum 2</td>
</tr>
<tr>
<td>Technical feasibility</td>
<td>Level of technical feasibility</td>
<td>Minimum 1</td>
</tr>
<tr>
<td>Acceptance</td>
<td>Decision makers’ acceptance</td>
<td>Minimum 3</td>
</tr>
</tbody>
</table>

Another criterion, which has been considered for the demonstrations, is to have at least 65% of the funds budgeted for the demonstration implementation available directly in the demonstration site.
Third step is the ranking of the sites. The evaluation technique chosen is one of the most suitable multicriteria for site selection: “Multiplication of Ratios” (see annex A for more).

This technique requires to individuate the set of evaluation criteria and to define for each criterion a weighting factor to establish its relative importance.

These factors will be established in a procedure described in section 3 of this document.

To ensure the consistency of the choice a sensitivity analysis on these weights will be made at the end of the selection process.

Each criterion is evaluated by its related indicators and provides a value which is the performance of the project in the criterion. With these inputs the technique normalises the criterion value to a common reference value (that is for example the correspondent criterion value of the project X) and raises it to the power of the weighting factor. The result is multiplied for the other results given by other criteria so determining the Total Performance (T.P.) of the project. The T.P. will allow ranking all evaluated projects.

1.6 Site selection

Two tables with the indicators chosen for the site selection (reported in section 2.3) have been made: in table 12 there are the indicators to collect for the showcases, whereas in table 13 there are the indicators for the demonstrations.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Indicator(s)</th>
<th>Indicator Weight</th>
<th>Criterion Weight</th>
<th>Threshold for admission if the criterion is mandatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a.1)</td>
<td>Consistency at national level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consistency at regional level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consistency at local level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a.2)</td>
<td>Application consistency with legal framework</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.1)</td>
<td>Progress level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.2)</td>
<td>Application integration with the mobility network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application integration with other policies and complementary measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application integration with the redesign of public space</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.3)</td>
<td>Level of technical feasibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.4)</td>
<td>End users acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decision-makers acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operators acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.5)</td>
<td>Level of data availability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c.1)</td>
<td>Received funds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expected funds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d.1)</td>
<td>CityMobil partner involvement in the project</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 13: Site-selection form for the demonstrations

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Indicator(s)</th>
<th>Indicator Weight</th>
<th>Criterion Weight</th>
<th>Threshold for admission if the criterion is mandatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a.1) Consistency at national level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consistency at regional level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consistency at local level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a.2) Application consistency with legal framework</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.1) Progress level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.2) Application integration with the mobility network</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application integration with other policies and complementary measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application integration with the redesign of public space</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.3) Level of technical feasibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.4) End users acceptance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decision-makers acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operators acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b.5) Level of data availability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c.1) Received funds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expected funds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d.1) CityMobil partner involvement in the project</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the site selection the members of the board of the project filled in table 12 or 13, by giving their different weights site by site.

2 Procedure to define indicator and criteria weights

The multiplication of ratios multicriteria method requires, as better defined in annex A, a list of evaluation criteria and relative weights.

The criteria have been already defined in section 1.4 as well as indicators to measure them. For those criteria measured by one single indicator the criteria is directly measured while for those measured by more than one indicator an “internal indicator weighting” has to be provided.

The procedure to define the criteria-weights and the indicator-weights is to select 5 of the CityMobil partners not directly involved with any site and ask them to score the importance of each indicator in the criterion and that of each criterion in the selection from 1 to 10. The averages will be re-sent to the same people who will be asked to review their judgment according to the averages. The weights coming out from the second averaging will be the weights to use.
3 Selection process results

3.1 Evaluation of the questionnaires
The present section reports on the results of the selection process conducted on the basis of the methodology described in sections 1 and 2 of this deliverable.

Table 14: List of indicators

<table>
<thead>
<tr>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency at local level</td>
</tr>
<tr>
<td>Consistency at regional level</td>
</tr>
<tr>
<td>Consistency at national level</td>
</tr>
<tr>
<td>Application consistency with legal framework</td>
</tr>
<tr>
<td>Progress level</td>
</tr>
<tr>
<td>Application integration with the mobility network</td>
</tr>
<tr>
<td>Application integration with other policies and complementary measures</td>
</tr>
<tr>
<td>Application integration with the redesign of public space</td>
</tr>
<tr>
<td>Level of technical feasibility</td>
</tr>
<tr>
<td>End users acceptance</td>
</tr>
<tr>
<td>Operators acceptance</td>
</tr>
<tr>
<td>Decision-makers acceptance</td>
</tr>
<tr>
<td>Level of data availability</td>
</tr>
<tr>
<td>Received funds</td>
</tr>
<tr>
<td>Expected funds</td>
</tr>
<tr>
<td>CityMobil partner involvement in the project</td>
</tr>
</tbody>
</table>
Table 15: Summary of the answers to the questionnaires

<table>
<thead>
<tr>
<th>Crit.</th>
<th>Indicator</th>
<th>Al</th>
<th>Ca</th>
<th>C.F</th>
<th>Da</th>
<th>Ge</th>
<th>L.R</th>
<th>La</th>
<th>L.B</th>
<th>O.C</th>
<th>O.Ci</th>
<th>S.M</th>
<th>Tr</th>
<th>Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a.1)</td>
<td>Consistency at local level</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Consistency at regional level</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Consistency at national level</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>(a.2)</td>
<td>Application consistency with legal framework</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(b.1)</td>
<td>Progress level</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>(b.2)</td>
<td>Application integration with the mobility network</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Application integration with other policies and complementary measures</td>
<td>3</td>
<td>N/A</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Application integration with the redesign of public space</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>(b.3)</td>
<td>Level of technical feasibility</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>(b.4)</td>
<td>End users acceptance</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>Operators acceptance</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Decision-makers acceptance</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
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<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4.5</td>
</tr>
<tr>
<td>(b.5)</td>
<td>Level of data availability</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>(c.1)</td>
<td>Received funds</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
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<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Expected funds</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**abbreviations:**

Al : Almere  L.B : Limeil-Brévannes  
Ca : Cardiff  O.C : Orvietto Centre  
C.F : Clermont-Ferrand  O.Ci : Orvietto Ciconia  
 Da : Daventry  S.M : Santa Margherita Ligure  
 Ge : Genova  Tr : Trondheim  
 Hy : Hyvinkaa  Up : Uppsala  
 L.R : La Rochelle  La : Lausanne
Table 16: Maestro evaluation

<table>
<thead>
<tr>
<th></th>
<th>Al</th>
<th>Ca</th>
<th>C.F</th>
<th>Da</th>
<th>Ge</th>
<th>Hy</th>
<th>L.R</th>
<th>La</th>
<th>L.B</th>
<th>O.C</th>
<th>O.Ci</th>
<th>S.M</th>
<th>Tr</th>
<th>Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a.1)</td>
<td>1</td>
<td>1</td>
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Table 17: Results of the Maestro evaluation within the various categories

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<thead>
<tr>
<th>WIDER CITY STUDIES</th>
<th>SHOWCASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>La Rochelle</td>
<td>1.063569</td>
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<tr>
<td>Limeil-Brevannes</td>
<td>1.058164</td>
</tr>
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<td>Trondheim</td>
<td>0.78623</td>
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<table>
<thead>
<tr>
<th>SHOWCASES</th>
<th>1.280212</th>
<th>Ad City Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genova</td>
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<td>Ad City Car</td>
</tr>
<tr>
<td>La Rochelle</td>
<td>1.197845</td>
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</tr>
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<td>Daventry</td>
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<td>CyberCars</td>
</tr>
<tr>
<td>Santa Margherita Ligure</td>
<td>0.962628</td>
<td>CyberCars</td>
</tr>
<tr>
<td>Orvieto Ciconia</td>
<td>0.935348</td>
<td>CyberCars</td>
</tr>
<tr>
<td>Hyvinkaa</td>
<td>0.801768</td>
<td>CyberCars</td>
</tr>
<tr>
<td>Almere</td>
<td>0.78623</td>
<td>CyberCars</td>
</tr>
<tr>
<td>Trondheim</td>
<td>0.78623</td>
<td>CyberCars</td>
</tr>
</tbody>
</table>
In the overall evaluation results of the questionnaires regarding the showcases, Genova is ranked at first place, followed by Daventry, Lausanne and Clermont-Ferrand. Besides the ranking also the feasibility and applicability of the proposed showcases with the available vehicles and capabilities (3 cybercars, 2 advanced city cars) were discussed and rated. As a result some of the cities were removed from the showcase list, because the proposed showcases seemed to be not feasible. Some other cities are not interested in showcases, because they have already conducted similar things. The cities, which are removed from the showcases list are: Orvieto Centre, Lausanne, Clermont-Ferrand, Limeil Brevannes, Cardiff.

