### Proposal full Title
City Alternative Transport System

### Proposal Acronym
CATS

### Type of funding scheme
Collaborative Project- Small or medium-scale focused research project

### Work programme topics addressed
SST-2008.3.1.1. New mobility concepts for passengers ensuring accessibility for all

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---|---|---|---
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3 | Communauté Urbaine de Strasbourg | CUS | France
4 | GEA J-M Vallotton et T. Chanard SA | GEA | Switzerland
5 | Institut National de Recherche en Informatique et Automatique | INRIA | France
6 | Israël Institute of Technology | Technion | Israël
7 | Centro di Ricerca di La Sapienza sul Trasporto e la Logistica | CTL | Italy
8 | Ecole Polytechnique de Lausanne | EPFL | Switzerland
9 | Primaria Municipiului Ploiesti | PMP | Romania
10 | Agenzia Regionale per la Mobilità-Regione Lazio | AREMOL | Italy
The CATS project objective is the final development and experimentation of a new urban transport service based on a new generation vehicle. Its major innovation is the utilisation of a single type of vehicle for two different usages: individual use or collective transport. This new transport service is aimed at filling the gap between public mass transport and private individual vehicles. It is based on two operating principles: the self service concept where small and clean urban vehicles are offered on a short term rental basis, and the flexible shuttle service where a variable length of vehicles convoy, driven by a professional driver, operates at fixed hours along a line on a permanent basis or on a case by case basis. Both these principles are integrated in a single service (composed of vehicles and stations) called Cristal.

The final aim of this new service is a more efficient mobility in cities through a more balanced use of small clean vehicles and mass transport. This inclusive new transport system is well adapted to the needs of people with reduced mobility, young passengers and tourists. Four Cristal vehicles and two stations will be made available by Lohr Industrie to the project for experiments. The CATS project will investigate through an in depth mobility needs analysis, on-site demonstration and showcases, the impact of the introduction of such a new system in three different European cities (Strasbourg FR, Ploeisti, RO, Formello, IT). The impact on environment and especially on CO2 emissions, as well as the acceptance and the evaluation of market take-up of the system will be studied. CATS will complement the design and manufacture of the Cristal vehicle via a detailed definition of its operating principles and by a design of its urban settings (stations, infrastructures,) in accordance with cities and citizens needs. A full evaluation plan is then foreseen as well as transferability assessment.
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1. SCIENTIFIC AND/OR TECHNICAL QUALITY, RELEVANT TO THE TOPICS ADDRESSED BY THE CALL

1.1 CONCEPT AND OBJECTIVES

1.1.1 PROBLEM STATEMENT

* The Lisbon Strategy adopted by the EU in March 2000 aims to make Europe, by 2010, the "most competitive and the most dynamic knowledge-based economy in the world". The strategy also refers to the development of renewable energies, improved energy efficiency and diversification of fuel supplies.

As far as dependence on energy supply is concerned, the Green Paper on Energy Efficiency, adopted by the EC in June 2005, aims at optimising transport and supporting alternative solutions to the use of car,

The object of the directive on clean vehicles in preparation is to accelerate the introduction of clean transport vehicles into the market. The idea is to protect the environment by reducing energy consumption and CO2 and pollutants emissions.

In parallel the recent European Green book “Towards a new urban mobility culture” set the scene for what will be necessary next - in terms of urban mobility, by means of environmental-friendly and technologically innovative transport modes.

The CATS project is built around the CRISTAL system, a clean and innovative transport system which is anticipating on the implementation of the regulatory measures and political orientationsforeseen in the above mentioned documents.

* In the last years, the European Commission has funded several research projects on automated vehicles and transport systems. The more related to this proposal are CyberCars, CyberCars2, EDICT, CyberMove, NetMobil, CityMobil, CityNetMobil and Eurforum. CyberCars and CyberCars2 are technological projects aiming at improving the technology necessary to vehicle automation. They were funded by DG IST.

EDICT and CyberMove, both DG Research projects, are city driven projects in which Personal Rapid Transit (PRT) and Cybernetic Transport System (CTS) respectively were studied on site through simulations and small demonstrations (or field trials); PRT and CTS are different transport concepts based on the same technology of vehicle automation. PRT supplies non-stop origin to destination trips on individual vehicles travelling on dedicated infrastructures. CTS supplies on-demand passenger services on collective vehicle sharing (in principle) their infrastructure with other users.

Netmobil is a Specific Support Action funded by DG Research to harmonise the other projects results and highlight common conclusions.

CityMobil is a DG Research integrated project that, building upon the experience of the previous ones, is implementing three large demonstrations in Europe and progressing on the technological developments.

CityNetMobil is a Coordination and Support Action (CSA) winning proposal in the first FP7 call, currently under negotiation, aiming at increasing the visibility of fully automated transport technology. CityNetMobil approach is to organise events (featuring live showcases of automated transport systems) around Europe to prove that automated transport is not only feasible but is available to be considered in planning and managing city mobility.

Eurforum is a DGTREN research project that has defined a European strategic research agenda to improve urban mobility.
Alongside with passenger mobility, several projects have been funded to identify solutions for freight distribution in cities. Among them HOST and Fideus proposed innovative concepts which might in the future be easily integrated with the CATS one.

- HOST proposes to re-use passenger vehicles in off-peak hours to distribute freight and collecting garbage simply switching cabins (concept which might re-distribute the investment on several transport services).
- Fideus proposes a hub and spoke concept for freight distribution in which freight is carried in one location of a pedestrian area and then distributed with an automated moving pallet releasing the delivery vehicle from being parked awaiting the delivery completion.

Although it is not CATS aim to investigate such concepts, combining CATS vehicles with some of these technologies and concepts might “sustainabilise” the entire urban mobility system.

* Many of the above mentioned projects proved how automation in urban transport is:
  - technically feasible: the state of the art technology is sufficient to implement working and reliable systems
  - well performing as transport system: waiting and travel time provided by these systems are generally shorter than the conventional transport systems they are designed to substitute
  - energy efficient and environmental friendly: energy consumed and emissions produced per passenger kilometre are in the range of one tenth to half of that of a bus system and 2% to 20% of that of cars
  - generally well accepted by users: interviewed users rated the systems always easy to use and safe and are more attracted by these systems than by conventional ones
  - financially neutral: these systems can in most of the cases cover operational costs and in some even repay partly or in total the initial investment
  - socio-economically viable: cost-benefit analyses shows generally a very positive Net Present Value

However, and despite all these benefits (with the exception of few pilot installations such as the Rivium business park in the Netherlands) these systems are not yet in use. To understand why such systems are not widely used, the research projects mentioned above have made an analysis of the barriers to the diffusion and deployment of these systems.

Classified according to the definition given by the EU Environmental Technology Action Plan (ETAP)¹ these barriers are linked to:

- economic issues: technologies produced in small scales are often more expensive than conventional ones and automated transport systems are not an exception; installation costs of these systems are significant and although it was proved that in the long term they cost as much as, or even less than, conventional ones, no city wants to be the first to invest;
- regulatory measures and standardisation: as many new technologies automated transport systems are in contrast with the present legislation which requires drivers on-board to allow vehicles on public roads; only niche applications on segregated routes are allowed by temporary waivers;

Success of the Cristal project shall only be possible if complete vehicle acceptance is pronounced, thus enabling its commissioning. However, as accreditation of several operation

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¹ Communication of the Commission to the Council and the European Parliament - January 28th, 2004
modes (self-service mode, recovery convoy, and public transportation shuttle) on a same vehicle is not planned in the current national and European regulations, it will be important to position us within the existing regulatory framework while answering as much as possible the use requirements of the Cristal project. Accreditation procedures shall be carried out in several stages.

First of all, the self-service mode shall be accredited according to the M1 small series category, then it will be necessary to modify the European regulatory framework through the national regulations so that the other operation modes of the vehicle, the vehicle recovery convoy mode, then the public transportation shuttle mode may be accredited. These procedures for modification request of the regulatory framework represent a long-term task since it will be necessary to involve modification of existing regulatory texts. First, we will limit ourselves to a national acceptance by relying on European texts, in order to ease later on a European acceptance.

Below are listed the European regulations to be observed for the small series M1 category:

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<thead>
<tr>
<th>Regulations</th>
<th>Titles</th>
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<th>M1 Small series</th>
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<tbody>
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<td>70-157-CEE</td>
<td>Sound levels</td>
<td>X</td>
<td>A</td>
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<td>70-222-CEE</td>
<td>Rear registration plates</td>
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<td>Braking devices</td>
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<td>Devices to prevent unauthorized use of motor vehicles</td>
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<td>74-297-CEE</td>
<td>Behaviour of the steering mechanism in the event of an impact</td>
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<td>Strength of seats and their anchorages</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
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<td>76-760-CEE</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>76-761-CEE</td>
<td>Headlamps which function as main beam and or dipped beam headlamps and incandescent electric filament lamps for such headlamps</td>
<td>X</td>
<td>X</td>
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<tr>
<td>76-762-CEE</td>
<td>Front fog lamps</td>
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<td>X</td>
</tr>
<tr>
<td>Regulations</td>
<td>Titles</td>
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<td>M1 Small series</td>
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<td>77-539-CEE</td>
<td>Reversing lamps</td>
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<td>A</td>
</tr>
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<td>Field of vision and windscreen wipers</td>
<td>-</td>
<td>-</td>
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<td>X</td>
<td>A</td>
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<td>X</td>
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<td>C</td>
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<td>92-23-CEE</td>
<td>Tyres</td>
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<td>92-24-CEE</td>
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<tr>
<td>94-20-CEE</td>
<td>Mechanical coupling devices</td>
<td>X</td>
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<td>96-79-CEE</td>
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<td>X</td>
<td>-</td>
</tr>
<tr>
<td>96-27-CEE</td>
<td>Side impact</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>2001-56-CEE</td>
<td>Heating systems</td>
<td>X</td>
<td>C</td>
</tr>
<tr>
<td>2003-97-CEE</td>
<td>Devices for indirect vision</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2003-102-CEE</td>
<td>Protection of pedestrians</td>
<td>X</td>
<td>-</td>
</tr>
</tbody>
</table>

**X**: Total compliance with the regulatory act is required. The EC acceptance data sheet must be delivered. Production compliance must be ensured.

**A**: No waiver shall be authorised, except those planned in the regulatory act. The acceptance data sheet and the acceptance marking are not required. Test reports must be established by a notified technical service.

**B**: Technical recommendations of the regulatory act must be observed. The tests planned in the regulatory act must be fully carried out, subject to the agreement of the competent authority in terms of acceptance, they may be carried out by the manufacturer: the latter may be authorised to produce a technical report. The acceptance data sheet does not need to be delivered and the acceptance marking is not required.

**C**: The manufacturer must demonstrate, to the satisfaction of the competent authority in terms of acceptance, that the fundamental requirements of the regulatory act are complied with.

- **This regulatory act is not applicable (no requirement) for this category.**

- **Technological questions:** although the presently available technology for automated vehicles is very robust and can be applied in total safety further researches are ongoing and needed especially for certain applications, such as long distance ones, in which high speeds and high capacities are required or such as urban ones;

- **Diffusion:** as most new technologies, these systems are better known to scientists than to those actors who should be the most active for their applications: politicians and local mobility planners.
In order to tackle these barriers, the CATS project will organise demonstrations, pilot installations and showcases that will help:

- by starting “mass” producing vehicles;
- by obtaining first certified (even if with simplified schemes) systems;
- by showing technology reliability and applicability;
- by spreading awareness on these systems.
- by testing the social acceptance of these systems, especially to people with reduced mobility.

1.1.2 PROJECT CONCEPT

* The FP7 reference call number SST.2008.3.1.1 “New mobility concepts for passengers ensuring accessibility for all”, addressed by CATS focuses, on the “next generation vehicle” and its market take up, bringing together all elements of a clean, energy efficient, safe and intelligent road transport system.

As will be demonstrated below, the CRISTA L system definitely corresponds to this requirement. Under the partnership with Strasbourg (F), Ploiesti (RO) and FORMELLO (I), CATS will develop an innovative strategy to test and introduce a clean urban transport system, the CRISTAL system, in three selected sites within the partner’s cities.

The Strasbourg demonstration includes the construction of two stations and the use of four vehicles, and therefore an in depth analysis of infrastructures needed for the system.

As a first short view, the CATS project, based on the CRISTAL technology and system design and demonstration is dealing with:

- an innovative transport system (three possible use, platooning technology...), increasing other public transports’ use by feeding them;
- a new dimensioning and Integration methodology (VOLTair);
- some Electric vehicles, silent and zero emissions well adapted to urban environment and fully accessible;
- stations design and building integrating all aspects of intermodality (infrastructure, localisation, comfort, effectiveness, communication, information);
- adaptability of the transport offer to all type of passengers (elderly, disabled, children, tourists needing travel guidance...).

* In the cities, where 80% of European citizens now live, urban transport is responsible for around 40% of total road transport CO² emissions. The cities, facing the impacts of their development – energy supply dependence, pollution, congestion, damages on human health and environment – have to organise differently their mobility.

The consistent growth in usage of transport modes, together with the ability to travel further and faster, are also responsible for the urban sprawl in sub-urban areas, threatening the preservation of natural resources, and affecting the local and global air quality. The environmental aspects of pollution can’t be distinguished from the social aspects: noise levels and air pollution in urban areas have to be reduced to ensure a good quality of life. The car, accounting for 75% of km made in the EU, causes most of the congestion and noise pollution in cities.

But of course, and on the other side, it is to be questioned whether the development of denser form of cities (for example with higher buildings to try to limit urban sprawl) is a good idea to improve quality of life...
Limiting pollution and encouraging citizens to walk, cycle or use soft public transport solutions, is also a way to fight against health problems linked to sedentary lifestyles (for example: obesity, lack of daily exercise, stress related illnesses, etc.). On average, a European citizen makes 1000 trips a year, 50% being less than 5 km long. For many short urban trips, walking and cycling are real alternatives to car travel and have to be seriously promoted.

*The CATS project is built around the CRISTAL system and around the wishes of three visionary local authorities willing to improve radically their citizen mobility. Its main innovation is to be possibly used of two different manners: as an individual or as a collective transport mode. Three testing site are full partners of CATS: Strasbourg (F), Ploiesti (RO) and the territory (and especially the city of Formello) of the Regional Mobility Agency of the Lazio region (I).