In case of Daventry it has to be clarified, if the city can provide the necessary infrastructure.

The other cities were classified according to the type of showcase (advanced city car/ cybercars) and ranked.

Advanced city vehicles:
1. Genova
2. La Rochelle

Cybercars:
1. Daventry
2. SML (if Genova is going to be selected for a showcase or demonstration SML and Orvieto will be skipped to avoid a focus on Italian cities)
3. Orvieto Ciconia (if Genova is going to be selected for a showcase or demonstration SML and Orvieto will be skipped to avoid a focus on Italian cities)
4. Hyvinkaa
5. Almere
6. Trondheim

It is agreed to try to conduct four showcases: two showcases with advanced city cars and two with cybercars.

The evaluation of the questionnaires regarding small demonstrations and the evaluation of the feasibility of the proposed demonstrations lead to the skipping of the following cities: Daventry, Limeil Brevannes, Orvieto Ciconia, Hyvinkaa, Almere.

The cities for small demonstrations were ranked according to the questionnaires and the developed methodology within CityMobil:
1. Uppsala
2. Lausanne
3. Clermont-Ferrand
4. Genova
5. Orvieto Centre
6. Cardiff (would have to be cleared due to expected high costs)
7. Santa Margherita Ligure
8. La Rochelle
9. Trondheim (to be cleared)

It is agreed that the three cities Uppsala, Lausanne and Clermont-Ferrand can be promising candidates for small demonstrations and shall be regarded in a first stage, because all of the three site actions are already taken or will be taken in next future with or without the aid of CityMobil, in order to realise innovative transport concepts. It will be beneficial, if the sites can be included as small demonstrations in CityMobil by funding them with a small amount of budget (compared to large-scale demonstrations). Pre-condition for the further consideration of any city for small demonstrations is that the system is implemented before 2010, so that there is a time frame of about one year for the evaluation of the system within the CityMobil project.

Besides the showcases and small demonstrations also wider city studies are considered. Promising candidates for these studies are: Limeil-Brevannes, La Rochelle and Trondheim (the order gives the ranking).
3.2 Results of the selection process within the various categories

The cities marked in green fields are selected, the cities marked with back up are back up candidates, if first candidates fail or reject participation.

Table 18 : Final results

<table>
<thead>
<tr>
<th>Reference Group Cities</th>
<th>Cybertcars showcase</th>
<th>Advanced City Cars showcase</th>
<th>small demo</th>
<th>city study</th>
<th>modelling study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almere</td>
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<tr>
<td>Cardiff</td>
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<tr>
<td>Clermont-Ferrand</td>
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<td>selected</td>
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<td></td>
</tr>
<tr>
<td>Daventry</td>
<td>selected</td>
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<tr>
<td>Gateshead</td>
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</tr>
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<td>Genova</td>
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<td>selected</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>La Rochelle</td>
<td>selected</td>
<td></td>
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<td>back up</td>
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<td>Limeil-Brevannes</td>
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<tr>
<td>Milano</td>
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<tr>
<td>Orvieto</td>
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<tr>
<td>Santa Margherita Ligure</td>
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<tr>
<td>Hyvinkaa</td>
<td>selected</td>
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<tr>
<td>Trondheim</td>
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<td>back up</td>
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<td>back up selected</td>
</tr>
<tr>
<td>Uppsala</td>
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<td></td>
<td>selected</td>
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<tr>
<td>Vienna</td>
<td></td>
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<td></td>
<td>selected</td>
</tr>
</tbody>
</table>

In the 3rd General Assembly meeting of the CityMobil project, held on April 19th in Valencia, decisions were made about the first selection of cities for showcases, wider city studies and small demonstrations. Not all of the cities of the Reference group could be selected at this moment. However, it was decided to involve all of the present cities of the Reference Group and possible future new cities in CityMobil activities and subsequently to apply for additional funds from the EU.

The EC requires that decisions and selections are made on an transparent way, meaning based on facts and figures, so that is why questionnaires were used for gathering information and decision making in the city selection process.
Also, the EC has a preference that there is a geographic spread in Europe regarding the distribution of activities, so after selecting a city in one country for a showcase, not a second or a third city from that same country will be applied for a showcase.

When looking at the table and the 12 cities that have been selected for some activity within the CityMobil project, it can be concluded that fortunately a large number of cities, although not all, with a wide geographic spread, have been selected for an activity in this first round.

Additionally, CityMobil consortium has been looking at finding ways of retrieving additional budget from the EC for the cities that are not included yet in any activity; also for including new cities that are interested, but were not in the list when the questionnaires were sent. A CSA (coordination and support action) is examined by European commission to support dissemination activities through 6 events combined with showcases called CityNetMobil.
4 Conclusion and recommendations

Since the beginning of CityMobil program, the Reference Group didn't stop to increase in size and interest.

Some cities have already planned demonstration programs (Uppsala, Lausanne, Cardiff, Daventry), others are already engaged in cybercars (Clermont-Ferrand) or advanced city cars (La Rochelle) activities, the other ones being much involved towards new integrated solutions in transportation systems.

The selection process has clearly demonstrated the high level of motivation and implication of the local stakeholders, in spite of common public administrations difficulties (electoral aims, rhythm of decisions and activities, finance, etc.).

Towards this stronger result than originally expected, the budget allocated to SP 1 (and especially task 1.5) is much too low to cover as many and various projects as possible. This situation is increasing with new cities going to be new candidates of the Reference Group (Montbéliard, Antibes for example).

This is the reason why it has been decided during last march 2007 General Assembly of Valencia to complete this budget, answering to a complementary call of the 7th Framework Program.

This coordination and support action (CSA) proposal called CityNetMobil is developing a program of 6 events-showcases designated to increase dissemination and sensitivation efforts and activities through a complementary budget of about 1,2 million euros. Each city of the Reference Group will be asked for organising a congress, conference, workshop dedicated to Mobility aspects and solutions, combined with some showcase demonstrations.

The CityNetMobil Program under evaluation by European commission years (2008-2010) will strongly complete all dissemination and demonstration activities of the CityMobil program that is ending in 2011.
5 Sources
6 Annex A - Multicriteria Evaluation Technique - The Multiplication of Ratios

This method is a Productive MCA Method, which gives a decision-maker the opportunity to rank a number of alternative projects on their performances against a set of pre-defined evaluation criteria and hence to select the most appropriate project for implementation.

To begin, the decision-maker has to provide the following prerequisites:
- List all alternative projects (i)
- List the appropriate set of evaluation criteria (j), against which the evaluation of the alternative projects will be conducted
- List the priorities and the relative weights of importance (w_j) of the selected evaluation criteria.
- Determination, on an artificial scale from 0 to 10, of the performances (e_{ij}) of each project in each one of the evaluation criteria.

Then, the total performance of each project is calculated by the formula:

$$ T.P._i = \prod_j \left( \frac{e_{ij}}{e_{1j}} \right)^{w_j}, \forall j $$

This way, alternative projects are ranked according to their Total Performances (T.P._i), with the greatest T.P. corresponding to the best alternative, and the least T.P. to the worst one.

It is apparent that the input-data prerequisites of this method are reduced to a relative weighting of criteria and to a measurement of projects' performances in an artificial scale 0-10.

As far as output is concerned, a global ranking of alternative projects is produced, in relevance to their Total Performances (T.P.).

Simplicity is the main advantage of this method. Also, the multiplication of ratios that takes place gives the opportunity to take into consideration the performance of low ranking projects.

The use should be aware that the weighting of the various evaluation criteria could be an arbitrary process unless the correct level of research is applied to this stage.

Example:

Assume that there are 3 alternative projects and the following 3 evaluation criteria:
1) Environmental Impacts   2) Safety   3) Risk

that the relative criteria weights are: w_1=0.60, w_2=0.30, w_3=0.10, and the performance of the projects in each of the above Criteria (measured on a ten-point artificial scale) are:

<table>
<thead>
<tr>
<th>MATRIX:</th>
<th>Criterion-1</th>
<th>Criterion-2</th>
<th>Criterion-3</th>
</tr>
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<tr>
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<td>4</td>
</tr>
<tr>
<td>Project-2</td>
<td>7</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Project-3</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

The total performance of each project is then:

- $E_1=\left[ \frac{3}{3} \right]^{0.60}\left[ \frac{5}{5} \right]^{0.30}\left[ \frac{4}{4} \right]^{0.10}=1$
- $E_2=\left[ \frac{7}{3} \right]^{0.60}\left[ \frac{6}{5} \right]^{0.30}\left[ \frac{9}{4} \right]^{0.10}=3.80328$
- $E_3=\left[ \frac{5}{3} \right]^{0.60}\left[ \frac{2}{5} \right]^{0.30}\left[ \frac{3}{4} \right]^{0.10}=2.96714$

And the overall rank is: Project-2 • Project-3 • Project-1.
7 Annex B - Potential sites description

This annex is a description of the different sites' involvement. Its precision level is in accordance to the state of coordination advancement of each city member of the Reference Group. Some projects are already quite well defined and described, others are still under discussion. Annex B reflects this "state of the art" whether any link or effect on the quality of each candidacy.

7.1 Almere

7.1.1 City wide description

Almere has decided that the city, in spite of its vast extension plans, should have only one main centre. It means that the capacity and the accessibility of the present city centre should be greatly enhanced. Today, they establish traffic jams on daily bases, within town centre and roads that lead to it. The main problems are the congestion, the accessibility, the environmental impact and the lack of infrastructure.

7.1.2 City wide objectives and problems

The car traffic to and from the city centre is growing in a high rate, they can no more longer accustom this growing car traffic and the parking spaces in the city centre that go with it. Therefore they are not looking into means of keeping the cars of the city centre by developing parking lots on its edge. For people wanting to park there, they need to create a transport mode fast and comfortably liked to the centre. Regular buses are not an option because the frequency will be too long. CTS can solve this problem with a high frequency service. This is possible because there is no driver cost and usually this is a main post in a budget for conventional PT.

7.1.3 Potential showcase description

The town centre of Almere could host a showcase in a public square. This could be done in 2008. Almere wants to slow down the growth of its car traffic. The congestion in the city centre is almost structural and the possibilities to expand the road capacity are limited. Another problem is to find a place to park cars : they are building a lot of costly parking spaces in the centre. It would be better to build them out of the centre and then, create new public transportation links.

7.2 Cardiff

7.2.1 City wide description

Cardiff is the Wales's capital and has a population of around 300'000 habitants serving a natural catchment area with a population of over 1'200'000. 48% of the population are using their own car and only 1% are using the bus to go to the station.

48% of the population are using their own car and only 1% are using the bus to go to the station.

7.2.2 City wide objectives and problems

Cardiff considers that the following points could be solved by innovative transport systems:

- achieve a balanced distribution;
- increase level of safety;
- improve accessibility to achieve social and economic regeneration;
- improve environmental and health impacts of transport;
- encourage economic regeneration;
- encourage social regeneration and combat social exclusion.
7.2.3 Potential showcase description
Cardiff could welcome a showcase on a new regeneration development area on a former dockland 1.5 km from the city centre.
A PRT demonstration has been planned in the EDICT project. A new demonstration could be presented in 2007/8.

7.3 Clermont-Ferrand
Clermont-Ferrand is located in the Auvergne region in the central area of France. It has 150 000 inhabitants, but it makes part of the Clermont Urban Community (composed of 21 towns) which has a total population of 280 000 inhabitants.
The mobility, mainly by private car, has been increasing in the city. In 10 years, the number of movements per day have increased by more than 100 000. This has brought an increase of atmospheric and noise pollution, the unequal distribution of the public road between the various modes, a decline in the quality of life and the attractiveness of the town centre, slowing economic and social activity.
The “Syndicat Mixte des Transport en Commun” (SMTC), the organizing authority of local public transports of the Clermont Urban Community develops a policy that consists in offering to the population a system of public transport which is an effective alternative in the excessive usage of the automobile. It opened to service in 2006 a north-south tramway line of 14 Km.
A showcase event was already executed in Clermont-Ferrand. Therefore, the city is not interested in a showcase but rather in a small demonstration.

Two possible small demonstration scenarios are considered:
1. The first application of the small demonstration is a link between the tramway and other public transports in the town centre.
2. The second possible application is a link between the end of the new tramway line and the main hospital of the city. A small demonstration for this system could take place in the parking of the hospital.

Figure 2 shows the site proposed in the town centre and the possible cybercar routes.

Figure 2: Site proposal in the town center
Both systems considered will be made of small vehicles running on demand on prefixed routes in a flexible way. The infrastructure necessary will be shared with pedestrians and cyclists, earmarked from the existing infrastructure.

The guidance of the system will be fully automated.

The network length will be in both cases of 1 km. The average waiting time at stops must be of 1 minute, and the commercial speed of 10 km/h.

7.4 Daventry

Daventry, located in Northamptonshire, UK, has a current population of 23,000, rising rapidly, towards a target of 40,000 by 2021.

The overall objectives for local transport are set out in the Northamptonshire Local Transport Plan 2006-2011, as tackling congestion, improving accessibility, improving safety, improving environmental impacts, encouraging healthier travel, improving highway maintenance and accommodating the high levels of growth proposed for the County.

The specific problems that the County expects to address through the use of advanced transportation technologies are

- the current very low use of public transport (without recourse to measures with adverse economic consequences);
- the environmental impact of transport, especially on global warming;
- the lack of accessibility to persons who the current travel options do not serve well (particularly young people, older people and those with a range of disabilities);
- the adverse land-use effects of transport, especially the land required for parking areas.

Daventry has been interested on implementing PRT since 2001. An initial study was commissioned, and initial modelling work indicated that greatly improved bus services might raise public transport modal share to 10%, but with an overall increase in transport energy use, emissions of global warming gasses, and a significant raising of public spending for service operation. The same modelling work indicated that PRT could achieve a 33% share and run at an operating surplus, while reducing energy consumption and emissions of global warming gasses. Heavy systems are far too costly for a town of Daventry’s size, and do not guarantee a better performance than bus services. To the County, PRT stands thus as the best option of advanced transportation system.

To confirm this conclusion, a more detailed study for a pilot was commissioned to a large consulting firm (Sinclair, Knight & Mertz) in December 2006. This study should come up with a more precise cost of the infrastructure, which is mostly at grade, because of the design of the city.

3 shows the site proposed for the cybercar small demonstration (in red) in Daventry.
Based on this background, two scenarios are considered: a showcase or a small demonstration. Either the showcase or the small demonstration will be within the town of Daventry. The precise site is being identified. The demonstration will be for Individual demand of passengers (taxi and shared-taxi like) and for freight uses.

Daventry would like to build a pilot by the end of 2007 and start operation by 2008 or 2009. For this, a request for proposals and a call for funding (mostly from the County) will be launched. The expected cost for the pilot is around 6M€.

The location that appears most likely for a small demonstration includes a section of a former railway (now transformed in bike path) linking the town centre with the northern part of the town. It passes both through residential and commercial areas. The total network length is about 5km. The infrastructure would be exclusively reserved for the PRT system. The guidance of the system will be fully automated. The required average waiting time is 1 minute or less. The estimated demand forecast for the full PRT network is 2000 passengers in the peak hour, but a demand of 200 passengers in the peak hour, to be confirmed by the model, is foreseen for the pilot.

Through the showcase, Daventry aims to increase political support for the funding of the pilot. It also aims to get more interest from the local population, which does not understand the concept yet. In case the showcase is done, it would take place in the town centre, probably on a section of a pedestrian street (Lodge Road). This site is immediately available, but its definition is subject to clarifying the legal situation of the showcase. The guidance of the system will be fully automated.
Daventry has been interested in the PRT concept since 2001 (CyberMove: Martin Lawson’s ULTRA). Since then, they became more and more interested in the concept for several reasons (it is not about congestion!):  
• offer a public transport more attractive than the bus (which has a 3% share of all trips)  
• improve the image of the city (with "innovative, clean transport")  
• attract value added industries  
• offer a link to the railway system (5km away from the centre)  

A detailed simulation has been previously done (based on a detailed model of the demand done by Daventry) which predicted a 33% share and a system which could run at profit. The simulation package is owned by Buchanan (this company is specialised in such transport studies).  

The County Council was very sceptical so a second, more detailed study for a pilot was commissioned in Dec. 2006 to a large consulting firm (Sinclair, Knight & Mertz) with numerous subcontractors. The cost (350,000€) was covered mostly by the Development Agency of the County. The results are expected in March. The County officials seem to be now a bit more convinced (but they are waiting for the conclusions of the study). This study should come up with a more precise cost of the infrastructure which is mostly at grade due to the interesting design of the city that have been developed recently, in the 1960’s.  