The Cristal system has been conceived to be implemented in urban environment with the minimum of infrastructures or physical constraints. Its main goal is to be adaptable to different kind of mobility demands that are usually taken into account by private cars.

The Cristal vehicle is running on regular roads, sharing the same paths than private cars, completing with an adaptable system the public transport offer. Its adaptability is provided to deploy as quickly as possible in city centres an alternative offer answering to the increasing users’ demand. It is a zero emission vehicle.

From the very beginning, it has been conceived as part of a global system in order to see how it can be complementary to other existing systems (or forecasted for the future).

Specific attention has to be drawn to the fact that modal transfer to this type of innovative system should come mainly from the private cars and/or from saturated collective transport systems. Ideally, for example, it should not bear too much of a consequence on bike use. The project will analyse what measures could and should be taken in order to lower the competition with soft modes. This must be coherent with objectives expressed in terms of neutral/ positive environmental impacts of such a system.

* CATS partners’ view is that new urban transportation systems must provide not only a radical improvement of mobility, but they also need to be environmental friendly and energy saving, to ensure sustainability. This issue has become a pre-requisite for the introduction of any new mobility system. The CRISTAL system is a zero pollution system inside the city centre: it does not produce any CO2 or other pollutants emissions. The global vision of zero emissions would be achieved when the electric energy for the vehicles will be supplied from clean renewable energy sources. Even if the electricity for the propulsion of the Cristal vehicles will be produced, in the intermediate time, in a power plant working on fossil fuels, the city centre will still be clean, the total emissions from the plant are controlled and CO2 emissions are constantly decreased by improved technologies such as combined cycles and use of natural gas. Energy usage could be reduced compared to conventional transportation by utilization of known benefits of electric vehicles and optimization the vehicle and the entire system parameters. As far as noise is concerned, the Cristal system is silent; however, for safety reasons, it has been developed with a feature to produce a little noise so that pedestrians are will be able to hear the approaching vehicle.

As far as space consumption and land use is concerned, the system does not require any specific infrastructure, obviously other than the stations. Furthermore, Cristal has been designed to be visually well integrated into the city: being nearly entirely transparent, its "visual" impact is pleasant. The system is "respectful" to the city and its architecture, and even more: it will provide a way to discover them (tourist application). It has been conceived taking into account, urbanity concerns.
The system has been conceived to be implemented in urban environment with the minimum of infrastructures or physical constraints. Its main goal is to be adaptable to kinds of mobility demand that are usually taken into account by private cars.

CATS will study the social impacts of the introduction of such a system, together with the analysis of the expressed needs and the solution offered by the Cristal system.

This analysis that will be realised in order to study, among others, what type of population would be more concerned with and would benefit from this type of vehicle and system: obviously, ageing population would be at the heart of the analysis, as a major target group. Others that may gain from the novel transportation system are handicapped people (reduced mobility, families with young children...): the system will be designed to be fully accessible.

* In Europe during the last years, and in a tentative to improve urban mobility and quality of life, new mobility concepts appeared in cities.

Two of the most interesting ones are:

- **Car sharing**

  It is often considered as not being a viable daily transport alternative. For car sharing to work properly, it is important that there be adequate density of the potential users so that one vehicle can be well used. The concept does not work well in heavily suburbanized areas (those suffering from urban sprawl). Such areas have generally been built for those who own a vehicle, and a resident would not be able to conveniently reach a central pickup location if there is insufficient public transport. And -last but not least-, car sharing appears not to be easily profitable: of course when people start to share cars, they will buy correspondingly fewer of them.

- **Cybercars**

  In a long term future it might be that Cybernetic Transport Systems (CTS) based on fully automated urban vehicles such as the cybercars will be widely available in urban roads and on new dedicated infrastructures. Such systems have been developed and evaluated in the scope of the CyberCars ([www.cybercars.org](http://www.cybercars.org)) and CyberMove ([www.cybermove.org](http://www.cybermove.org)) projects during the 5th FP and are now being deployed, in particular through an Integrated Project of DG Research called CityMobil, which started in 2006.

  The cybercars solution is difficult to implement because of regulation problems especially linked to street protection on one hand, to the management of interactions with traditional cars on the other hand. Another problem of this new kind of transportation system is their integration in the urban environment.

  It will take a long time (and perhaps never) for this type of vehicles to be generally available everywhere. In the meantime, individual transport is still dangerous and not accessible to the entire population such as those with no driver's license, those who can not afford a car, those with sensory or motor handicaps, and those who should not or can not drive anymore.... The public transport system is often of difficult access to part of the population and can rarely perform the door to door transport needed for many moving needs. On the other hand, regular cars are not well adapted to the ageing population and even less to many of people with reduced mobility.

  However, accessibility and implementation of inclusive and environmental-friendly transport systems are crucial to achieve sustainability in transport. Public transport is one of the main alternatives to the use of car in the cities, and is a crucial solution for the 40% of EU households who do not have access to a car. Key interventions to counterbalance the constant increase in car use must rely on improved services, which imply accessibility for all, reliability, comfort and punctuality.
But transport industry should also be creative to attract new passengers into the public transport system by proposing attractive and technologically innovative transport modes. The CATS project is at the heart of such consideration.

* The CRISTAL system that will be studied in CATS is following a long survey of initial experiments developed all over Europe, analysis of dysfunction or failure causes. It is gathering four major conditions able to implement and deploy such a system in the best conditions of use and urban integration:

- Specific vehicles and stations, adapted to self service,
- Appropriated system of management and exploitation,
- System fitting with a global strategy of mobility transport and car park management,
- Integration and supporting measures.

The gathering of these conditions makes realistic the provision of an operational offer, competitive towards car attractiveness. The Cristal vehicle itself is:

- Compact (about 3,3 meters long),
- Of 6 persons capacity,
- Non polluting and silent,
- Able to be used in manual driving (self service) or in convoys (platooning or towing without contact) and remote controlled by local operator,
- Fully accessible.

For all these reasons Cristal is a very adaptable system, able to answer to different mobility demands: individual demand by a full self service system, semi collective demand by an urban shuttle or “collective taxi” offers.

With its individual or semi collective units of mobility, the Cristal’s give the possibility of a complete transport offer, ran by the same operator, and exploiting the existing public transport network. At the same time, it provides answers to all users needs in their urban mobility.

* For the first time, the Cristal technology is proposing a system of towing well adapted to these conditions of use: the operator is able to adapt its offer to the evolution of the demand in time and to urban space; he is managing “in real time” its fleet of vehicles.

The integration into the CRISTAL system of a range of innovative technologies such as information system, automatic analyses of the users (data mining), platooning (immaterial towing) or computer aided tourism, complete this new offer of mobility (stations as mobility interfaces, vehicles as mobility supports/vectors).

As far as design is concerned the CRISTAL system is also innovative. It is an important point because modal shift is also dependent upon a good image of the transport means. While driving a car is a symbol of freedom and personal success, riding a bus is still being seen has something being done by people who can not afford a car. This bad image of public transport has now a good opportunity to change because of the climate change threat and because citizens are aware and concerned by this threat. This is the reason why an industrial company such as Lohr industries proposes the Transport, last generation of tram on tyres and now the CRISTAL system. These kind of solutions are perceived more “luxuous”, friendly and comfortable: in doing so, they have a central role to play to accompany this evolution of mentalities.

One of the strong points of the CRISTAL system that the CATS project will try to evidence is the complementarity of the CRISTAL system with the classic public transport network, with
the car and also with cycling and walking. The selected sites in Strasbourg, Ploiesti and Formello will be chosen because of their strategic location in the cities. To be useful, modal shift should come mainly from the car so that the potential patronage increase will bring real newcomers into the transport systems.

* In link with the transferability issue, a central point of the CATS project is to give tools to EU new entrants in order to help manage the foreseen explosion of car ownership. When speaking about modal shift in Europe new eastern partners, the question of social equity is even more crucial. Although mentalities are gradually changing, the image of owning and driving a car is over there even more perceived as a sign of success and independence, and therefore influences travel choices. This is why CATS will take into account particularly what happens in these transition economies.

To summarize the above points, CATS approach consider particularly important to merge environmental, technological, social and economic considerations, as to have a transversal implementation strategy for the CRISTAL system. The demonstration foreseen in the project will take into account this transversal approach; they will also take extensive consideration of the results of citizens’ consultation and mobility needs analysis.

* Speaking about “ensuring sustainable mobility”, one can not ignore the recent Green book “Towards a new urban mobility culture” which is a step forward for Europe in this field.

It is important for the CATS partners to demonstrate how CATS fits with the objectives developed in the green book, the main objectives of which are:

- “Reconciling the economic development of cities and their accessibility with the improvement of quality of life and environmental protection”.

The CRISTAL system is a zero emission and a silent system. From the very beginning, it has been conceived to be fully accessible. CATS will test all issues linked to station design and vehicle running in terms of urban integration, accessibility and environmental neutral effect of the system.

- “Proposing new additional private and public ways of transportation complementary to the existing offer”.

The innovative CRISTAL system can be used as an individual or as a collective transport mean. Being at the same time a public and a private transportation mean, it is a radically new mode of transport. Its concept has been designed to be in complementarily with existing transport modes. However it might also be used on its own where the geography or the density conditions forbid the development, at a reasonable cost, of a correct public transport offer.

- “Creating new infrastructures and services intended to facilitate fastness and comfort of movements while rationalising use of space”.

The CATS project will study virtually the station design, and then for real on the three demonstration sites foreseen. The CRISTAL system requires light infrastructures settings: it therefore preserves the availability of public space and enhances its reallocation by specific integration measures.

- “Involving local authorities in the implementation and the exploitation of services and innovative applications, from the very first steps and in accordance with all stakeholders (developers, suppliers, service providers, users, etc.)”.

The CATS project associates local authorities from eastern and western Europe, and their
main public transport operator. It involves research institutes, industry and land use specialists. It will focus on an extensive analysis of citizens’ needs and wishes, and on their acceptance of the new technology developed by CRISTAL.

* As demonstrated preliminarily, the CATS project, with the promotion and the test of the CRISTAL system, is fully in line with this FP7 call objectives. The real final deliverable of the CATS project is the development of a sustainable urban mobility system, accessible to all, environmental and user-friendly, adapted to local authorities realities and priorities and providing as well high-quality, safe, intermodal and “light” infrastructure for facilitating the citizens daily life.

1.2 PROGRESS BEYOND THE STATE-OF-THE-ART

* Since about 30 years, carsharing transport systems have been developed and experimented in many European countries. The most famous are Procotip (Montpellier-France 1972), Witkar (Amsterdam, The Netherlands, 1974), Praxitèle (St Quentin, France 1994), Liselec (La Rochelle, France 1996), CityCar (Martigny, Switzerland 1998), Diracc (Singapour, 2002), Vulog (Antibes, France 2006).

- The Procotip system of Montpellier was based upon 35 existing internal combustion vehicles (Simca 1000 automatic gear). The system was operated like “bumper vehicles”: a “plastic coin” was inserted to limit the use of the system. The vehicles were used by a “club of users”. The system stopped because of its insufficient size and financing. The vehicles were parked on 18 parking lots…only when they had a row vacant!

- The Witkar system did use (at the end of the project) 35 specific electric small vehicles, reserved to students of the Amsterdam University. Some stations were specifically built and organised like self service vehicles distributors. The experiment stopped because of physical dysfunctions and its insufficient size for an efficient service.

- Praxitèle was based on industrialised Renault Clio electric vehicles. A fleet of 50 vehicles and 14 stations was operated during 3 years. A system of automatic charging was specifically built in order to increase the level of range. The experimentation was lead by INRIA and operated by Veolia transport. It stopped at the end of phase 1 (specific vehicles were designed but the manufacturer then decided not to follow up the -niche market- project)

- The Liselec current experimentation in La Rochelle started in 1999, using 50 electric vehicles Peugeot-Citroën located in 6 charging stations. The distribution of the cars is “hand made” (one driver for each vehicle). It is the longest experimentation of this type of service. The vehicles are now at the end of their -long- life, the main problems being maintenance and too small sized service. The Liselec stakeholders have shown a great interest into the Cristal concept in terms of exploitation (platooning) and specific car use.

- CityCar is a Swiss experimentation led between 1998 and 2000, with 30 electric vehicles Ligier Ambra, 20 stations located in the centre of Martigny and operated by Car Postal. No supporting measures were taken by local authorities in terms of parking policies or traffic management. After a period of users’ interest for the system, the experimentation stopped because of several dysfunctions of the cars and the small size of the system.

- Diracc (Direct Access) is the car sharing system implemented by Honda in Singapour in 2002. In Singapour, the city is extremely dense and the municipalities impose very high taxes to car owners. The system offered one way trips between any of 21 ports (pods) with no reservation required and no return time needing to be specified. Recent reports say the service had 2,500 members with access to 100 vehicles. The service
quality was especially high: each vehicle was equipped with a touch screen that provided the interface for the on-board computer, as well as navigation and real-time traffic information. The system has closed in the beginning of 2008, six years after its start. Apparently it did close because of the high equipment costs of the service, and because of the complexity of the tariff system.

All these systems were implemented on small scales and never reached a significant dimension, nor were accompanied by general mobility policies and integrated measures. Other systems have been tested in Berlin or Kyoto: they were all abandoned for reasons of the same kind.

* However the success of large bike sharing systems such as Velib (Paris, France 2007), Velov (Lyon, France 2006), Call a bike (Germany) have to be included in the global picture. And this success might suggest that cities and citizens are ready to invest in and use larger scale car sharing systems.

The city of Paris plans to launch a transport system based on the use of self-service cars called ‘Autolib’. It is estimated that this system will make use of 4'000 vehicles and is based on the same principle as that of Vélib. Hiring of electric cars for short, point to point distances, without the need of pre-booking, will be from various stations along predetermined routes. The targeted objective of this system, similar to that of the bikes system of self-service, is to allow an automatic regulation of the stations at maximal level due to the various trips done by the users.

The CATS project would run on the same lines as the project Autolib on this last point, since the idea of the wide auto regulation of the system will have a strong bearing on the way it will function. However, the different experiences especially those observed from the self service bikes, tend to show that this auto regulation is particularly difficult to reach and would then involve the manual adjustments at the stations. In the case of CATS, an indisputable advantage comes to the scene: far from requiring the use of the “jockey” which would only redistribute the vehicles at the stations, the regulation measure becomes also a mode of transport of travellers.