Daventry would like to start the construction of the pilot at the end of 2007 for an operation two years later. For this, they will launch at the same time a request for proposals and the call for funding (mostly from the County). The expected cost for the pilot is around 5M€. To increase their chances of obtaining the funding, they would like us to organise a showcase quite soon. This would help them getting more interest from the local population (which does not understand yet the concept) and convince the sceptics at the County level. Any support (financial or even purely technical) from the CityMobil project (representing the EC) would also definitely help them.  

The potential site for the showcase could be an ex railroad track now converted into a bicycle lane (about 2.5km). It is a bit narrow for 2 vehicles (two ways track) but it can be widened fairly easily.  

Daventry offers a real opportunity for the installation of a total system covering the needs of the entire city at a reasonable cost, due to its urban organisation. A showcase should not be too difficult to organise and would certainly help them getting the support from the population and from the County to launch the pilot.  

7.5  Genova

7.5.1  Site description  
Genova, Liguria chief town, numbers 800,000 inhabitants. The harbour is the most important in Italy and among the main in the Mediterranean area.  
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 on 1992, the G8 on 2003 and the nomination as Cultural European Capital on 2004.

The new Genova based her rebirth by recovering her hinterland green areas, the ancient harbour and the historical centre. The renowned pride gave the town the consciousness to be able to face the future with a glance to the past.

Now, inside the Genovese historical centre, three areas has been selected to meet the City Mobil project:

- the first one in Piazza Sarzano, most ancient area in town,
- the second follows the "carruggi" line (extremely narrow old streets, typical of the town urban texture) of the Mura della Marina,
- the last one in via Porto Antico, heart for tourists and commerce activities.

7.5.2 The Historical Centre

The Genvoa 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 7.5.2 a).
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 made by narrow streets keeps impassable the manoeuvring areas to the smallest vehicles too. This brings inhabitants and commerce activities to go away.

It’s a pity for the housing and urban values, which by a complete renewal and easy access could be desirable to large population strata and commercial activities (present housing value, in theory 1 milliard euros; after renewal: 4-5 milliard euros).

For all these reasons, the Genova historical centre is a stimulating case study.

The investigation of instruments and organizing models is vital not to upset this existing rigid system: by one side the study of vehicles easy to move in this streets tight reticulum, on the other the research of an organizing model allowing 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 (Figure 7.5.2 b).

Figure 7.5.2 b  Historical Centre boundary
7.5.3 The Project- Criteria for areas selection.

When the vehicle enters a protected area (at the border of the historical centre) automatically inserts the correct propeller system (electrical, hybrid or else) and as much automatically, limits speed following the area conditions. Furthermore, when it reaches particularly difficult and narrow areas, the same automatism inserts the assisted guide which acts all the vehicle functions: speed; obstacles sensing; and more, the respect of a planned layout as if it had a virtual rail; and when necessary, pre-arranged stop.

The individual vehicle use is limited to the car-sharing; this same solution could be used for various public services: taxi, commerce, social services (ambulance, handicapped, ancient people, etc.)

In order to develop the showcase, three spots were selected with well defined judgement criteria:

1) **The route difficulties**, to employ to advantage the vehicle capacities in order to easily face and overcome them. Consequently the route must have obstacles, rises, straits, curves and what else already on the spot or artificially created as on theatre scenes.

2) **Daily life in town**, the trial route though in a populated area of the historical centre, must not create obstacles or problems to the inhabitants. The area will be rightly isolated for security since the demonstration is made with a none homologated, still under test vehicle.

3) **Base ground.** The spot must guarantee a space where the public may verify the capacities of the vehicle under test; a space to install a City Mobil information stand with exhibition area; a
screen for filming and a placing for services. Every route must guarantee a video survey system in order to observe on the screen every action of the vehicle.

Figure 7.5.3 Selected areas

7.5.4 The Showcases

Showcase n°1: sited in Piazza Sarzano area, it develops along 200 meters. 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. An important presence is the Faculty of Architecture in Genova, partner in this CRF work; the university terrace dominates Piazza Sarzano, so becoming an observation ground for the showcase development (Figure 7.5.5).
Figure 7.5.4 Piazza Sarzano

Figure 7.5.5 Showcase n°1
Showcase n°2: sited along the Mura della Marina, it develops along 170 meters. This second showcase presents the same characteristics and difficulties of the former, but the location encourages a great attraction of public. This borough is sited on the boundaries of the Porto Antico (touristic heart) and is near Porta Siberia, tourisy and museum site in town. The place offers an elevated large area to the public and the possibility to have two base ground spaces (Figure 7.5.6).
**Showcase n. 3**: sited in via al Porto Antico, it develops along 170 meters. This route is near the main pedestrian entrance to the Porto Antico, therefore the base ground has a great attractive and visibility power. The route develops inside the above said street without creating obstacles to the inhabitants, being the same street commercial only. Obstacles and difficulties the vehicles must overcome are artificial (Figure 7.5.8).

![Figure 7.5.8 Via al Porto Antico](image)

![Figure 7.5.9 Showcase n°3](image)
7.6 Hyvinkää

The vision of Hyvinkää upon urban development and the city in the future is as following:

- there is no issue of occupation as a drive for urban development
- local stakeholders want to develop Hyvinkää as a “green city”, with no cars in the city centre
- Hyvinkää is the first city in Finland, belonging to a group of Cities, called the Safe Community, stimulating and providing various kind of safety to their inhabitants
- ageing is an issue, they want to offer good access to the city centre also to elderly people, also not by using cars, but other means of public transport

Derived from this vision, Hyvinkää’s planning regarding urban development is described in 3 different phases:

1. Preparation & feasibility phase, 2007-2008, including a city modelling study for phase 2, and implementation of a show case in december 2008
2. Reconstruction of inner centre, including new Town Hall, and implementation of Advanced Transport Systems in city centre, 2008-2012

A site for a showcase has been identified: it is a 700 m length track, an asphalt road connecting two parts of a commercial area (Sveitsinportti).

![Figure n°7.6.1 : parking and commercial area already open in the zone under construction](image-url)
Another site could be investigated for a showcase in the inner city. This has to be still evaluated with CityMobil partners.

Figure 7.6.3: the highest hill in the city, landmark that will be kept in the future project

Figure 7.6.4: building of the telephone company, which due to the communication infrastructure is difficult to remove from the project area
Potential topics to investigate in the showcase are for instance the human interactions and human perception, the safety and security issues, and the performance in a Nordic climate.

Potential contribution from the CityMobil consortium are/could be required in:

- preparing the overall showcase plan, including the budget, perhaps in a one day workshop,
- the field of safety/security assessment,
- and on the city and business modelling aspects.

Infrastructural changes and requirements have to be identified in order to establish the budget. In particular it is a requirement that the system can be operational in Nordic climate. Attention has to be paid to the circumstance that the surface of roads can be covered with a (thin) layer of partly melted snow and ice (applying a white line for optical tracking does not seem feasible).

City of Hyvinkaa is aware of the 35/65 share in contribution for showcases and is basically willing to contribute. Also, local stakeholders are positive towards becoming partners in the project, if this would be useful. However these decisions need also formal approval by the Municipal County based on a more detailed plan.

7.7 La Rochelle

La Rochelle is a port located in the Atlantic Coast of France. Its main activities include industrial fishing, heavy industry and tourism. With more than three millions visitors per year, it is the third most visited city in France. The city is part of the “Urban Community” of La Rochelle, a group of eighteen cities around La Rochelle. The mobility problems must therefore be considered in relation with the other cities. The whole Urban Community has a population of around 147 000 inhabitants.

La Rochelle has a long tradition of innovation in public transportation. It claims the invention of the first “day without my car” and the first protected urban area. Amongst its many innovative public transport services, it has a public access bicycle service, an electric boat service to cross the Old Port, a “boat bus” connecting the old port and the “Minimes” area, and a car sharing service with electric vehicles named Liselec. This service is the motivation of the city to host an advanced city vehicles showcase. Another interesting point is that La Rochelle develops also innovative programs for the mobility of goods. It has open to serve since 2001 an interchange platform named Elcidis, where heavy lorries discharge goods that are then distributed with electric vehicles in the city.