The link between CATS and the bikes system of self-service which appeared on the French scene during the past few years, is very close, and the analysis of these systems must teach us a lot as far as the organisation of the project CATS is concerned. Therefore, the logic geographical distribution of the stations over the territory and the impact that this distribution generates on the running of the system (flow, the concentration of bikes in a specific point) must be taken into account. Consequently, for the bikes system of self-service, it appears relevant that the distance between the stations of the Cristal project should be of 300 meters between each station.

And there are other similar elements which can be compared between these self-service vehicles systems; therefore, the method of renting of Cristal will probably be of the same type as that of the Velib method of renting or that of the Velo V method of renting: for example with magnetic cards offering different types of subscription and allowing progressively a fare integration for the bikes systems of self-service to the subscription of the collective transport. The lessons learned from the payment system by credit card at the stations appears equally relevant for CATS as for the Velib or Velo’V, (e.g. holders of foreign bank cards) and these must be followed with attention and adopted. Finally, another similarity between these different services, the relationship between the user and the vehicle is modified: the user is disconnected from the ownership of the vehicle, and at the same time enjoys the advantages of an individual collective transport system.

* The legitimate position of CATS and of the CRISTAL system in this state of the art can be demonstrated as follows:
Cristal is the result of gathered experience: the vehicle is fully specific, its operating system conceived and developed for its applications. The transport system is dimensioned and integrated through preliminary territorial studies defining precisely all pertinent sites for its exploitation, phases of deployment and measures of integration. The CATS project is resulting from a detailed and systematic observation of all kind of comparable systems.

Cristal is a very original system because of its platooning capability: indifferently used as a single vehicle or a convoy, its adaptability confers to Cristal an exclusive manner in answering to individual mobility problems, without integration problems. A high technological system of information and communication linked to local operating transport system, immaterial towing offering many configurations of use, are aspects under development and need to be experimented in real conditions of use. Last but not least, the human factors are not forgotten: a strong commitment of selected end users is needed to adapt the offer to their requirements or recommendations.

Furthermore CRISTAL is designed for self service individual use as well as for public transport. The platooning technology allows for a variable size train of vehicles, with a single driver. The fact that two services are possible with a single type of vehicle has for consequence that the cost can be supported by two types of end users, thus enabling to achieve economy of scale to the benefit of the cities and of the citizens.

The CRISTAL system is therefore specifically designed to reduce the operating costs through the use of platooning technology. For the car sharing usage, platooning allows the operator of the system to move several empty vehicles at once with a single driver. This allows having vehicles available for use everywhere in the city, with a minimal fleet.

1.3 S/T METHODOLOGY AND ASSOCIATED WORK PLAN

The aim of the CATS project is to finalize the development and to experiment a new urban transport service based on a new generation of vehicle. The CATS project will contain 7 Work Packages, of which 5 are technical work packages, to achieve the project aims:

- WP0 MGT Project Management and Coordination
- WP1 RTD Mobility Needs Analysis
- WP2 RTD Operating principles
- WP3 RTD Development of the station and virtual integration
- WP4 DEM On site demonstration
- WP5 RTD Impact assessment
- WP6 OTH Dissemination of CATS Results

The following chart provides an overview of the project and its decomposition into Work Packages:
WP1 is entrusted with the task of determining especially for Strasbourg the most appropriate operational site and also predefine the best implementation of the Cristal system. The recommendation of WP1 will assist WP3, WP4 and WP5 in developing methodologies in order to optimise the best implementation of the Cristal system in the city.

In WP2, INRIA and his partners will design the operating principles of the transportation system in the 2 modes which are self service and variable train. Simulation tool will be used to design and to evaluate the operating principles. INRIA will develop it in order to provide a generic tool for the operators but also to optimise the system in terms of number of vehicles and in terms of operation.

In WP3, the team will design the stations and to define the services and the use of the stations base on WP1 and WP2 results.

After obtaining the results by the 3D demonstration of static integration and 3D demonstration of operating system, the demonstration in real conditions a showcase and exhibitions will be performed within WP4.

The impacts and the success of CATS project will be evaluated by using different indicators in WP5 and it will also answer to the approval of the system Cristal by the citizens.

To ensure the smooth running of the CATS project, WP0 is dedicated to the management of the project. WP0 deals with administrative and technical management of the project and also deals with Quality Control and Ethical Issues within it.

Finally, WP6 deals with dissemination of the outcomes of the project activities coupled with the interaction with the stakeholders in order to maximise the usefulness and to promote the future launching of the system in other cities. Some of the key dissemination and implementation activities will include internet side, workshops for stakeholders, dissemination material, contact with end-users and a final conference as detailed in WP6.
The detailed project planning is shown in a Gantt chart:
Selection of the Sites

Three sites have been selected for demonstration. They are located in three different geographical zones: one in France-Strasbourg, one in Romania-Ploiesti and one in Italy-Formello. In this context, Strasbourg and Ploiesti will be in close connection. Both cities have been cooperating in previous projects and have already developed good interactions. On its side, Formello will be in close contact with the roman university La Sapienza as they have been partners for many years. During the CATS project they will capitalize on links created during previous projects.

Description of the Site of the demonstration in Strasbourg

The site has not been chosen yet. It will be define by the studies carried during the project.

Description of the Site of the “Showcase” in the city of Ploiesti

There are some reasons for choosing this place for the Cristal vehicle showcase in Ploiesti:

It is located exactly in the city center, in the neighborhood of the City Hall and the Culture Palace and it is part of the North South axe of the city. The N-S direction includes the main boulevard of the city and it is subject of some projects for traffic and ecological transport and for sustainable urban development.

Also through CIVITAS Success project will be modernised a number of bus stations from the city center and from this direction.

We consider that through CATS project (Cristal vehicles) we can investigate the effects of these advanced transport solutions on this urban area, especially in the center area, which is an area with a large number of institutions, governmental and private as well as population.

Description of the Site of the “Showcase” in the city of Formello

The location of the “showcase” is Formello town located in Latium Region to north of the city.
of Rome.

Formello town, with 11,000 inhabitants, is between two towns, Cesano and Morlupo with, respectively, 10,000 inhabitants and 8,000 inhabitants, located in a very prestigious archaeological area named "Parco di Veio (see figure 1).

Cesano town is crossed by a regional railway line (FR3 Viterbo-Roma) with a foreseen passengers demand at year 2011 of 11,000 pass/h during the peak period, whilst the Morlupo town is crossed by a regional railway line (Roma-Viterbo) with a foreseen passengers demand at year 2011 of 8,000 pass/h during the peak period (see figure 1).

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Figure 2 gives a framework in terms of railway infrastructure, showing the existing regional railway network and the location of the “Showcase”.

The Cristal transportation system to be applied in this case should be oriented to the variable train, in order to provide an innovative transportation system to link two very important regional railway lines improving the accessibility to the public transport.

The showcase fully complies with the directives of the Regional Government:

- harmonize private transportation needs with overall public transportation needs;
- integrate the various modes of transportation;
- improve the efficiency, effectiveness and quality of the public transportation system;
- to encourage the use of public transportation services.
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<thead>
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<th>Work package No (^1)</th>
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<th>Type of activity (^2)</th>
<th>Lead participant No (^3)</th>
<th>Lead participant short name</th>
<th>Person. months (^4)</th>
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<th>End month (^6)</th>
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\(^1\) Work package number: WP 1-WP n

\(^2\) Please indicate one activity per work package:
RTD = Research and technological development (including any activities to prepare for the dissemination and/or exploitation of project results, and coordination activities); DEM = Demonstration; MGT = Management of the consortium; OTHER = Other specific activities, if applicable in this call.

\(^3\) Number of the participant leading the work in this work package

\(^4\) The total number of person-months allocated to each work package.

\(^5\) Measured in months from the project start date (month 1).
Table 1.3.b: Deliverables List

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4.5 Data collection and analysis 4 R PP M30

5.1 Evaluation plan 5 R PP M12 and M34
5.2 Final evaluation 5 R PP M34
5.3 Transferability assessment 5 R PP M34
5.4 Roadmap to the market 5 R PP M34

6.1 Website 6 O PU M4
6.2 Leaflet 6 O PU M6
6.3 Newsletter 6 O PU M9
6.4 Video 6 O PU M30
6.5, 6 and 7 Exploitation plan 6 R CO M13, M25, M36
6.8 Showcase activities 6 R PP M32
6.9 Dissemination event 6 R PP M36

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Table 1.3.c: List of milestones
Table 1.3.d: Work package description

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Objectives
CATS project defines itself as a specific process, which allows to structure methodically and gradually a future reality. CATS management activities are entirely coordination and control activities, beginning with the aim of achieving the objectives in accordance with requirements which the CATS consortium suggests to answer. Consequently the work package “Project management” has to achieve the following objectives:
- To monitor the project, in administrative, financial and technical terms,
- To assure the conformity between project plan, requirements, milestones and to achieve the objectives in time,
- To provide the interface to the EU services and external actors.
- To assure high quality outputs.

Description of work
Task 0.1 – Administrative and financial management [Leader : ERT] (M1 to M36)
The objective of this task is the administrative and financial management of the project. The project manager is responsible for all project related administrative matters. Beyond others he has to organise the information flow between the Commission and all project partners. He manages the necessary financial transactions. In close link with the project coordinator who is responsible for all project related scientific and technical matters, the project manager will be responsible for the preparation of the periodical reports contractually required by the European Commission using the input provided by the Work Package leaders. He secures the reporting activities in line with the contract and the

7 Please indicate one type of activity per work package:
- RTD = Research and technological development (including any activities to prepare for the dissemination and/or exploitation of project results, and coordination activities);
- DEM = Demonstration;
- MGT = Management of the consortium;
- OTHER = Other specific activities, if applicable.
consortium agreement and supervises the dissemination activities. According to the description here above, the administrative management activities are the preparation of annual and audit reports (administrative part), project financial statements, monitoring of resources, the organisation of the eventual consortium meetings, the selection and distribution of the EU financial contribution (financial part) and the representation of the Consortium towards the EU and all relevant external entities.

**Task 0.2 – Technical management [Leader: LI] (M1 to M36)**

The objective of this task is the technical management of the project. The technical management activity will be conducted, by the coordinator in order to coordinate the technical efforts and outputs of the partners. The technical activities being led in WPs by task leaders will be monitored against technical milestones, outputs and project objectives.

The project manager will coordinate internal review of project’s outputs (e.g.: deliverables and reports) with the support of the coordinator, as well as the coordination between related WPs. The respect of deadlines and technical objectives, and particularly of technical critical issues, will be pursued.

Meetings will be held with regular deadlines and in accordance with the project plan, in order to assess the degree of completion of work, including technical results and deliverable preparation. Based on the monitoring of resources performed within task 0.1, specific attention will be devoted to the relevant use of resources according to the project objectives.

**Task 0.3 - Project quality assurance and Quality assessment [Leader : ERT] (M1 to M36)**

The objective of this task is to define, describe project rules and ensure/check their applicability and applications. Dedicated to help the management of the project, this task will provide a quality plan for CATS project. This deliverables elaborated by the coordination team will describe activities, processes, responsibilities, and methods and resources setup to accomplish/complete the project. The Steering committee of the project, which is composed of WP leaders, Coordinator and technical managers, has to amend if necessary and approve this document. After that the quality manager will ensure this guideline is applied. Regarding this guideline, specific and basic measures will be defined such as:

- To provide for each physical meeting, an Agenda with terms of reference and minutes of the meeting,
- To propose methods to solve eventual conflict,
- To provide the process to assure the assessment of each deliverables by internal peer review process, and to monitor the good achievement of the process.

This plan will also include the recommendations and graphic templates elaborated within WP6.

In order to avoid possible profusion of meetings, it will be preferable as far as possible to use the electronic tools.
Deliverables
D0.1.1 First Periodic Report: 18 months report on progresses of the project drafted according to Commission’s specifications (ERT, M18)
D0.1.2 Final reports: report issued at the end of the project according to the Commission’s specifications include the second audit report (ERT, M36 after the closure meeting)
D0.3.1 Project quality plan (ERT, M3); this deliverables could be updated according to decisions from Steering committee.
<table>
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**Objectives**

In this Work Package, we will launch a detailed analysis of citizens mobility needs and consequently provide a justification and/or adaptation of the Cristal concept to these needs. This will be based on an analysis of the state of the art and results of similar type of projects.

City studies will be performed (top down studies for planning and bottom up approach for end users recommendations) in order to determine the most appropriate operational site within each partner city of the project. Different scenarios of user needs will be analysed by an ex ante evaluation using the MAESTRO methodology in order to pre-define the efficiency of the Cristal system towards its own conditions of use.

**Description of work**

**T. 1.1. User needs analysis and system dimensioning- [ Leader: GEA] (M1 to M10)**

In this task, the potential mobility demand and qualitative users' needs to which the system can respond will be elaborated for the sites that were selected in a preliminary «territorial study». The approach will contribute to enrich and complete the functional and technical specifications of the transportation system and of the vehicle itself.

The Voltair methodology will be used. It consists in a top down approach based upon the following phases:

- Evaluation of the mobility needs
- Analysis of the aims and constraints (users, territory, planning...)
- Multi modal and space enhancement concept
- Selection of pertinent sites
- Pre dimensioning of the system
- Final dimensioning and integration conditions

In parallel, a bottom up demarche is provided through the following phases:

- Presentation of the preliminary study to the local stakeholders
- Evaluation of the proposed pertinent sites
- Analysis of the end users expectations
- Requirements and recommendations for WP3 (virtual integration) and WP4 (demonstration)
A preliminary city study has been executed before the CATS Project kick off in Strasbourg. It is now for Strasbourg to complete the preliminary study results by an analysis of the city pertinent requirements and recommendations (bottom up approach).

For Ploiesti and AREMOL (Formello city) the complete top down and bottom up approach will be conducted to final requirements and recommendations for WP3 (virtual integration). For those two cities, a complete city study will be conducted, in order to define precisely where and how Cristal system can be useful.

The city study is a “top-down” 10 months approach divided in 2 main parts:

- the first part is about pre-dimensioning (territorial constraints analysis, strategic equipments, mobility demand generators, current demand evaluation, existing and planned offer, modal share, pertinent sites definition)
- the second part is about system integration (system dimensioning, end users’ evaluation and requirements, stations’ implementation, integration measures, work program, economical study).

The end users’ participation is wished during the second phase of the study in order to define and verify all realistic conditions of use that will be virtually preliminary tested.

The city study objective is also to enlarge knowledge and planning about all Cristal integration requirements within contrasted cities contexts.