For the city, the objectives of the showcase are:

- to experiment new technologies that might improve the system operation, mainly by reducing vehicle redistribution costs;
- to determine the feasibility of an extension of the operation area;
- to reduce or even eliminate private car circulation in the city centre to reduce noise and pollution.

One of the main advanced technologies to be considered is the platooning. The showcase should help the city to determine if the cost of redistributing the vehicles between the stations can be reduced.

The operation of the showcase will be dual mode: automated on specific infrastructure and manual elsewhere. The showcase would take place between the “Minimes” area and the city centre. The expected network length is 4 km. The specific infrastructure will be shared with buses and cyclists. The expected demand is 20 redistribution trips per day. No waiting time or commercial speed was defined because the operation of the Advanced city vehicles should be done by the operator.

There is a strong acceptance and support for the system among end-users, operators and decision-makers, and therefore a similar level of acceptance is expected for the showcases.
Concerning data for studies, the city holds Liselec’s database and has performed specific demand studies in the new area to be served in 2006. The city is also willing to make specific before-and-after data-collection during the showcase.

### 7.7.1 The Liselec car-sharing system

One of the many innovative public transportation services in La Rochelle is Liselec, a city-wide car-sharing system of electric vehicles. This system was put to test in 1993 through an agreement between the city of La Rochelle, the car manufacturer PSA Peugeot Citroën and EDF (Electricity of France), and opened to public service in 1999. Currently there are 7 Liselec stations spread around main spots with a fleet of 250 vehicles. While not in service, the electric cars are parked and recharged in the stations.

Currently the city considers renewing the car fleet and expanding the operation from the city centre to a larger area of the Urban Community. A new system operator was selected in 2006.

### 7.8 Lausanne

#### 7.8.1 Introduction

The EPFL (Ecole Polytechnique de Lausanne) site is a wonderful opportunity to experiment the Serpentine system (not homologated yet) in a restricted and private area.

The current constructed environment is similar to a small village generating a compact environment of 10'000 persons with all the constituents of a social life. The Serpentine system becomes integrated completely for the internal movements into this site.

The future developments of this science pole will allow, later, enlarging in a wider scale the use of the Serpentine system to connect the various centres of interests (campus, housing, congresses centre, hotel, businesses, etc.).

EPFL is an institution of public law and depends on the Federal department of the interior of the Swiss Confederacy. 3 main missions of EPFL are formation, research and valuation of the technical sciences. The site is entirely located on the private domain belonging to the Confederacy. This peculiarity allows testing prototypes directly near its designers without hindering the road traffic of the public domain.

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**Figure 7.8.1: Aerial view of the EPFL**
Detailed description of the Serpentine system

Site

EPFL is located in the Southwest of the City of Lausanne. The school is surrounded with the cities of Chavannes, Ecublens and St-Sulpice. EPFL goes alongside the University of Lausanne (UNIL) the institution of which shares numerous technical, student and social infrastructures.

Figure 7.8.2a : Site map showing centres of interest

The main access of EPFL in public transport is by the southwest subway of Lausanne "m1" which goes along the site of the high schools, with a direct connection with the regional railway lines at the station of Renens and with indirect connection to the Station of Lausanne for main lines via the interface of the Square of Europe.

Interfaces with the TL buses lines (Public transports of Lausanne region) complete the sideboard of the site of the high schools and of the surrounding districts.

Layout test phase

The layout test is built on the diagonal axis between the "m1" stop (southwest subway of Lausanne) and the Dome (auditorium of big capacity) via the Esplanade where are grouped various services (businesses, restaurants, etc.). The terminus is near the central library (BC).
This plan for the test phase will measure approximately 440 m. in double ways with 3 sections completed by 4 gyrating for a total developed length of 1'020 m. The exploitation of the line will contain 7 preseried capsules. The duration of the route between the 2 extremities will be about 4 minutes with a cadence of 1 minute. The flow in test phase will be about 250 pers. / hour.

The characteristics of this test phase layout are:

- Length: 440 m. in a straight line
- Number of sections: 3 in double paths
- Number of gyrating: 4 totalising 140 m. length (35 m. / gyratory)
- Total developed length: 1'020 m.
- Circulation of the capsules: Right path
- EPFL level of circulation: Correspond to level 1 or 1st floor (5 m. except ground)
- Size: Capsules without modification regarding the dimensions
- Test exploitation operating: September 2007

The layout is inserted into wide pedestrian spaces at the level 1. The site is very visible by the public, from the main entrance in the North, near the "m1" station, and the Esplanade in the South. The flexibility of settlement facilitates this layout test because there are no civil engineering important works to be realized and the costs of infrastructures are limited to the installation of the ground guide. This investment, not marginal, is included in the development expenses.

At the legal level, the site being purely pedestrian, the initiatives are simplified there.
• Future network

Later, a complete meshed network could be realized within the framework of a system of internal mobility at the high schools and planned in the main plan of the campus 2010. The extension of the test or definitive network is possible through the Esplanade, by borrowing the existing pedestrian routes.

Figure 7.8.2c : Projected network in the EPFL site, 2009

The Serpentine network will contain numerous sideboards for future constructions planned from 2009, such as:

- Conference and congress centre (2'000 pers.)
- 1 hotel of 150 rooms
- 600 housing units
- Others infrastructures linked with the campus.

The Serpentine network realization will replace advantageously the nearness routes by car and will be the indispensable and additional element of internal movement to the subway "m1".

The concept of meshed network, on which circulate the Serpentine's capsules, suggests applying to the public transport the flexibility of movement of a private vehicle. A stitch is created by surrounding every building of an one-way runway clockwise (capsules running to the right). Every stitch is connected with the others by gyrating knots and that will allow the capsules to cross from stitch to stitch and so to cover the whole network independently.

The concept of meshed network also allows a flexible settlement according to the demand. Every stitch may be added to the network without questioning the previous investments.

Besides the proper EPFL network, a secondary network could develop on the site of the UNIL with a connection as a strong axis between the 2 poles of the high schools. This route would present a length of 1’500 m. approximately, without considering the possibilities of stitches in the UNIL.
7.8.2 The Serpentine concept

- Description of the functioning

The Serpentine system is a mean of transportation of the type APM (Automated People Mover) or according to its configuration, PRT (Personnal Rapid Transit).

The Serpentine Capsules are small battery-driven vehicles fed by induction from an active way lying on the road. They are similar to horizontal elevators "on call", with the choice of a predetermined destination.

Principal elements are:

- Infrastructure
- Other kind of Infrastructure
- Position of the mobile
- Guiding
- Movement
- Slope / maximum ramp
- Type of turning back
- Exploitation
- Vehicule
- Cadence
- Capacity
- Maximal line length

Ground (on road) in proper site
Shared with soft mobility modes
4-wheels capsules lying on the road
By magnetic stripes on the infrastructure
Discontinued
10 %
Looping
Automatic
On client call
4 persons up (lumbar vertebra support) by capsule
Depends on the available number of capsules
No limit but 5 km maximum recommended
According to the network extent, management centre

7.8.3 Technical specifications

Car body: synthetic material
Traction/propulsion mode: electric motor located in the wheels

Dimensions

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Floor height</th>
<th>Weight (empty)</th>
<th>Maximum load</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.20 m</td>
<td>1.40 m</td>
<td>2.20 m</td>
<td>170 mm</td>
<td>400 kg</td>
<td>350 kg</td>
</tr>
</tbody>
</table>

Total weight 750 kg

Speed
- on the road = 18 km / h maximum, in pedestrian area = 7 km / h
- Emergency braking 2.5 m / s²
- Nominal acceleration / braking 1.2 m / s²
- Passengers security: Sliding doors closing the passenger cell
- Road users security: many obstacles detection cells
The low width of capsules is very visible on the pictures and demonstrates the flexibility of integration in the pedestrian traffic and in narrow streets. Furthermore, its body is evolutive.

7.8.4 The Serpentine’s advantages

The Serpentine system gives positive results in the ecological balance sheet:

- no release of flue gas by capsules,
- no emission of particles at the level of the motorization and of the transfer of energy,
- rational and thrifty use of the energy by recovery in the braking or sloping.

Capsules Serpentine become integrated easily into the everyday life, namely:

- access facility for the persons with reduced mobility thanks to the low floor of 70 mm of the stop!
- facilitated use by the customers,
- no noise, in particular in the acceleration, sloping or in the braking,
- light vehicle decreasing the wear of road surfaces,
- vehicle offering numerous security aspects contrary to cars.