The results of the user needs analysis will be used to refine the operation model of the system in order to have a system specifically adapted to the cities context. (WP 2)

T.1.2 Ex Ante evaluation- [Leader : CTL] (M5 to M12)

This task will work under guidance and in strict cooperation with WP5. It will use the evaluation plan developed in task WP5.1 to make the first step into the evaluation of the three cases.

In this task, evaluation criteria will be set up within the different scenarios of use. Indicators to measure such criteria will be defined as well by using a specific measurement method (MAESTRO). This task also includes the definition of thresholds for success and reference cases (based upon current situations) in order to assess the system added value.

A first quantification of expected results from Strasbourg, Ploiesti and Formello is the final output of this task. It will enable first comparisons between the three cities and a first approach of transferability issues.

A rather strict methodology is provided for the evaluation of different scenarios of use within their localization and operating conditions. The process is divided into the following four steps.

- Objectives definition
- Scenarios classification
- Choice of criteria and indicators
- Evaluation

The objectives definition describes what is to be learnt from the project and what is to be achieved by the experimentation. The definition of the objectives serves as the basis for judgment in evaluating the system being studied. 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 Cristal system-users and those affected by the system as non-users, e.g. residents.
- Decision-makers: those who decide over implementation of Cristal system.
- Operators: selected representatives of transport operator and service providers.

T.1.3 Site selection - [Leader: CTL] (M6 to M12)

Each city will determine the place and context for the system to be first installed. The system’ minimum initial configuration will be defined and then dimensioned for that specific application.

The requirements of the transportation system, with an analysis of the users' expectations and a pre-evaluation of the transport demand, will be specified.

The expectations and needs of the users and of the non-users will be assembled in a survey and will be based upon the analysis of existing data from previous similar projects (CyberMove, CityMobil,…).

People with reduced mobility needs (disabled, elderly…) will be a focus point.

Societal and economical aspects are taken into account: they define as precisely as possible the different pertinent criteria and indicators that will be taken into account in the ex post evaluation. This system of evaluation is defined in order to be applied on several user groups, stakeholders and local operators during the final evaluation process, at the end of the project.

T.1.4 Multimodality and mobility behaviour – [Leader :EPFL] (M6 to M12)

EPFL LaSUR’s methodology regarding mobility representations and practices as well as the users’ perception and practice of multimodality is twofold: quantitative surveys completed by qualitative interviews depicting the largest possible range of situations and stakeholders, in order to include both known regular practices and as yet unknown practices that might emerge as the CRISTAL demonstrations unfold. Therefore we will interrogate potential users (both individual and professional needs); operators, professionals active in transport and urban planning, decision-makers, etc.

Participants’ representativity in the quantitative surveys will be ensured by the usual household quotas method. Fine-grained analysis of motives and representations will be gathered through a set of interviews of stakeholders from different standpoints.

The presentation of results will be organised as a synthesis identifying user needs and perceived obstacles to development, regarding 4 main axes: the image of CRISTAL in regard of other transport modes; how and why CRISTAL is being used, depending on user’s framework of needs, demands and constraints; perceived impacts of CRISTAL use, on a personal level and at the society level; perceived development potential.
The surveys will comprise issues on both car-sharing and public transport use, related mobility practices, representations, related services that are considered important, and more specific measures quantifying behaviour such as the number of times the system is used, the number of kms made, related costs incurred, changes in the use of other modes, etc.

The main question regarding the users’ perception revolves around how people willing to use CRISTAL as a public-private mode perceive the already existing public transport and private modes, such as the automobile? Is CRISTAL a means of adding another card to their set of existing transport modes, or a means to totally replace either public transport or the car, that suffer from a negative image and that they wish to avoid all together?

To answer this question, it is important to know what are the perceptions in relation with the existing transport modes, and thus we plan to ask open questions: prospective users are to mention freely three adjectives qualifying the automobile, public transport, car-sharing, and CRISTAL as such. The perception of the different modes will be measured through the spontaneous mentioning of three adjectives that best qualify each respective mode. Perceptions may vary depending on whether the specific mode is used or not. These adjectives are then classified as positive, neutral or negative. A synthesis typology will then be built, showing how perceptions vary with different user profiles. Both typologies will be cross-referenced in order to build a complete picture of « who thinks what » in function of « who does what ».

**Deliverables**

D.1.1 User needs analysis and system dimensioning for Strasbourg (GEA, M5)
D 1.2 User needs analysis and system dimensioning for Ploiesti (GEA, M10)
D.1.3 User needs analysis and system dimensioning for Formello (GEA, M10)
D.1.4 Ex ante evaluation report (for the three cities) (CTL, M12)
D.1.5. Multimodality and mobility behaviour report (EPFL, M12)
Objectives

The specific objective of this work package is to define and design the operating principles of the transportation system (and therefore its expected performances) in its 2 running modes: individual self service and collective urban shuttle.

The idea is to complement the design and manufacture of the Cristal vehicle via a detailed definition of its operating principles (fleet management, information, vehicle charging...) which are needed for an efficient operation of the system in the different partners cities (adaptation of the system to specific local demand or requirements).

Description of work

T.2.1 Self service operation- [Leader: INRIA] (M6 to M18)

The study of the self service operation will be based on the experience of the key partners in previous systems such as Praxitele, Liselec or Cité-VU which are all based on electric vehicles. The main considerations are the ease of use by the customers and the economic efficiency of the system, but other aspects such as for example energy, environment and integration with other modes of transportation will also be addressed.

The research will be carried from the work done in Praxitele by INRIA with the optimisation of the management fleet. The objective is to move the empty vehicles between the stations (and possibly with on-the-spot demands) and to the recharging stations in an optimal way to guarantee optimal system operation: good satisfaction of the demand at the lowest cost for the operator. The new feature used in the CATS Project will be the use of the platooning technique for the displacement of empty vehicles. This work will be done by using stochastic models of the demand and optimal control techniques.

T.2.2 Urban shuttle operation- [Leader: INRIA] (M6 to M18)

The study of the variable train with individual vehicles is more innovative since no such system has ever been put in place. Therefore, the operation study will be based on simulation runs in various environments. Here, the objectives are the satisfaction of the demand in a minimum time and the efficiency of the system which includes the drivers.

Here again, optimal control techniques based on stochastic models will be used in order to find the best operative modes in terms of user demand satisfaction and cost to the operator. This will be adapted in each local situation.

T.2.3 Simulation tool and stochastic modelling- [Leader: INRIA] (M14 to M18)

We will develop a simulation tool to design and evaluate the operating principles. An entire fleet of vehicles will be simulated in each partner city environment to see how the system is responding in its 2 modes to various types of demand. This tool should also enable us to dimension the system in terms of number of vehicles and in terms of its operation. This will allow us to evaluate how the system can scale up to a large demand.
INRIA will develop this tool as a generic tool for the operators. We will therefore pay particular attention to the ease of use and the possibility to use existing data bases describing the city and its existing transport modes. Indeed, the simulation tool should be able to take into account the demand generated by the existing public transportation system and rebalance its offer with Cristal.

Technion will add to the tool a simulation of system performance including energy management, based on the derivation of characteristic driving cycles of the vehicles according to user needs. This part of the tool will enable to carry out evaluations of energy and environmental impacts (emissions of pollutants and CO2) and comparisons between various options and current reference patterns.

EPFL will contribute specific inputs towards the development of the simulation tool based on ongoing stochastic modelling research.

**Deliverables**

D2.1 Operating principles in self service mode (INRIA, M18)
D2.2 Operating principles in urban shuttle mode (INRIA, M18)
D2.3 Driving cycles simulations (INRIA, M18)
D2.4 Expected performances in terms of availability, waiting times, travel times and costs (INRIA, M18)
Work package number | 3  
---|---
Start date or starting event: | 11  
**Work package title** | Development of the station and virtual integration  
**Work package Leader** | LI  
**Activity Type** | RTD  
**Participant number** | LI CUS GEA PMP AREMOL TOTAL  
**Person-months per participant:** | 12 3 10 4 2 31  

**Objectives**

The objective of this work package is to design the elements of the demonstrator to be adapted to each specific local situation (Strasbourg (FR), Ploiesti (RO) and Formello (I)) and define the conditions of the system in the three cities. It includes the detailed design of the stations and vehicle adaptations (electrical traction equipment, induction charging, platooning, ergonomics, 2D, 3D design). This WP will deal with all preparatory elements of WP4.

**Description of work**

**Task 3.1 Design of the stations-[Leader: LI] (M11 to M15)**

This task will define the services and the use of the stations based on WP1 and 2 results. It includes listing:

- technical services (energy and vehicle availability management, operating aid system, link with the local operator’s traffic control tools…)
- services to passengers (passenger information system, reservation system, ticketing…)
- interaction with the transport network, especially the technical interfaces: signalling, traffic control…

It also includes the definition of implementation constraints such as existing underground networks, electromagnetic compatibility, compatibility with accessibility standards of the road network, etc.

**Task 3.2 Virtual static integration-[Leader: CUS] (M15 to M18)**

This task will virtually integrate the CRISTAL system into the three chosen sites of Strasbourg, Ploiesti and Formello, according to the findings of Task 3.1.

The urban environment (pertinent site) of Strasbourg will be 3D modelised and the Cristal system virtually installed in these environments (including all adaptations of public spaces). In Formello and Ploiesti a 2D planning will be provided from the city studies.

All integration requirements will be identified and evaluated through different alternative proposals and validated by the competent services of Strasbourg, Ploiesti and Formello.

**Task 3.3 Virtual dynamic experimentation of the system-[Leader :LI] (M18 to M21)**

This task aims at testing virtually what would then be experimented in real conditions in WP4.
The two possible running modes of the system: self service and shuttle but also the convoy mode will therefore be virtually validated in order to detect possible problems or dysfunctions in different situations (standard, exceptional and critical conditions),

For Strasbourg only, this task includes modelling of information system in order to demonstrate the coherent link with the door to door regional information system which will start running late 2009.

**Task 3.4 Validation- [Leader: CUS] (M21 to M21)**

The main goal of this task is to evaluate the 2D / 3D experimentation in its different aspects (static and dynamic) and to present the results of the whole process to local authorities of Strasbourg, Ploiesti and Formello, for validation.

In link with WP4, the validation process will also take the form of a presentation of the 2D / 3D planning and simulation to the citizens.

These agreements obtained with end users, operator and political stakeholders will ensure the future conditions of integration and deployment of the Cristal system and the transferability of the results obtained.

**Deliverables**

D. 3.1 Station design (LI, M15)
D. 3.2 3D demonstration of static integration (CUS, M18)
D. 3.3. 3D demonstration of operating system month (LI, M21)
D. 3.4. Validation report (CUS, M21)
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**Objectives**

This WP includes stations installation and experiments in Strasbourg on the selected site. It includes an exhibition in Ploiesti and a showcase in Formello.

Four Cristal vehicles will be made available to the project for experiments by Lohr Industrie.

For both cities it includes assessment of results of the introduction of such a new system in three voluntarily different European cities (Strasbourg, Ploiesti and Formello).

Three different kinds of partnership are foreseen. A full scale demonstration (four vehicles and two stations in Strasbourg) will be operated during 5 months. A showcase will be organised in Formello on the basis of technological presentations (for example, two vehicles showing all technical capabilities). An exhibition will be organised on the basis of existing dissemination tools in Ploiesti.

**Description of work**

The on site demonstration is the final step of the Cristal prototypes development: the prototypes are composed by 4 vehicles and 2 stations independently developed at LOHR industrial site: all technical specifications and functions will be preliminary validated before being installed in a demonstration site located in the city of Strasbourg. All necessary civil works will be conducted in order to integrate the demonstrators in real conditions of use: the location of the demonstration should be a result of the preliminary Strasbourg city study. End users (citizen, local associations’ representatives, local operator,...) will be selected to follow all scenarios of functioning (car sharing, urban shuttle, on demand convoy, modal transfer, information, survey and maintenance).

In Formello, citizens will be informed of Cristal project description and capabilities by a showcase: the formal results of the studies (city studies and evaluations) and the vehicles will be exposed and demonstrated presented during an existing event or an event organised specifically.

In Ploiesti, citizens will be informed of Cristal project and activities by an exhibition presenting the results of the city study, a video on the Strasbourg’s demonstration.

Partners of CATS consortium will contribute to conferences and debates organised during a workshop.

One of the main objectives of this WP is to compare the ex ante evaluation (virtual integration) by an ex post evaluation, organised in realistic conditions of use: all scenarios virtually analysed in WP3 and validated by the consortium will be tested in real conditions for a highly detailed condition of comparison. A selection of end users will be made in order to operate the system during a significant period (5 months), in all conditions of operation: urban shuttle, self service and “collective taxi”, and in order to analyse all eventual dysfunctions of the system and provide to LOHR Industrie the best
recommendations for the final integration and deployment of the Cristal system.
For Strasbourg, the demonstration will be made in link with the existing transport network.
The WP5 questionnaires will be used.

**T.4.1. Project presentation for Strasbourg- [Leader: CUS] (M21 to 25)**

The project will be presented to the citizens in order to explain the objectives of the cities and the potentialities of the system. It will be explained how mobility could be improved by such a system. The information of the citizens will start at month 2 of the project and will be running until the end of the project.

This task also includes driver training : indeed, bus drivers of the local transport company will be trained by Lohr to drive the CRISTAL vehicle. They in turn will provide training to the citizens for the self service use of the vehicle.

For the shuttle and the convoy mode, professional bus drivers will run the system.

**T.4.2. Construction and demonstration of the system (5 months ) for Strasbourg- [Leader :CUS] (M21 to M30)**

Two stations will be constructed in Strasbourg in the selected site. All necessary civil works will be conducted in order to integrate the demonstrators in real conditions of use: the location of the demonstration itself will be the result of the preliminary Strasbourg city study.

The station will be fully refurbished with information and ticketing equipments, an information system dispatching real time information on vehicle availability will be implemented.

LOHR will also supply four vehicles for this demonstration. The two possible type of usage offered by the system (self service mode and shuttle mode by means of vehicle convoy) will be tested in real operational conditions, with end users. Those end users (citizens, local association, local operator...) will be selected to follow all operating scenarios (car sharing/self service, urban shuttle, on demand convoy, modal transfer, information, survey and maintenance).

The demonstration will be carried out over a period of 5 months and will allow regular and specific use of CATS.