Serpentine is ideal because of its moderated impacts on environment:

- easier integration in public and private areas, by the share of the existing infrastructures,
- few infrastructures in proper site,
- less influence upon the ground by its volume,
• the stops don't require huge constructions,
• perfect integration in urban and touristic landscape sites,
• complementarities with other means of transports,
• innovative initiative for the soft modes mobility in public transports.

On the economic plan, the Serpentine system offers the following advantages:
• driving technology without contact, thus moderated wear of the motorisation components,
• decrease of the number of mechanical details (no gear box, no deck, no transmission, no pistons and cylinders, etc.),
• capsule made of recyclable and little expensive materials.

The possibilities of Serpentine networks are uncountable just like shown after.

7.8.5 Potential market
The main market segments are, at first, those who require a transfer of persons, scheduled or upon demand, and it, through a proper site where the APM (Automated People Mover) will have no interaction with the public automobile traffic:
• airports,
• universities,
• city centres,
• residential areas,
• commercial and administrative centres,
• congress and exposition centres,
• touristic sites,
• hotel complexes,
• leisure parks,
• industrial sites,
• internal links in a large but few densified area,
• intercity links between 2 neighbour villages,
• etc.

Numerous cities showed their interest for the Serpentine, of which:
Lausanne 	 Edge of the Leman lake
	 High Schools site

Geneva 	 District of the International Organizations
	 Edge of the Leman lake

Companies of public utilities are also interested for an internal mobility in APM vehicle.

Geneva airport – Cointrin
University hospital of Geneva
7.8.6 Budget of investment and operating expenses

7.8.6.1 Investment
The Serpentine system is in phase of development.

The calculated investment contains the budget of development and the industrialization of the Serpentine until the implementation of a preseries of 7 capsules on the layout test located in the EPFL.

The development includes the following components:
- transmission of energy without contact,
- electric engine,
- electronics of driving and safety,
- embarked guide and redundant for the automation of the movements,
- informatics specific to the project,
- tests of the system,
- layout,
- mobility study.

The total of this post is budgeted in: 878'787.- €

The industrialization includes the concrete elements in the exploitation for a preseries of 7 capsules:
- manufacturing of frames and electric engines,
- manufacturing of bodies,
- infrastructures works,
- exploitation of the preseries of 7 capsules.

The total of this post is budgeted in: 1'060'606.- €

Total investment: 3'200'000.- €

This investment will be completely chargeable to the industrial partner who will be chosen for this project.

7.8.6.2 Financial support
Several investors have already proposed to be partners in the Serpentine development.

Very advanced negotiations are in progress with a local manufacturer interested in this system of mobility. This active company in the technology of the public transportation field would finance all the investments of mass development and test phases to create a demonstration site. This operational exhibition would be the gallery of presentation for export markets, with which the potential seems credited by the increasing interest of communities and private companies foreign to the system Serpentine.

7.8.6.3 Exploitation
The exploitation is based on the following elements:
- Line: 7 capsules and 3 sections
- Schedule: 07 :00 – 22 :00 so 15 :00 per day / 24
- Number of days / week: 6 days / 7 (Monday-Saturday) so 300 days / year
- Equivalent to 4'500 h of exploitation per year
- Rush hours: 07 :00 – 09 :00 11 :00 – 14 :00 16 :30 – 19 :30
- Equivalent to 08 :00 / day on 250 days
- Estimated potential of real use: 2'000 hours / year
- Number of paying sections per hour: 415 / h for the 7 capsules so 830'000 / year
- Number of sections crossed in a year: 1'200'000 paying sections and empty (estim. 30%)
- Sharing of charges by section:
  - From the subway "m1" stop: Section 1 = 125 pers. / h
  - Section 2 = 85 pers. / h
  - Section 3 = 40 pers. / h
  - Total = 250 pers. / h

7.8.6.4 Exploitation charges
Operating costs are included in the phase of development until the regular and public starting. During the test phase, the responsibilities of this post are estimated and distributed as follows:

- Traffic gestion and surveillance: 2 persons at 50% = 60'606.- €
- Maintenance / Repair: 1 person at 50% = 30'303.- €
- Maintenance and repair material = 60'606.- €
- Telemaintenance = 36'363.- €
- Energy = 1'818.- €
- Rent of the local = 12'121.- €
- Material renewing = 45'454.- €
- Diverse = 4'242.- €

**Total of charges** = 251'515.- €

7.8.6.5 Exploitation results
Results will be collected as follows in exploitation: 0.30 € by crossed section.

The real use is estimated at 2'000 hours per year, representing 830'000 paying sections.

At the rate of 0.30 € per section, the potential recipe would be about: 415'000.-€.

The difference between charges and results would be equal in 0.- €

The exploitation would not present thus either deficit, or profit! It would be a completely self-financed exploitation.

7.8.6.6 Planning and realisation delays
The construction of 7 capsules for exploitation on the layout test is foreseen to be operational in October 2007.

Since March 2007, several already contracted partners are studying the applications of technologies developed within the framework of their companies on the Serpentine capsules.

In April 2007, an industrial partner should be chosen and will begin the manufacturing of 7 capsules according to the planned periods for the prototype and the preseries.

The tests will begin in the course of September, 2007 in the EPFL, on the layout test to end in an exploitation prototype with the aim of the presentation to the customers in the course of October, 2007. The public use will be made possible after the presentation on the layout test.

New lines will complete the basic network from the presentation. These new sideboards will be functional in spring, 2008 and will allow the launch of a public exploitation, at great level, in the EPFL site.

In 2009, the whole network of the EPFL site should be operational as a nearness mean of transportation.

In parallel, several steps will be started to present the system to public communities and potential private customers.
7.8.7 Characteristics of the small demonstration

A small demonstration imply the following points:

Beginning of the small demonstration: 2008
Realisation: 12 months
Demonstration: 12 months
Deliverable: Final report submitted middle 2009
Cost (based upon 7 vehicles): 1’950’000 € (industrial partner)
EU expected subsidies: 100’000 €
City Mobil partner: GEA
Stakeholders commitments: May 2007

7.9 Limeil-Brevannes

Limeil-Brevannes is a suburb of Paris located in the East zone of the “Parisian Region”. It has 17650 inhabitants and a surface of 693 hectares, of which about the 10% is forest.

Limeil’s public transportation and mobility problems are typical of the suburban areas in metropolitan regions. Line A of the Express Regional Network (R.E.R.) ends west of Limeil, at the adjacent town of Boissy-Saint-Léger, line D of R.E.R. surrounds the adjacent town of Villeneuve-Saint-Georges, east of Limeil, where it has a stop, and Metro line number 8 ends at the adjacent city of Créteil. Despite the proximity of all these fast links to Paris, low-frequency buses provide the only public access from the centre of Limeil to the Metro and R.E.R. stations.

Limeil has defined in the recent years an environmental sustainability policy for its future growth. The city government is now building a “zero energy” public school, and has projected the construction of a sustainable district named “Les Temps Durables” (The Sustainable Times). This neighbourhood will feature High-Environmental-Quality housing, geothermal energy for heating and solar panels for the production of electricity, alternative water management, reduced parking places and no circulation of private cars in the area. In order to connect this new district to the mass public transit system, a cable-car line going to the “Créteil-Préfecture” Metro station is being built.
7.9.1 Aims of the local authorities
Develop the new « Temps durables » district (beginning end 2007):
2000 new inhabitants, 9.5 ha, the first « sustainable area »
Plan and integrate CTS connected to the existing PT network
Connect the city to the Parisian RER network with a cable-car
Enhance the « sustainable attitude » through public policies (transport, green spaces, soft modes, public equipments such as « Green school », etc.)
Figure 7.9.1.1/2/3 : views and masterplan of the new "Temps durables" sector
7.9.2 City study description
The city of Limeil-Brévannes is one of the partner cities belonging to the Reference Group of CityMobil.

As such, it answered successfully the preliminary questionnaire sent to each of them. During the meeting of the 19th February 2007, the representatives of the CityMobil Consortium preset the city of Limeil-Brévannes to implement a "showcase" as an integration study ("paper study"). For that purpose, an amount of 50'000.-€ was reserved by the CityMobil program, intended to subsidier in this study's implementation.

The territorial paper studies fits in the framework of the CityMobil project. They mainly aim to identify mobility needs to which the innovative systems of transport (Cybercars) will be able to answer and their way of being integrated within the urban frame.

In this prospect, it is a question of applying a specific methodology of integration of these new modes of mobility, the VOLTair methodology. This last one was imagined and finalized within the framework of the European project of research and development CyberMove (5th PCRD).