2 groups of users will be targeted:

- the first group (regular users) previously recruited will be clearly identified and followed, and will allow the analysis of the daily interest of the CATS’ system in order to evaluate the relevance of this system in comparison to the other modes of transport that the end users used before (the car in particular)

- the second group (specific users) will allow the random experimentation of the system, in parallel to the use by the regular users. This second method of experimentation is more restrictive because it entails the inscription of the users for each trip (driving licence, insurance, permits by LOHR and so on), and will offer the advantage of gathering other information that the CATS system will provide with regards to changes in mobility patterns (observation of the specific use by the tourists who would discover the system for example).

These 2 experimental methods will allow to cover the needs of mobility offered by CATS (daily, regular, occasional travels) over various distances. Besides, such an organisation of the system will ensure the experimentation of the system in its different forms (use of shuttle, self service in lean periods).
At the end of the 5 months demonstration period, the system would have been widely used in its various forms of self-service and shuttle and for different reasons (residence-work, shopping, leisure time activities, discovery and so on). The analysis of the impact of CATS on urban mobility will be better when based on the observations of the actual use and implementation of the system once there is a complete set up of the system with several stations and vehicles.


The demonstration in Strasbourg will be in real conditions and integrate station operation, while in Formello the showcase will be take place during several days (according to involvement of local authorities) with a presentation of the vehicles..

The standards and the regulations will be identified for Ploiesti and Formello

In Ploiesti and Formello, the results of the city studies will be organised and presented through exhibitions, with other dissemination supports (videos, modelisations, virtual demonstrations, posters, leaflets, etc.). These exhibitions will be introduced in an existing event dedicated to mobility problems and solutions or in a special event organised for the cause of the project.


This task includes making of and analysis of surveys done towards the system users. These surveys will deal with issues such as

- Ergonomy, accessibility, acceptability of the system and its technology, security, pricing policy or mobility trend.
- Environmental impact: noise, saving on CO2 emissions, impact on climate change, energy efficiency measures.
- Accessibility
- A specific survey will be made to highlight interactions and/or potential problems regarding the complementarity with the existing transport network.

To complete the users’ quantitative surveys, EPFL will deploy on-site observation methods of real-time user behaviour, namely at the stations, in order to evaluate accessibility. Furthermore, accompanying users in several selected trips and systematically gathering their thoughts "on the go" through qualitative interview methods will allow for measuring the acceptability of onboard technologies and interactions with other road users.

**Deliverables**

D.4.1. 4 vehicles and 2 Stations (M25) LI
D.4.2. Operating system in Strasbourg (M30) CUS
D.4.3. Operating showcase and exhibition in Formello (M32) AREMOL
D.4.4. Exhibition in Ploiesti (M32) PLP
D.4.5. Data collection and analysis (M30) EPFL
Work package number | 5 | Start date or starting event: | 9 and 28
---|---|---|---
Work package title | Impact assessment
Work package Leader | CTL
Activity Type | RTD
Participant number | LI | CUS | GEA | AREMOL | TECHNION | CTL | EPFL | PMP | Total
Person-months per participant: | 4 | 2 | 2 | 0 | 9 | 12 | 6 | 3 | 38

Objectives
In this work package, impacts of the system will be studied. The impacts concerned are those regarding: multimodality/intermodality (and especially complementarity with other transport modes and impact on modal shift from the car), mobility, environment (and especially the absence of CO2 emissions), social and economical issues linked to the system. Another specific item deals with the acceptance of the system and the evaluation of its market take-up.

A system exploitation plan will be elaborated taking into account barriers, facilitators and other deployment conditions, as well as actors, legal aspects and certification issues.

Description of work

Task 5.1 Evaluation plan– [Leader :CTL] (M9 to M12) and (M28 to 34)
Having in mind the various types of impacts listed hereafter, this task will identify a selection of pertinent indicators with their measurement methods. This task also includes the organization of a process of citizen consultation in the partner cities.

Task 5.2 Ex post evaluation- [Leader: CTL] (M28 to 34)
This task is deals with the evaluation of the following issues

Sub task 5.2.1 Multimodality and intermodality Impacts
This subtask is based on the VOLTair methodology application, the latter being one of the results of the CyberMove project (FP5). The methodology is intended to evaluate transportation tools through the identified needs, to link the pertinent ones into effective “mobility chains” adapted to different types of moves, including services and infrastructure dedicated to intermodality optimisation. The level of “interoperability” of all existing and planned transport systems will be evaluated, in order to provide recommendations for different types of urban structures.

This task then leads to the specification of the role of the Cristal system and to the definition and optimisation of the adapted intermodality services and infrastructures.

Sub task 5.2.2 Mobility impacts
This subtask will evaluate the impacts on mobility in the three selected zones (Ploiesti (RO), Strasbourg (F), Formello (I)). The CRISTAL system is not to be introduced as an isolated transportation system in a city. Apart from the demonstrations of WP4, it is clear that the introduction of such a system has to be conceived, from the very beginning, as part of a global system in order to see how it can be complementary to other existing...
systems (or forecasted for the future).

Specific attention will be drawn on the fact that modal transfer to this type of innovative system should come mainly from the private cars and/or from saturated collective transport systems. Ideally, for example, it should not bear too much of a consequence on bike use: CATS will analyse what measures could be taken to lower the competition with soft modes.

**Sub task 5.2.3 Energy and environmental impacts**

These impacts will be evaluated as follows: the planification of the Cristal system operation will include the definition of one or more representative driving cycles. For those, the energy utilization will be estimated and optimized by using a simulation algorithm similar to that applied in the CyberMove Project. Based on it and the efficiencies of the energy conversion and propulsion systems, the total inventories of energy consumption, pollutants and CO2 emissions (from the power plant) will be calculated. These will be compared to the energy usage and emissions in the current situation from cars to be replaced by the Cristal. The gain, i.e. emission reductions and energy saving, will then be assessed.

**Sub task 5.2.4 Social impacts**

The need is to have an easy access to inner city travel. This sub task will evaluate, for the three demonstration sites, how -and how much- the mobility (with a special focus on elderly, people with reduced mobility or with young children…) is improved by the proposed completion of the existing public transport. A system such as CRISTAL might be a way to bring people to heavy modes stations. However, one should not underestimate the social acceptability of such an innovative system, especially the ageing population.

Social acceptability also deals with a tariff (fare) policy adapted to what users are ready to pay for such a service and to how much a financial contribution a local authority is ready to provide for its citizen mobility with such a system. There is a balanced economic threshold that needs to be found (see also ST.5.2.5 below).

**Subtask 5.2.5 Economic impact**

The economic impact of a system such as CRISTAL for local authority and their territory and for the citizens will be studied here. This is closely linked to the work performed in WP1, 2 and 3, especially with the complementarity / the competition with other transport modes. It includes issues such as tariffs, cost of the system, better economic result and recommendations considering the characteristics of the operating zone in the city.

This sub task will define which range of fare should be applied and how the tariff policy can be integrated in existing ones (public transport networks). This analysis mainly relies on how the focus groups value the use of the system and is conducted in partnership with the local transport operators. One possibility to be considered is adoption of free rides for people with reduced mobility, reduced tariff during off-rush-hour traffic…Taking into account inputs from the other WPs of the Project the expected operating balance of the Cristal system will be established, integrating investments and operations costs, potential incomes from the traffic and subsidiary incomes (advertisements, commercial partners,…) and environmental, societal and economical benefits.

**Task 5.3 Transferability-[Leader: Technion] (M30 to 34)**

Under this task, the partners will be using the results obtained on the sites after the demonstration and show case to compare them and analyse which are the benefits for different sites, especially in the New member states. The transferability to other European cities of the three set of data will be studied, the Strasbourg data being the more complete (construction of 2 stations).
T.5.4 Attitudes toward multimodality, acceptance and subsequent practices – EPFL-[ Leader: EPFL] (M28 to 34)

In a set of multimodal uses, self-service is often seen as the missing link between individual transport modes, such as the car and other modes, such as public transport, walking and cycling. This alternative allows people to renounce having their own vehicle or a second vehicle in the household. Acceptance of substituting ownership value for use value is an important step to measure here, especially in regard to maintaining the symbolic status of mobility while changing the way of being mobile.

Self-service has been growing steadily in Europe and the States, but its market potential, albeit great, suffers in the eyes of its users-to-be from a confusion between self-service and car-pooling, and an image of technical experimentation, where new car-embarked technologies may seem difficult to master. Market acceptance of technical innovation will thus be the object of fine-grained measures to identify where potential obstacles are situated. Another important factor is the simplicity and flexibility of the booking system. En-route modifications are usually welcomed as a real plus. User satisfaction with these possibilities regarding CRISTAL will be measured through a specific set of questions.

Vehicles on-demand have no parking constraints and no maintenance costs for the user; they are therefore considered, as EPFL-LaSUR and other studies have shown, as an interesting alternative investment to car ownership in answering punctual mobility needs of not only individuals but enterprises as well. From the standpoint of professional mobility needs, which are often punctual but repeated from time to time, optimising their mobility needs through the use of outsourced vehicles that “exist” only when requested is considered by enterprises as a pragmatic solution that has also the advantage of being economically and ecologically sound. Measuring professional mobility expectations and how CRISTAL may fit into an enterprise’s sustainable mobility strategy is thus crucial to appreciate how this offer could meet this particular demand.

Booking ahead and the subsequent need for programming in advance the use of car-sharing is usually seen as a constraint if people have to book too much beforehand, but it is also considered an advantage, as booking does ensure vehicle availability. Network density is crucial in this respect: the number of vehicles available at any given station and nearby stations has to be enough that last minute booking is still possible most of the time. Thus an important factor is how near the stations are to the users’ location and how accessible they are. This factor being quite crucial to WP2 task of optimising the network, it will be given special consideration in the surveys. The resulting optimised network will here be considered in its adequacy (or not) to market conditions.

Most people who have adhered to a self-service system remain faithful to it over the years, except when a major change of lifestyle occurs, influencing mobility behaviour (change of residence, job, arrival of a child, etc.). Interest for self-service when such changes occur will be measured through a specific set of questions.

Advantages mentioned for self-service, such as being practical, fast, simple to use, are bound to be the same as those mentioned for other modes of individual use, such as the car, the motorcycle or the bicycle. Comparisons between the CRISTAL system and more “traditional” individual transport modes will be sought and analysed to gain a better understanding of what are the advantages users hold in high regard and what makes them consider transferring modes.

Complementarities regarding public transport use as well as possible negative transfers
(where users abandon public transport in favour of CRISTAL) will be studied in detail. This market study wouldn’t be complete without taking into account potential transfer from human-powered modes such as walking and cycling. The use of CRISTAL for relatively short distances will be broken down by motives, typologies of origins/destinations and preferred itineraries, in order to better understand these particular transfer possibilities.

For people who have a low perception of the car (respectively of public transport), regardless of whether they use it or not, there might be a strong potential to switch to a car-sharing mode use such as the one CRISTAL allows. This potential will be measured through specific sets of questions measuring stated preferences for transferring to CRISTAL from previous car use (or using it to complement public transport use).

**Deliverables**

D.5.1. Evaluation plan (CTL, M12, M34)
D.5.2. Ex post evaluation report (CTL, M34)
D.5.3. Transferability assessment report (Technion, M34)
D.5.4. Roadmap to the market (EPFL, M34)
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**Objectives**

The objective of the work package is to prepare and support the exploitation and dissemination of the results of the project. Consequently the work package “Dissemination of CATS results” has to achieve the following objectives:

- To provide the interface to the EU services and external actors
- To offer the strategic interface for the project with reference to the EC policy issues.
- To widely disseminate project concept, developments and findings to all key actors in the field in an interactive way, integrating their feedback at key points of the specification, design, development and evaluation work.
- To issue exploitation plans for key project results.

**Description of work**

**Task 6.1 Dissemination (ERT and all other partners)**

**Dissemination Tools (ERT)**

- **Logo**: the first step for a good communication is to deliver a project logo and to issue some Recommendations and Templates for project documents. This will be done, by ERT during the first Month of the Project.

- **Website**

  **Public part**: The project web site will be designed and implemented on the Internet, by ERT. It will include public documents, deriving from the project work, which will be regularly updated, offering links to other interesting sites and links to partners’ web sites. The objectives of the website are to provide general information in English language about the project and to communicate about the results of the project. **Private part**: The web site will also include a private part aimed at easing the communication amongst partners of the project. This private part will include the following features: document management, contact list, calendar of events.

- **Leaflet**: At an early project stage several dissemination materials will be published.

- **Newsletter**: In the course of the project, a short newsletter will be edited and published. This newsletter will provide dedicated information about the project results and achievements. Three issues of the Newsletter are planned.
A **video** will be realised during the demonstration in Strasbourg by INRIA team. It is a contribution in kind from INRIA. This video will be presented during the show cases in Ploiesti and in Formello.

A PPT presentation of the project as well as a Fact sheet will be prepared at an earlier stage.

### Scientific Communication (ERT)

To increase the interest for the project results and to enhance the dissemination of project results, dedicated communication activities will be implemented. This will be done by the organisation of special sessions during exiting Conferences and by the setting-up of a final workshop. During the life of the project, Special Sessions during Conferences or Congresses are preferred as the impact is often higher that with a dedicated workshop. To feed the research work within the project, particular attention will be given to the invitation of stakeholders to attend special sessions and final workshop (at their own expenses). The idea is to exchange with these stakeholders during the sessions and to include the results of these exchanges in the project global thinking.

The participation to congresses and key conferences is already planned. To address more specifically the stakeholders of the projects some events have already been targeted. The partners may submit papers and proposal to have special session, for example in:

- Polis annual conference
- UITP
- ERTICO
- TRB
- TRA,
- CIVITAS
- ITS Congress

At present time, as the calls for these conferences are not known, it is not possible to specify the partners that will be involved. The choice of partners will be made on a case by case basis. The above list however is not exhaustive. At last, Partners will be encouraged to publish articles in Scientific Journals, based on or referring to the work achieved in the project.

The information will be also spread by internal Journal for example CUS Magazine, local press and also by TV. During the demonstration in Strasbourg, a communication is forecast as well as Ploiesti and Formello where the show cases will be taken place.

Furthermore, some links with the NICHES project and other related projects (PICAV, TRANSIMUM FOR ALL) will be developed during the period of the project CATS.