It consists mainly in:

- identifying all the needs of mobility in the studied perimeter (lines of desire),
- sizing the various tools answering these needs,
- sizing the new supply of proposed mobility by putting it in connection with the general politics of the urban movements,
- identifying the phases of implementation as well as integration or accompaniment wished measures.

The territorial studies CityMobil address firstly the communities of the Reference group, which have a strong potential of urban restructuring.

The methodology proposed to Limeil-Brévannes articulates in two main stages:

- territorial analysis and multimodal diagnosis of the movements allowing the understanding of the current functioning of the movements, the identification and the examination of the potential perimeters to setup the Cybercars,
- after the choice of the setting-up perimeter, sizing and having taken measures of settlement of the Cybercars systems on the reserved relevant sites.

The results of the first stage will give the occasion to collect the expectations and the reactions of the various actors concerned by the CityMobil project (local operator, associations, etc.).

The second phase will be led on a regular information to these same actors.

7.9.2.1 Identification of the potential perimetres of setting-up
During all this phase, a narrow collaboration with the services of the town, or of the agglomeration community, will be necessary to collect and gather the necessary data. To contain the delays and the costs of the study, it is not planned to realise specific investigations (countings, inventories, inquiries). The existing data in terms of countings of traffic, collective transport, the inquiry-household, etc. will be the first to be exploited.

7.9.2.2 Identification of the potential perimetres of Cybercars settlement
According to the knowledge which local offices have of the town of Limeil-Brévannes, a first identification of potential perimeters of setting-up innovative systems of transport will be realised. A list of potential sites will be directly submitted to the representatives of the city concerned by this study, so that these can also propose a certain number of potentially interesting sites. It is agreed that 2 or 3 potential sites will possibly be retained.
These perimeters will have to present the following characteristics:

- local difficulties of accessibility or a deficit in supply of transport because of local conditions (forced topographic of the network...); the Cybercars must be proposed in sites where they can bring a real «plus» in terms of movements;
- a large variety of the various origins and destinations of movements in the perimetre, to avoid mono-functional perimeters badly adapted to self-service;
- a most regular possible distribution of the demand in movements within the perimetre throughout the day and the week;
- etc.

The anticipated sites can, for example, be the widened city center, or the new quarter called "Temps durables" and his link with the terminal station of RER A "Boissy - St-Légier". Certain housing districts or areas of peripheral activities will or not be integrated.

7.9.2.3 Analysis of the potential sites of setting up

Analysis by site

At this stage, it will be question to realise for every anticipated site an analysis allowing to bring into light:

- the main characteristics of the territory activity;
- the location and the typology of the population and the jobs (potential or existing ones);
- the location and the typology of the main generators of movements (potential or existing ones);
- the road network and its principles of functioning;
- the location of the main car parks (public or private);
- the loads of traffic on the structuring road network;
- the network of collective transport and its principles of functioning (levels of accesses, typology of lines);
- the use of the collective transport network (in-off at the stops, load by line, in section), according to the availability of the data;
- the possible main network towards soft-modes and the developments in their favour;
- etc.

It will be essential, at this level, to make a first global quantitative evaluation of the functioning of the movements:

- identification of the modal parts;
- and of the structure of the movements (in particular stream of transit, exchange and internal).

Definition of the objectives of movements for every sector

From the elements of analysis of the previous phases, the stakes in movements for the identified sectors will be enhanced, in agreement with the local Authorities. These objectives can concern just as much the traffic (accessibility, safety, satisfaction of needs in car park) than the collective transport and the soft-modes (reassurance / comfort, quality of itineraries, level of accesses, cover of the territory) or furthermore, aspects connected to territorial planning (requalification, centralities).
Definition of the multimodal concept and the role aimed by the Cybercars

According to the data of analysis mentioned above, it will be possible to bring into light the role played by the Cybercars within the general system of movements of the sector:

- series of movements aimed by the Cybercars systems (for example, internal movements in the city center, movements in connection with underground parkings, etc.);
- first evaluation of the volumes of movements associated with these series of movements (unrefined evaluation of the potential);
- role assured by the CRISTAL within the general organisation of the movements of the individual traffic, the collective transport, the soft-modes. It is indeed important to conveniently place this new kind of movements in regard to the existing modes.

In these operations, it will be question of accommodating, but also of distinguishing the basic functions of the Cybercars, which are, notably:

- the self-service mode, used in an individual way;
- the shuttle mode, used in a collective way;
- the "urban automated elevator" (semi collective);
- others.

Evaluation of the possible sites of settlement

The confrontation of the various data and the analyses established on every site will allow to determine, within the framework of the CityMobil program, the site accommodating the best the following requirements:

- where a system of public individual vehicles is able to participate the best in the answer to the identified objectives;
- the area of the sector and the intensity of the movements concerning the deployment of Cybercars which will be compatible with the possible technical means;
- the spatial and temporal characteristics of needs in movements for the Cybercars which are the most susceptible to be compatible with the supply considered for the experiment;
- the site notably allows a simple introduction of a system of public individual vehicles without the necessity of important developments or measures of accompaniment, which could not be reasonably considered within the framework of CityMobil;
- the sector in which the projects of planning / requalification will be the best to offer a good opportunity to the Cybercars;
- etc.

In conclusion of this phase of evaluation, a site will be chosen to continue the initiative and the step of planning, detailed sizing and exploitation.

Collection of the expectations

It will be important to represent the purposes and the first results of the CityMobil program to the actors of the mobility, the various services of Limeil-Brévannes, associations, etc.

This exercise will fit in perfectly with the concerns and the dialogue habits of Limeil-Brévannes.
7.9.2.4 Sizing and measures of implementation (FUNCTIONNAL AND TECHNICAL INTEGRATIONS)

Sizing of the chosen system

This phase requires a precise approach of the territory on the relevant site because it is question of foreseeing the setting-up with as much precision as possible of the chosen system. In a first stage, the sizing will be realised according to an alternative system of public transport such as he could be developped beyond the CityMobil program.

It will be question of proceeding in :

- the precision of the perimeter of evolution of the vehicles ;
- the evaluation of the necessary number of vehicles needed ;
- the evaluation of the necessary infrastructures ;
- the definition of the location of the infrastructures and of the number of vehicles affected according to the identified potential demand and the existing generative poles ;
- the sketch of some integration modes in some standard-locations.

A narrow collaboration with the local Authorities will be necessary at this stage, because only they have a knowledge at the same time global and detailed enough of the territory to allow analysis at this detailed level.

Sizing of eventual complementary systems

In parallel to the chosen system, it is also question to define the complementary needs :

- itineraries ;
- regular movements and offered capacities ;
- number of necessary simultaneous vehicles ;
- amplitudes of functioning (periods of functioning) ;
- etc.

Definition of the accompanying measures

In coherence with the chosen multimodal concept, it is necessary to define a certain number of measures of accompaniment allowing to strengthen the attractiveness of the Cybercars :

- modification of the management of parking places ;
- tariff politics combined with collective transport ;
- reorganisation of the public space ;
- local modifications of the circulation layout ;
- etc.
Adaptation for the CityMobil program

From the sizing of the device realised in the previous phase, the technical constraints and available means particulate to a Cybercars deployment will be integrated. If needed, the initial considered device will be adapted to answer these constraints and limit the importance of the necessary "heavy" measures of accompaniment, to facilitate the speed of settlement and the reduction of its cost. The most tried technologies within the consortium will be proposed and the conditions of deployment will be defined.

At this stage, the predictable functioning of the Cybercars will be clarified:

- Type of users and aimed manners;
- expected attendance (number of users / day);
- number of vehicles and stations to foresee, their location and the distribution of vehicles in each station;
- principles of exploitation (management of the system, rebalancing of stations);
- precise definition of the perimeter of introduction of the system (period of realisation);
- measures of urban integration;
- measures of technical integration (frameworks, vehicles, exploitation systems, etc.).

7.9.2.5 Follow up

To follow this study, a group will be constituted in order to join the actors of the city and/or of the town of Limeil-Brévannes (local operators, elected representatives, in particular) likely to be concerned by the project.

Reports

All the analyses and the propositions will be illustrated during the study by figures to facilitate the communication and approach by the non-specialists. This aspect can become important in case of re-use of these documents during sessions of information of political authorities, for example.

Delays

The necessary delays for the fulfillment of this study can be estimated in:

- phase 1: 4 months;
- phase 2: 3 months.

7.9.3 Paper study description (VOLTair methodology)

Part 1: territorial analysis and multimodal diagnosis:
- general understanding of the offer and demand
- definition of pertinent perimeters
- global transport concept

Part 2: dimensioning, description and integration of:
CTS lines and connections in pertinent perimeters
(coordination with local end users, operator, etc.)
- exploitation conditions (technology, timetables, etc.) and urban integration
7.9.4 Planning of realisation

Characteristics

Duration: 7 months
Deliverable: Final report submitted beginning 2008
Cost (approx.): 100'000 €
EU expected subsidies: 50'000 €
City Mobil partners: INRIA, GEA
Stakeholders commitments: May 29th 2007

7.10 Orvieto

Orvieto is a small but famous centre of enormous historic, artistic and religious interest, which has 25,000 inhabitants and welcomes 2 million tourist a year.

Two different showcases have been planned to do in Orvieto, one for the historic centre and the other for the peripheral area called Ciconia. The historic centre is situated atop a platform of tufa rock known as “La Rupe”. Ciconia is a peripheral residential area with problems regarding its connection with the railway station.

Such two places are linked with two problems which regards Orvieto, one per each place:
1. the connection between the arrival of the funicular system now existing to historic centre, in particular to the Orvieto Duomo;
2. the connection between the scholastic pole of the peripheral area of Ciconia and the train station and the funicular station.

7.10.1 Orvieto historical centre

The historic centre of Orvieto is situated atop a platform of tufa rock and is known as “La Rupe”. Due to the geological problems of La Rupe, the Italian Government passed a special law entitled “Urgent Measures for consolidation of the Rock of Orvieto and Preservation of the Scenic, Archeological and Artistic Heritage”. One of the major causes of deterioration of the city and the rock itself is tourist traffic, especially the circulation of tourist buses.

The alternative mobility system of Orvieto derives from a feasibility study made by the Umbria Region in 1980 to restore the funicular. It is a multimodal system responding to the demand for access to the historic centre. The system consists of two preferential routes to the Rupe, one on the East side and one on the West side, two “park and ride” systems and a distribution system in the historic centre. The Municipality has approved in 1991 a Traffic and transport Plan and in 1995 the Alternative Mobility Plan, which have defined the mode and function of traffic and parking systems and the public transport and the funicular in the city.

The historical centre of Orvieto is shown in Figure.
The interventions in the Orvieto city centre are:

- new short distance transport systems: Funicular, Escalators and Elevators;
- new peripheral parking areas (Parking once known as “Campo della Fiera”);
- use of electric minibuses in the historic centre;
- reorganisation of traffic circulation and creation of extensive pedestrian zones and area restrictions;
- revising central parking areas strategies;
- associated pricing strategies (parking and public transport);
- physical measures for traffic calming and to discourage illegal parking.

On the basis of such interventions, the system studied to serve the historical centre will be made of a collective scheduled service on assigned routes, like the conventional buses.

The infrastructures required for such system will be shared with pedestrian and cyclists and earmarked from the existing infrastructures.

The guidance of the system will be manual-assisted.

Concerning the transport features of the system, the network length will be about 1 km, the commercial speed of the vehicles will be in the range between 10 and 15 km/h and the average waiting time at the stops will be about 5 minutes.

The estimated demand to serve will be about 600 passengers/day, considering users coming from buses, private cars and pedestrians. However some push measures have to be adopted in order to obtain such demand.
7.10.2 Orvieto Ciconia

Ciconia is a peripheral residential area where about 4,000 inhabitants live. It is located far from the city centre on the other side of railway and motorway Roma-Firenze.

The location of Ciconia is shown in Figure.

Figure 7.10.2 : Location of Ciconia

The actual links between Ciconia (where a scholastic pole and a hospital are located) with the other parts of Orvieto are a pedestrian bridge and a vehicular bridge.

A new automatic system which links the Ciconia area (in particular the scholastic pole) with the railway station parking is the objective of this small demonstration.

Such system will be a collective scheduled one on assigned routes, like the system proposed for Orvieto historical centre and reported in section 4.1.1.

The infrastructures required for such system will be shared with pedestrian and cyclists and earmarked from the existing infrastructures.

The guidance of the system will be manual-assisted.

The network length will be about 1.2 km, the commercial speed of the vehicles will be in the range between 15 and 20 km/h and the average waiting time at the stops will be about 3-4 minutes.

The aim of such system is to serve public transport users, people using a private car and pedestrians.
7.11 Santa Margherita Ligure

7.11.1 City wide description
Santa Margherita Ligure is a municipality of 10'405 people, located along the sea in the Genova province, in Italian region Ligure. Modal splits are 80% done by private vehicles and 20% are done by public transport.

7.11.2 City wide objectives and problems
The main purpose of the public administration is the integrated management of the mobility: the new technology is particularly able to face the problem to let free the waterfront. Usual systems of transports are not as competitive as private cars.

7.11.3 Potential showcase description
Santa Margherita Ligure is a good site to realize a showcase, because it is located along the sea in the Genova province. There are a lot of tourists during the spring and the summer, so it's a good period to welcome a small demonstration.

7.12 Trondheim

The objectives for the city 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. 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 truck and private car 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.

Figures 7.12.a & 7.12.b: Trondheim's Harbour: Cruiseships and commuter ferry dock (future Conference centre and hotel site)
The second site is the city centre itself. The pedestrian area holds a major part of the commercial activity. It will be extended and closed to all private car traffic (in the end it will be around 0.6 by 0.6 km). With the extension of the pedestrian area, the municipality plans to create a hub for all the city buses in a small area next to the pedestrian zone. The 30 years old tramway line (run by Veolia) should also be extended (one block!) to connect it to the hub. The extension of the pedestrian area will increase the walking distance from parking lots. Walking in the area, in heavy winter conditions, can discourage people from strolling all through the commercial area, making conditions for commerce difficult in the areas far from the parking spots or from the bus hub. This might also generate pick-up and drop-off traffic around the pedestrian zone. The distribution of goods is also a problem to be solved with the extension of the pedestrian area. A solution might be a hub to collect goods from Lorries and then distribute them with no polluting (automated or not) vehicles (aka Elcidis project).

The third site that might be served by an automated shuttle is the hospital renewal project, 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 currently exists a train depot. 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 present a strong potential for specific applications of automated systems.

The city officials are eager to implement the systems, and they have the support of the National Road Administration. However, this should be confirmed by specific studies, in whose execution the CityMobil consortium can definitively help the city. Since politicians consider serving the presented areas only through traditional transportation systems, a showcase would be helpful to make them consider automated transportation systems as a suitable option. A showcase could be easily organized, either between the harbour and the existing bridge, in the city centre or in the hospital area.

The timing of the future plans of the city fits very well with the execution of a study or a showcase in 2008 or 2009.

7.13 Uppsala

The CityMobil project and the role of a small demonstration was discussed.

The vision of Uppsala upon Urban development and the role of the city in the future (2020) was presented; (in short: emphasis on City of knowledge, City of everyone in the social context, sustainable city)

Derived from this vision:
- The plans from Uppsala regarding sustainable growth were presented and discussed: Uppsala has the strategy to develop and secure a parallel implementation of 3 structures in parallel:
  - being the built-up structure, the buildings, housing policy, land purchase policy,
  - being the green structure, environmental planning, nature conservation,
  - being the traffic structure, regarding mobility and (public) transportation,

One of the first plans being carried out is the development of the City centre, with a new railway station (160 Mln Euro, 2005-2011)

A PRT test track is in construction now, in April the final cabins are expected, in the summer the certification by Swedish railway institute is expected.

In parallel a feasibility study regarding the dimensioning of a real PRT system will be carried out, first results have to be available in Octobre.
Potential topics to investigate in PRT track are for instance the human interactions, the safety and security issues, and the influence of Nordic climate on performance.

After this test track phase a next phase of constructing a real PRT system will take place, at this moment two track scenarios do exist.

Potential contribution from the CityMobil consortium could be required in the fields of safety/security and on the business modelling aspects. However, this has to be discussed in more detail later on, leading to a detailed Uppsala-CityMobil cooperation plan including plans for budget, efforts, tasks and planning.

City of Uppsala is aware of the 35/65 share in contribution for funding of small demonstrations, and is basically willing to contribute. Also, they are positive towards becoming a partner in the project, if this would be useful.

Conclusion:
The planned test track in Uppsala is offering interesting opportunities for investigation, and Uppsala is a city with a strong urban development and enthusiasm in this field, so it is a good city for cooperation in our small demonstration plan.