In addition, the city of Strasbourg plans to quickly integrate cities network as "Move on CityMobil" or "CityNetMobil". Their activities are based principally on one hand, upon administrative planning and results, on the other hand upon technical experimentations and integrations. A demonstration is planned before the end of the project, integrated in urban real conditions of functioning and exploitation: this could be a real opportunity to organise one club’s meeting with this integrated demonstration. GEA could lead with LOHR this dissemination activity.

### Task 6.2. Exploitation (ERT and all other partners)
The purpose of the task is to make sure that partners are following the rules that will be stated in the Consortium Agreement signed before the contract. It deals with an optimal and consented use of intellectual property rights.

To do so, and in order to ascertain ownership of knowledge, an exploitation plan will be issued and continuously updated during the life of the project. This plan aims at specifying the property rights and at determining for each participant the way it will use the knowledge gathered during the project. This task will be based on the agreement formulated in the consortium agreement.

**Deliverables**

D.6.1. Website (ERT, Month 4)
D.6.2. Leaflet (ERT, Month 6)
D.6.3. Newsletter (ERT, Month 9)
D.6.4. Video (INRIA, Month 30)
D.6.5, 6.6., D.6.7: Exploitation plan (ERT, M13, M25, M36)
D.6.8. Showcase activities (INRIA, Month 32)
D.6.9. Dissemination event – Special Sessions and Final Conference in Strasbourg (see dissemination plan) (CUS, M36)
### Table 1.3.e: Summary of staff effort

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2. IMPLEMENTATION

2.1. MANAGEMENT STRUCTURE AND PROCEDURES

Taking into account the size of the consortium and the type of activities that have to be carried out, it is proposed to organize the management structure on simple principles of governance. Therefore the objective is to set-up a lean management organisation. To ensure a good management of the project it is anticipated that there will be at least 1 consortium meeting every 6 months. The Project will start with a Kick-off meeting that will take place during the first months of the Project. A private area will be implemented in the Website site. This private area will mainly give access to all documents and partners contact information.

The management will be performed by:
- The Steering Committee
- The Coordination Team.
- The WP leaders

The Management structure is based on the diagram below.

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**Coordination team**

Mr Jean François Argence (LI) is the Coordinator for CATS.

He shall have the responsibility for the scientific, financial and administrative management on a day-to-day basis. He will be the chairman of the steering committee and the intermediary between the consortium and the European Commission.

In particular, he will carry the overall responsibilities for:
- Monitoring and reporting of progress, deliverables and milestones
- The preparation and the running of the meetings
- Authorizing payment to partners after verification of the technical work done
Proposing to other partners solutions and contingency plans in case of delay, discrepancies or when a technical choice has to be made.

He will be supported in this task by the Project Manager ERT. ERT will be in charge of the administrative and financial tasks so as to permit the rest of the consortium to focus on the scientific and technical matters. It will perform the following administrative tasks:

- Administering the Community financial contribution regarding its allocation between beneficiaries and activities, in accordance with the grant agreement and the decision taken by the consortium. The coordinator shall ensure that all the appropriate payments are made to the other beneficiaries without unjustified delay
- Managing delivery and follow-up of administrative and financial documents
- Being a permanent contact point for the Coordinator and all the partners regarding their participation in the project
- Easing the coordinator of administrative tasks and notified the consortium of due dates
- Preparing and organizing all the meetings
- Reviewing the reports to verify consistency with the project tasks before transmitting them to the Commission
- Following up the project expenses and tracking deviations, ensuring that all appropriate changes are recorded accurately in the cost baseline, preventing incorrect, inappropriate or unauthorised changes.

**Steering committee**

The decision-making is under the responsibility of the Steering Committee. Its role is to decide about the high-level of management issues, including mainly technical, financial, exploitation, dissemination, planning and control matters.

The Steering Committee is composed of the Coordinator and one representative from each contracting partner. Its role shall deal with but not be limited to the following matters:

- Political, scientific and strategic orientations of the project
- Follow-up of the progress regarding to the objectives, approval of the corresponding reports, including the activity reports to be submitted to the European Commission
- Modifications to the work packages
- Selection, among the results of the project, of those offering a strong potential that might lead to specific projects or innovation-related activities
- Follow-up of intellectual property rules, including press release and joint publication
- In case of default by a contractor, decision upon its exclusion, how to re-organize the project activities and the if necessary the replacement of the defaulting contractor
- Decision upon the allocation of finding and approval of the financial report
- Amendments to the Consortium agreement.

Therefore, the steering committee is well suited to cope with the collective responsibility of the consortium for the technical implementation of the project CATS. It will pay attention to all problems related to the technical implementation.

Potential solutions to overcome those issues are being detailed in the consortium agreement.
The model of consortium agreement will be the DESCA. Decisions may have an impact on documents such as the contract signed with the EC and or the consortium agreement. The co-ordinator has the responsibility to notify the EC any change that would alter the contract signed with the Community to get their approval. He is also responsible for updating the consortium agreement once modifications have been approved and for making amendments signed by all contractors.

**WP Leaders**

The work-package leaders of CATS project are:

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<th>Leader</th>
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<tr>
<td>WP6</td>
<td>Dissemination and Exploitation of CATS results</td>
<td>ERT</td>
</tr>
</tbody>
</table>

The steering committee may appoint another WP leader in case of default.

The work package leaders are responsible for the performance of specific work packages (WP).

The WP leaders will:

- Manage the research activities included in the WP
- Collect the data from the participants as a basis for the progress reports
- Make proposals to the Steering Committee regarding the improvement of the activities
- Propose an allocation of technical and human resources, if needed
- Identify the risks and the Steering Committee in case of delay which could affect the planned activities

**Decision-making**

The Steering committee will meet every 6 months. An agenda will be proposed by the Coordinator. During those meetings, all decision should be taken by vote under simple majority. All decisions-making procedures will be defined and detailed in the consortium agreement.
2.2 INDIVIDUAL PARTICIPANTS

**Organization: LOHR Industrie**

**Short name: LI**

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### General Description

LOHR is a private-owned French group. For over 40 years, it has been the world specialist in the design and manufacture of transportation systems for goods and people. Its main activities relate to the transport of vehicles: car-carrier truck, piggy-back transportation, ModaLOHR (rail-road) and to public transport, with the TransLOHR (tramway on tyres) and Neoval (automatic light rail, in cooperation with Siemens T.S.).

As the European Commission only acknowledges one corporate body per partner, LOHR Industry is the official one for the CRISTAL project. However, the Industrial Research Centre in Automatic Light Transport Systems (CRISTAL), is structured on different groups: the industrial group specialized in the design and manufacture of urban transportation systems (LOHR), a national competency centre dedicated to computer science and automatism (INRIA and its partners) and on planning and integration specialized partners in charge to define the functional specifications of the platform (TRANSITEC SA), in order to guarantee the best introduction and use of urban zones.

### Main expected tasks

Coordination, WP 4 (stations construction, vehicle provider)

### Main staff members to be involved in the project

- **Jean-François Argence** is Sales Manager for France for Lohr Public Transport activities, more effectively in charge of TRANSLOHR. He is a lawyer. He started his career in charge of an institutional legal public service, and then became Principal Private Secretary of the Strasbourg Mayor, in charge of the urban transport and of the development of the new tram network in the city, until 2001 elections. Then he has integrated the LOHR Group.

- **Jean-Luc ANDRE**, R&D Director, in charge of the development for new products of LOHR Group: Car carriers, tramway, rail-road, special vehicle.

- **Didier MANDART**, designer. He has designed the new tramway on tyres Translohr.

- **Christophe BINDER**, technical expert for motorization and energy.

### References

**Car-Carriers:** The design, manufacture and marketing of equipment designed for vehicle transportation have been, for over 40 years, an essential activity at LOHR industrie. Its field of operation has progressively grown so as to enable the company to be present today on all 5 continents.

**Rail-Road:** The MODALOHR, developed by LOHR Industrie, with a low floor and articulated wagon, enables the quick, safe and economical transhipment of standard semi-trailers from the road.

**Public transport:** The TransLOHR, thanks to its travelling on tyres, is a part of the new generation of light-rail urban tramways. Being a real tool to re-conquer the urban space and to transform the city as well as its use in-depth, it offers a unique ease of urban insertion thanks to its manoeuvrability and its man-sized gauge.
Organization: Europe Recherche Transport  
Short name: ERT  

General description  
Europe Recherche Transport is a private commercial organisation, directly controlled by INRETS (French Research Institute for Transport and Transport safety). It was created in 2003 under the status of society by simplified action (SAS).

Its core activity is to support various types of organisations and entities in the building up and in the management of National, European or International research projects linked to transport issues.
In doing so, ERT might be in charge of the day to day management of the project, including financial issues, of dissemination activities and/or of quality activities.

Main related expertise  
ERT staff is specialised in project management, legal issues, quality assurance issues, and communication issues. ERT is currently involved in 12 European research projects, among which half as a coordinator. This includes all type of EU instruments, from SSA to NoEs.

Main expected tasks  
ERT is the project coordinator and is in charge of administrative and financial management of the project. As project coordinator, ERT is involved in administrative and financial management, project quality assurance and quality assessment. ERT will also be involved for setting up dissemination plan and developing dissemination tools, and for managing the exploitation plan.

Main staff members to be involved in the project  
Dominique Fernier, ERT CEO, has BS & MS degrees in Mechanical Engineering and a MBA. His expertise includes products based business, engineering and services sales in Europe, North America and South America. His experience includes more than 6 years of various experiences in European research projects on vibration and acoustic in the transport field. He is membership of the US Society of Automotive Engineers and French Society of Automotive Engineer.

Fabienne Janin, master in Biology, post graduate in marketing and management, is involved in the management of European projects since the FP5 and well aware of other European programmes such as DG SANCO, INTAS. She will be the project manager.

Farida Idir, master in Editorial Management and Internet Communication, has more than 9 years marketing experience, communicating to both corporate & SMEs. She is in charge of dissemination for many European research projects from FP6 and FP7.

Organization: Communauté Urbaine de Strasbourg  
Short name: CUS  

General description  
Created by the law of the 31st of December 1966, CUS is a tool for cooperation between municipalities, in order to provide a frame to their developments.
3 CUS departments are involved in CATS.
This unique organisation is led by an assembly, which consists of the municipal Council, representing the residents of Strasbourg and the council of municipalities, representing the municipalities of the Urban Community. Competences are shared between these two structures. The Urban Community is busy with urbanism, local urbanisation plans, economic development, public roads (1000 km of roads), swimming pools, main infrastructures and main sport events…, water and sewerage, cleanliness, transport and mobility, car parks, social housing, that is of common interest for all municipalities and rationalize their intervention. Authorities in charge of regulation between the urban community and the municipalities have been created.

The “Transport and travel department” elaborates and implements the travel policy for all modes of transport on the entire territory, including public transport (tram, tram-train, park-car constructions). It also defines the "Schémas Directeurs" for transport, local travel plans, road and park travel plans. It oversees the implementation of these policies through the follow-up for operators and public services delegation.

**Main expected tasks**
WP4 – T4.1 and T4.2

**Main staff members to be involved in the project**

Ronan Golias is head of the Transport and mobility department of the Communauté Urbaine de Strasbourg. This department is in charge of transport planning, the building of transport infrastructures (tram network extensions, public car parks), the management and control of the public transport operator, the day to day management and promotion of alternative modes of transport. Till 2007, he was head-assistant of the Transport Planning Policy section of the Street and Transportation Department of the City of Paris. He was in charge of the parking policy, mobility management and a prospective program of reduction of car use by limitations of access.

From 1996 to 2002, he was head of the department of Planning, Environment and Transport systems of the GART, the French association of local political authorities in charge of transport planning and public transport.

Timothe Kolmer is currently in charge of transport prospective studies at the “Communauté Urbaine de Strasbourg”. Thus, he contributes to the realisation of the community Mobility plans and to innovative projects. Beforehand, he also worked on sustainable mobility thematics as he was consultant in a transport consulting office and as he participated to the implementation of the Velo’V project in Lyon. He made urbanism studies, with a large specialisation concerning transport questions, at the "Institut d’Urbanisme de Paris” and the “Ecole Nationale des Ponts et Chaussées”.

Jean-Baptiste Schiber has been joining the Departement for International and European Affairs of the Urban Community of Strasbourg since January 2009. He is in charge the implication of Strasbourg in european networks and the facilitation of both project identification and management with support of the European Community. His skills are based on a ten-year-experience within the INTERREG joint technical secretariat by the French-German Managing Authority of the Euroregion PAMINA and an expertise in public crossborder cooperation in the Upperrhine region at the Préfecture de Région Alsace. He has a strong training in political science and obtained a master in international relations and european affairs.

**References**
To make the built-up area more attractive and to answer the issues of mobility, the City and the CUS have launched a public debate about the impact of car usage in the city. It has given birth to a synthesis of the reflection, and then to the settlement of concrete and coherent initiatives called “Ecomobility in Action”, which became the backbone for a new travel policy. Today, Ecomobility is firmly implemented, and takes account of the city and its transport in all their aspects and constraints. Three main ideas come to support it:

- A sound car usage and behavioural shifts in favour of alternative transport, and especially tram and bikes.
- To protect the accessibility and the living environment.
- To reinforce road safety and prompt people to respect road regulation.
- Economy, ecology and “ecocivism” are clearly taken into account in the ecomobility action of the Urban Community of Strasbourg. The need of sustainable development is a central issue of Strasbourg’s development objectives, to find a balance between quality of life, economic development and protection of the environment.

Strasbourg studied under the COMET project (2001-2004) within the specific research and technological development programme (“Energy, Environment and Sustainable Development”) how to transfer tertiary activity from the centre of European Agglomeration to the outskirts.

In 2003, the City of Strasbourg created the “Club de Strasbourg”, a network of 38 municipalities from 13 countries from East Europe, to face the prospect of a widening of the European Union and has developed several operational projects:

- Training to financial tools of the European Union and experience exchanges
- 2 days training to learn using structural funds (September 2004);
- 4 days training to new European Programs in order to co-finance some sustainable development projects with the help of the French Ministry of Foreign Affairs, following its call to a decentralized cooperation project (16th-17th October and 29th-30th November 2006)
- Experience exchanges on urban transports and travels

5 study seminars within the urban transports and travels network with the help of the European Union in the URBACT programme framework (May 2005-May 2006).

Organization: GEA J-M Vallotton et T. Chanard SA
Short name: GEA

General Description
GEA is a Swiss private office specialized in urbanism, land and regional planning. Its multi-disciplinary team of 25 collaborators is composed of architects, urban designers, engineers in environment, landscape planning and biology, jurist.

GEA is existing for 35 years. Its large experience with the policies of many Swiss cities is based upon very efficient multi-disciplinary consultation methods.

Main related expertise
GEA is especially working on urban mobility aspects for 20 years.

GEA has been partner of the CyberMove consortium (5th PCRD) and is currently partner of CityMobil consortium (FP6). It has conceived (in partnership with Transitec SA) the "VIP methodology" concerning the use of Individual Public Vehicles in urban centres and the "VOLT'air's methodology", additional deliverable of the CyberMove program, concerning universal approach for conception and integration of automated transport systems in urban centres.

Since CyberMove program, GEA has organized in collaboration with INRIA, 2 major Cybecars
demonstrations (Antibes Fort Carré / Port Vauban, CyberMove June 2004; Nancy Place Stanislas, MobiVip June 2005). GEA is currently involved in R&D concerning the use of electric vehicles in new forms of urban mobility: creation of the European showroom of Eco-Mobility (Move on Montbéliard) and of the European Club of Eco-Mobile cities (Move on CityMobil) in Montbéliard and Cluster “Vehicule du futur” (2007), conception and coordination of the Cristal Project, innovative transport system developed in Strasbourg and Montbéliard.

Main expected tasks
WP 1 and Task 1.1

Main staff members to be involved in the project

Thierry Chanard is director, master of architecture, EPFL Swiss Federal Polytechnical Institute of Technology of Lausanne), 1985.
Urban designer, Thierry Chanard is personally involved in all R&D innovative transport systems studies: conception of the VIP’s and VOLTair methodologies.
Conceptor of the Cristal transport system, Thierry Chanard is involved in a lot of dissemination and deployment actions (congresses, showcases, conferences, etc.). Expertises in many historical and touristic sites for CTS integration (France: Grenoble, Nancy, Antibes, St Raphaël and Switzerland: Lausanne, Monthey, etc).

Patrick Berno is collaborator, landscape designer, master of landscape design, graduated from the Landscape planning school of Lullier (Geneva). since 2006. Patrick Berno is involved in all integration aspects.

Laure Boiteux is collaborator, architect, master of architecture, graduated from the school of architecture of Strasbourg, since 2007. Laure Boiteux is specialized and involved in all integration aspects, in Cristal project coordination.

Organization: Institut National de Recherche en Informatique et Automatique
Short name: INRIA

General description
INRIA, the French national institute for research in computer science and control, is the only French public institute entirely dedicated to research in information and communication science and technology (ICST). 2 INRIA departments are involved in the project.

Throughout its nine research units located in different regions, INRIA has a workforce of 3,600; 2,800 of whom are scientists from INRIA and its partner organizations. INRIA has an annual budget of 180 million euros, 30% of which comes from its own research contracts and licences. INRIA plays a leading role in the following fields: "networks, telecoms and multimedia", "complex systems and software" and "modelling, simulation and visualisation". As its strategy closely combines scientific excellence with technology transfert, it develops collaborations with the economic world through strategic industrial partners and by creating companies (80 start-ups in 20 years) - particularly through its subsidiary INRIA-Transfert, participating in four venture capital funds.

INRIA is partner in about 120 FP6 projects (90 of them in the IST priority).
The department **IMARA** (Informatique, Mathématique et Automatique pour la Route Automatisée) has been involved over the last 15 years in the application of Information Technologies in the field of intelligent road transport and in particular in driving assistance and automation. IMARA was the coordinator of the CyberCars Project and is currently the coordinator of CyberCars-2. The IMARA department is now closely linked to the robotics group of Ecole des Mines de Paris directed by Claude Laurgeau. MinesParis, INRIA and ARMINES have signed a collaboration agreement establishing the Joint Research Unit *LaRA* (La Route Automatisée), hence these entities can be seen as one single team which now works on several common projects such as Cybercars-2. They will work jointly under the same budget distributed by INRIA using the special clause 10 of FP7 Grant Agreement. LaRA comprises about 60 scientists, which have been involved in many European Projects such as VISIMPLANT, CARSENSE, CAMELLIA, REACT, C2REACT, CyberCars, CyberMove, CyberCars-2, CityMobil. The LaRA group works also in close cooperation with several research teams at INRIA and in particular with e-Motion specialised in mobile robot research and Hipercom, a team specialised in wireless communications.

**Main expected tasks**

WP2- Task 2.1, 2.2 and 2.3

The role of INRIA in CATS is to bring its expertise in the development of car-sharing systems and in the operation of automated or semi-automated vehicles. In particular, INRIA will design the operating principles which will govern the operation of the system. Furthermore, it will develop a large simulation tool to validate and optimise the 2 concepts of car-sharing and flexible bus and demonstrate the impacts which should be expected.

**Main staff members to be involved in the project**

**Dr. Michel Parent** - Michel Parent is currently the program manager at INRIA of the R&D team on automated vehicles (IMARA research group). He was also the program coordinator of the European project CyberCars (www.cybercars.org). This program has resulted from the development at INRIA of a new type of vehicle called the CyCab which includes drive-by-wire and automatic driving and is now manufactured by Robosoft, an INRIA start-up company. He now coordinates the follow-up project CyberCars-2 and he is involved in Have-IT, InterSafe-2 and in CityMobil.

Michel Parent has a strong interest in the development of innovative transportation systems since the 1990's when he moved to INRIA to work on Praxitele, the first advanced carsharing system based on electric cars and advanced information and communication technologies. Michel Parent has also a strong interest in robotics aids for the handicapped. He was the assistant director of the Spartacus project in the 1970's and he developed the first computer controlled wheelchair in 1980 while at Stanford University.

**Dr. Fawzi Nashashibi** - Fawzi Nashashibi has been senior researcher in the robotics centre of the École des Mines de Paris since 1994. He is an R&D engineer and a project manager at ARMINES since May 2000. He was previously a research engineer at PROMIP and a technical manager at Light Co. Education: MSc in Automation, Industrial Engineering and Signal Processing, PhD in Robotics from Toulouse University and finally HDR (Accreditation to research supervision) from University of Jussieu (Paris 6). His main research topics are in environment perception and multi-sensor fusion, vehicle positioning and environment 3D modeling with main applications in Intelligent Transport Systems and Robotics. He played key roles in several European and national French projects such as Carsense, ARCOS, LOVe and
he is also involved in much collaboration with French and international academic and industrial partners.

**Dr Arnaud de la Fortelle** is civil servant at the French Transports Ministry and is currently Director of the Joint Research Unit LaRA (see above). He manages for LaRA several French and European projects (Puvame, Prevent/Intersafe, REACT, COM2REACT...) He has a Ph.D in Applied Mathematics and engineer degrees for the French Ecole Polytechnique and Ecole des Ponts et Chaussées.

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**Organisation: Israel Institute of Technology**

**Short name: Technion**

**General description**

The Technion – Israel Institute of Technology is Israel’s primary and oldest technological university (founded in 1924), ranks among the leading technological universities in the world. The Technion offers pre, graduate & postgraduate students the opportunity to pursue world-class research in sciences, engineering, industrial management, economics, medical school, and many other fields. The Technion has over 13,000 students, 25% of them graduate students. With the merging of science and technology, and research becoming multi-disciplinary to a large extent, the Technion consists of 18 faculties and over 30 research institutes & centers, all circulated around a flexible organizational structure, enabling it to respond to new and interdisciplinary research priorities.

**Main related expertise**

The Internal Combustion Engines Laboratory (TICEL) is part of the Research Center on Energy Engineering and Environment Protection at the Faculty of Mechanical Engineering. Some of the Lab projects are carried out within the framework of the Technion Transportation Research Institute (TRI). TICEL current research activities in the areas of transport, energy and environment include: assessment of vehicle emission factors; study of vehicles urban driving patterns; assessment of exposure of road users to air pollution; environmental and economical aspects of alternative transportation systems; environmental friendly vehicles (electrical, hybrid or powered by gas, or alternative fuels) – developing of technology and forecast of the impact of their market penetration.

**Main expected tasks**: WP5 Task 5.3

**Main staff members to be involved in the project**

- **Prof. Yoram Zvirin** is the TICEL Head and has served as TRI Head. He coordinated, with INRIA, the preparation of the CyberCars and CyberMove proposals, and then was involved in the research work throughout the Projects, in the fields of energy and environmental impacts. He has been involved in the EU ARTEMIS Project, COST346 and CANTIQUE Programs. He is leading the TICEL group in the CityMobil EU project. He has also served as the Director (CEO) of the Israel National Museum of Science, gained international recognition for his work on transport and thermal science. He has worked in the USA, France, UK, Italy, Switzerland, Japan and Korea.

- **Dr. Leonid Tartakovsky** is the TICEL Chief Engineer. He joined the Group in 1992 after immigrating from the ex-USSR, where he worked at the Research Center for Testing and Refining of Motor Vehicles, Moscow, and served as Head of the Engines Laboratory. He has gained much experience in the field of vehicle road tests, emissions control, engine exhaust gas aftertreatment, alternative fuels, electric and hybrid propulsion systems. He played key roles in the European Projects ARTEMIS, CyberCars and CyberMove, COST346 Program and now participates in the CityMobil EU Project. He worked as a visiting scientist in TNO Automotive, the Netherlands.
Organization: Centro di Ricerca de “La Sapienza” sul Trasporto e la Logistica
Short name: CTL

General description
The Centre for Transport and Logistics (CTL) at the University of Rome “La Sapienza” is a centre of excellence started in 2003 with a start-up funding by the Italian Ministry of Education, University and Research. Since 2006 it became an autonomous department of the university.

Main related expertise
CTL’s activities encompass both contributions to basic research on transport systems and logistics and practical applications for government and industry. Several engineering departments make available to CTL their expertise in transport, logistics, mechanical engineering, telecommunications, and computer science.

Research on transport and logistics at CTL covers all modes of transport, passenger and freight, public and private, together with innovations in the field of telecommunications, computer systems, vehicle mechanics, and supply chain management. Research topics are: mobility planning, public transport, fare policies, road accidents assessment, innovative systems for road safety planning, low emission vehicles assessment, design and development of on-board units for monitoring passenger and freight vehicles, development of new business models for industrial districts logistics, development of ICT platforms for transport and logistics, benchmarking transport systems and logistics.

CTL’s research involves European projects, feasibility studies or consultancy for government and industry. Among the most relevant ongoing European projects: SafetyNet on road safety, Freightwise on intermodal transport, CityMobil on innovative transport systems, HOST on sustainable urban transport vehicle design and prototyping.

CTL works with academic, corporate, public-sector partners in Italy and abroad; some partners are: TNT Logistics, Telespazio, Honda Italia, Italian Institute for Foreign Trade (ICE), ENEA, University of New South Wales, INRIA, Technion, ITS Leeds and TNO.

Main expected tasks
WP5 Task 5.1 and 5.2

Main staff members to be involved in the project
Prof. Francesco Filippi. Transport engineer since 1970. Professor in DITS, Engineering Faculty, University of Rome La Sapienza he is CTL director. He is active in European research for European Commission DG Research, TREN and INFSO since FPIV and in all transport sectors in Italy. From 1992 to 1998 he was the Italian representative at the management committee of DG VII for FPIV and EURET research Programmes of European Commission. Areas of specialisation for both research and practical applications: transport planning, vehicle mechanics, road safety, environment, public transport, freight transport and logistics, monitoring and telematics technology. Recent projects (2002-2007): CityMobil, EDICT, Netmobil, CyberCars, CyberMove, HOST, Freightwise, GIFTS, EXTRAWeb, ROSEBUD, Safetynet. Numerous papers published in Europe and the U.S.; on Editorial Advisory Board of Transportation Research. Languages: Italian, English, French, Portuguese.

Dr. Adriano Alessandrini. Mechanical engineer since 1998 and PhD in energy technologies since 2003 he is currently Research Fellow (Assegnista di Ricerca) at DITS (Dipartimento di Idraulica Trasporti e Strade università di Roma “La Sapienza”). Expert in transport planning, transport systems and in environmental impact of transport he participated to CTL activities since before it was funded; he contributed to write the initial proposal in 2001. He took part in more than 20 research projects including Freightwise (2007-12), CityMobil (2006-11), HOST (2005-07), CyberCars (2001-04), CyberMove (2001-04) and Italian Ministry of Research (MIUR) including Design of a power-train for city-cars (2000-2002). He lectures as expert to postgraduate mechanical engineers. Languages: Italian, English, French.
General Description

EPFL is one of the two Ecoles Polytechniques fédérales in Switzerland. Its mission is threefold: education, research and technology transfer at the highest international level. With more than 250 laboratories and research groups on campus, EPFL is one of Europe's most innovative and productive technology institutes. The School's unique structure facilitates transdisciplinary research and encourages partnerships with other institutions. EPFL emphasizes both fundamental research and engineering applications.

The Transportation Center brings together more than 20 laboratories active in transportation-related issues at EPFL. The Center spans a wide range of research themes related to the transportation of goods and people, such as the environment, energy, mobility, urban planning and land use, information and intelligent transportation systems, economics, multimodality and logistics, vehicles and infrastructures.

Main related expertise

LaSUR

Under the direction of Prof. Vincent Kaufmann, the Laboratory of Urban Sociology (LaSUR) comprises around fifteen researchers and PhD students united towards the comprehension of urban experiences within a social science perspective. The LaSUR researches the social conditions that produce and appropriate cities or territories, collaborating intensively with its partners in engineering and architecture. The LaSUR uses quantitative and qualitative methods to confront urban phenomena through the mobility capacities of its actors. In this perspective, the principal research themes are daily mobility, residential history, the dynamics of suburbanization and gentrification, public space, and network management.

Professor Vincent Kaufmann is a sociologist graduated from the University of Geneva. He obtained his Ph.D. in 1998 at EPFL. He was a research fellow at the University of Lancaster (UK) (2001-2001), at Ecole des Ponts (Paris, F) (2001-2002) and an associate professor at University of Cergy-Pontoise (2002-2003). His research interests focus mainly on understanding modal choices and practices interacting with different urban environments and urban lifestyles (multi-residence, the use of mobility in fitting daily activities’ agendas against time and space constraints) and evaluating urban planning and transportation policies.

Related publications

Flamm M., Se passer de la voiture demande beaucoup de savoir-faire, La Revue Durable, Nr. 18, pp. 31-34, 2006.

TRANSP-OR

Directed by Prof. Michel Bierlaire, the Transport and Mobility Laboratory is active in
modelling, optimization and simulation of transportation systems, with a specific emphasis on the mobility of individuals. The main research activities are oriented toward three main complementary directions.

**Transportation research**: identifying new solutions to transportation problems, on the ground, in the air, or on the sea, transport of people or goods, whatever the mode. The focus is on technical solutions, but also on their impact on the system as a whole, and the interactions of the transportation systems with land use, the economy, the environment, etc.

**Operations Research**: designing, implementing and testing new mathematical models and algorithms. The laboratory is involved in various aspects of operations research, such as optimization (continuous and discrete), queuing theory, graphs and simulation.

**Discrete choice models**: the laboratory is specialized in the design, the specification, the estimation and the analysis of discrete choice models. Largely used in transportation demand analysis, these models can be applied to other contexts as well, such as marketing and image analysis.

**Professor Michel Bierlaire** holds a MSc and a PhD in Mathematical Sciences from the Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium. Between 1995 and 1998, he was research associate and project manager at the Intelligent Transportation Systems Program of the Massachusetts Institute of Technology (Cambridge, Ma, USA). Between 1998 and 2006, he was a junior faculty in the Operations Research group ROSO within the Institute of Mathematics at EPFL. In 2006, he was appointed associate professor in the School of Architecture, Civil and Environmental Engineering at EPFL, and became director of the TRANSP-OR.

His main expertise is in the design, development and applications of models and algorithms for the design, analysis and management of transportation systems. Namely, he has been active in demand modelling (discrete choice models, estimation of origin-destination matrices) and Dynamic Traffic Management Systems.

Michel Bierlaire is closely collaborating with some of the most renowned researchers in transportation science, including Moshe Ben-Akiva, director of the Intelligent Transportation Program, Massachusetts Institute of Technology, Cambridge, USA; John Polak, head of the Centre for Transport Studies, Imperial College, London, UK; Daniel McFadden, University of California, Berkeley, Nobel Prize laureate 2000. He is the founder/lecturer of the EPFL Advanced Continuing Education Course "Discrete Choice Analysis: Predicting Demand and Market Shares". He has published in journals, such as Transportation Research Part B and Transportation Science. He is a member of the Editorial Advisory Board (EAB) of Transportation Research Part B, and of Transportation Research Part C. He is involved in the organization of the Swiss Transportation Research Conference since its first venue in 2001. He is also a member of the organizing committee and of the scientific committee of ITS2008. He is an elected member of the Council of the Association for European Transport, the European equivalent of the US Transportation Research Board.

**Related publications**


**Organization: Primaria Municipiului Ploiesti**

**Short name: PMP**

### General description

Ploiesti municipality is a territorial – administrative unit with judicial personality. It contains a patrimony and takes the initiative regarding the administration of local public interests, exercising, legally, its authority within the established territorial – administrative limits. The public administration of Ploiesti municipality is based on the principles of the local autonomy, on the public services’ decentralization, on the eligibility of the authorities of the local public administration, on the legality and consulting of the citizens in local issues of real interest.

According to the strategy presented in Local Agenda 21, Ploiesti will become the heart of a metropolitan area that will comprise 6 surrounding villages and will add a number of 70000 inhabitants to the administrative area. The coordination of the metropolitan area functions such transport, communication, technological development or environment will be made by an organism structured on partnership principles. The city’s daily activity requires a high level of mobility.

Ploiesti land use projects consider public transport as a main factor of urban planning, as it will feed new developments areas: Hippodrome, Carino residential area, Strejnic charter airport. Therefore, in the elaboration of programs and policies, the following principles will be taken into consideration: reducing transport distances for population and for goods distribution, reducing costs for maintenance and exploitation, reducing investment costs for amortization of transport means and for the use of these means of transport in the transport process, friendly development of nearby spaces of alternatives transport lanes.

### Main expected tasks

WP1 and WP4-Task 4.3. PMP will take part in the research and dissemination activities.

### Main staff members to be involved in the project

**Cozia-Roxana Georgescu**: Executive Director of the International Relations Department of the Ploiesti City Hall. She coordinates the activities of this department and represents the City Hall in international cooperation. She also manages International programmes and projects and has worked on a range of projects such as CIVITAS SUCCES, SPICYCLES, PRACTISE – promoting Reproducible Actions in the Communities to Improve Sustainable Energy, SCUOLAXENIA – YOUTH Programme – July 2006 and INTERREG programmes. She is graduated in Mechanical Engineering and did master in Public Administration and European Integration and a Post doctorate course at the Petroleum and Gas Institute. She worked in industry as a mechanical Engineer.

**Milena Perpelea**: International Financing Projects, Responsible in the International Relations Department at Ploiesti City Hall. In this position she is responsible for the implementation and running of EU programmes and European matters concerning the Ploiesti city. She has considerable experience of working on EC funded projects including acting as project manager for the CIVITAS SUCCESS project, part of the CIVITAS initiative and local coordinator in the SPICYCLES project (IEE Programme 2006). Milena graduated with a degree in Engineering and she has a master degree in Public Administration Management.

Since 2001, **Mihaela Oprea** has worked as an Executive Officer in the International Relations Department at Ploiesti City Hall. In this position she is responsible for the implementation and running of EU programmes and European matters concerning the Ploiesti city. She has considerable experience of working on EC funded projects including acting as project manager for the CIVITAS SUCCESS project, part of the CIVITAS initiative and local coordinator in the SPICYCLES project (IEE Programme 2006). Milena graduated with a degree in Engineering and she has a master degree in Public Administration Management.

Since 2001, **Mihaela Oprea** has worked as an Executive Officer in the International Relations Department at Ploiesti City Hall. She has worked on several national and international programmes such as CIVITAS SUCCESS, URBACT programme and Local Agenda 21. She is graduated in Economic Sciences. She has attended courses on economics and urban marketing.

### References
Whilst previous studies for Ploiesti have been extensive, a far more comprehensive analysis covering a number of urban transport issues are addressed through the Ploiesti Master Plan for Public Transport. Urban areas can develop and grow very quickly over time, and measures, improvements and policies are required to enable flexible responses to changing conditions, so as to relieve traffic congestion without constraining economic development, so as to enhance the liveability and vibrancy of Ploiesti.

The city is an important railway centre connecting Bucharest with Transylvania and Moldavia. Ploiesti’s public transport system consists of an extensive network of buses, trolleybuses and trams.

Private companies provide transportation to the neighbouring rural areas and other parts of the county, however the transport network modernisation and improvement is necessary. The present condition shows no facilities for cycling, even though a demand for dedicated infrastructures exists; only three short streets for walking are provided. The first targets of the City Master Plan are: 1) The urban traffic should offer a chance for non-car drivers, as well as for drivers (cohesion principle) and 2) The promotion of an alternative urban transport system should enhance the Local Agenda 21 provision (sustainability principle).

Organization: Regional Agency for mobility in Latium
Short name: AREMOL

General description
AREMOL was created to provide the Latium Region and its local authorities with an efficient technical operational organization. The agency was set up for the planning of local public transportation, the study of the evolving situation in the Regional transportation sector, the study of transportation networks and their infrastructures, the evaluation of services supplied by the public transportation suppliers, the quality, efficiency and safety of such transportation systems and their environmental impact on the Region.

AREMOL, an instrument of the Latium Region, is a legally incorporated self-governed administrative body with its own administration, financing and accounting. It performs its activities in full compliance with political programmes approved by the Regional Council, with the Regional Government’s Executive Committee directives while at the same time respecting the operational stipulations laid down by the Regional Transportation Management.

Institutional activities includes
a) formulates the regional transportation plan outline according to the existing environmental compatibility guidelines;
b) defining the criteria to reduce traffic congestion and environmental pollution;
c) sees to the preparation of the transportation service budget;
d) prepares a state of Regional mobility report and an analysis of Regional transportation costs surveys and evaluates citizen Regional transportation needs, as well as identifying regional travel demand forecasting models;
e) prepares tariff system proposals, integrated mode tickets and tariffs for the various types of transportation;
f) prepares reports and make necessary proposals regarding minimal transportation network services while keeping in mind the use of low environmental impact technology in order to obtain maximum environmental compatibility;
g) all aspects of public tenders relating to Regional transportation service contracts;
h) manages Regional public transportation service contracts, verifying that the consumers are respected and treated equally;
i) submits proposals for the allocation of local public transportation financing
j) proposes investment plans to be included in Regional public transportation programmes;
k) carries out studies, prepares and proposes plans, projects and acts relative to the Region’s duties and obligations in the light of European Community legislation in the transportation sector with an emphasis on the following objectives:
   1. optimize the employment of allotted funds;
   2. harmonize private transportation needs with overall public transportation needs;
   3. integrate the various modes of transportation;
   4. improve the efficiency, effectiveness and quality of the public transportation system;
   5. study incentives to encourage the use of public transportation services.

Main expected tasks
WP 4 Task 4.3

Main staff members to be involved in the project
Prof. Antonio Mallamo was appointed Executive Director of AREMOL in year 2007. He has been involved in research in the field of transportation for more than 15 years. In addition to his research and teaching activities, Prof. Mallamo has been a consultant of very important private and public companies in the transportation field. He participates to many European projects in the IV Framework Programme (DGVII – DGXIII – DGXII) in the transportation sectors. During his career he managed very and prestigious projects in the field of transport.

Eng. Tommaso Picano is a transportation and traffic engineer and is employed as Chief Engineer. He joined to AREMOL in year 2005. He worked in research the field of transportation at the beginning of his career and after he joined to an international civil engineering company where he worked for 10 years. He has been Responsible of the overseas branches of the company, where he managed very important transportation project.

2.3. CONSORTIUM AS WHOLE

CATS has succeeded in setting-up a consortium that includes all skills needed to ensure the success of the mentioned objective of the project: researchers, services providers and final users are represented. RATPP, CTS, AREMOL transportation companies as well as the subcontractors Technomade, Lasmae and UTVB have recognised the importance and the relevance of the performed research, and is keen to accompany future research efforts by giving input and testing the results of CATS. Research will be done by leading university and research institutes; this knowledge will be transferred to the manufacturer LOHR Industrie, different services will be defined and then suited for the end user. Finally, the partners of the CATS project will form an ideal consortium to develop methodologies and technologies needed to further achieve the Commission objectives regarding see topics

Several partners of the CATS project team (LOHR Industrie, GEA, INRIA, TECHNION, CTL, EPFL, CUS, PMP) have been successfully working together and building up experience during different projects such as FUI, CIVITAS for example. Some of them have a close cooperation in technological projects like INRIA with LOHR.

Most of partners are part of European forums dealing with urban mobility issues (Polis, Eurocities) and other academic committees (TRA, TRB....).

CATS’ consortium shows a balanced participation regarding the following three points:

Nationalities: partners from five different countries.
Type of partner: Research institutions, solutions developers, project managers and SMEs. The share of SME in the CATS project is 20% and they contribute with 105 persons months.

The following SME’s will participate and contribute to the project with the following background, scope of activities and interests.

<table>
<thead>
<tr>
<th>SME</th>
<th>Background</th>
<th>Scope in CATS</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOHR</td>
<td>Design and manufacture systems for goods and people</td>
<td>Study the station construction and its implementation</td>
<td>Validation in real conditions of the Cristal system. Expectations of future implementation of the Cristal System</td>
</tr>
<tr>
<td>GEA Partners</td>
<td>Specialist in urbanism land and regional planning</td>
<td>R&amp;D concerning the use of electric vehicles in new forms of urban mobility</td>
<td>R&amp;D innovative transport systems studies and dissemination and deployment actions</td>
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</table>

2.3.1 SUBCONTRACTING

Tecnomade is a start-up of INRIA which is the partner of the Cristal consortium since the beginning of this project. His main expertise is on the modelisation of urban environments and innovating transport systems.

The subcontractor will represent in model3D real time the environment and the integration conditions of the station at Strasbourg in order to test virtually different layouts and uses in the WP3. The total cost is 50K€.

UTBM has a unique expertise in micro-simulation of several vehicles in real situations. Their simulator can take into account complex life-like situations and can simulate the behaviour of several vehicles with their respective sensors and control algorithms. INRIA will therefore subcontract the task of validating the control algorithms for platooning in various situations: entering or exiting a platoon, in emergency stops, in steep grades, etc. This task is estimated at about 6pm and a total cost of 40k€.

LASMEA, this research lab has developed specific platooning techniques for cybercars (the same vehicles as those of INRIA) based on differential GPS and based on vision. Their techniques will therefore be integrated with their assistance in the INRIA prototypes and later on in the Cristal vehicles for optimum control and safety of the platoons. Here again, the task is estimated at 6pm and 40k€.
Transitec is traffic engineers office specialized in planning and dimensioning innovative transportations systems. This company has been involved, in partnership with GEA, for the VOLTaer methodology providing and is actually studying with GEA the Strasbourg’s city study. During CATS project, Transitec will be involved in the 2 city studies (Formello and Ploiesti), in support of GEA’s tasks (WP2) for all transport and traffic aspects, strengthening the pertinence and efficiency of both city studies. This task is estimated at about 10 pm and 100 K€.

The LASUR laboratory of the EPFL wishes to employ a subcontracting procedure with a polling institute to conduct a phone survey for the ex-ante phase planned within WP1.

This is justifiable on technical grounds. A poll is indeed the most reliable and economical way to obtain a good quality sampling covering the whole metropolitan Strasbourg. The same questionnaire submitted in paper form by post would imply lower quality results, considering the significant losses on the returns of self-filled questionnaires. On the other hand, an approach with investigators making home visits would involve the commitment of large human resources in a slower and ultimately much more expensive process, both in coding and in analysis. We would probably therefore be forced to restrict the scope of the study to the city of Strasbourg itself rather than the whole of the agglomeration. But it seems to us though that it is precisely the agglomeration inhabitants that would make the most use of the new CRISTAL device.

We will be bidding French polling companies as the field of study is in Strasbourg. We believe that the sum of 50,000 Euros is a reasonable budget which is justified given the length of the survey (approximately 30 min) and the expected size of the sample, which should be important enough to be representative of the whole agglomeration. In our experience with prior sampling procedures the price range should stay within a range of plus or minus 5,000 Euros of the stated amount.

We believe that the subcontracting procedure is in this case the most efficient and economical way to achieve this part of the research work. That is why we advocate the award of this subcontract.

2.4 RESOURCES TO BE COMMITTED

2.4.1 ADEQUACY OF RESOURCES

The Consortium brings together all the actors required for the successful completion of the proposed work. More specifically, it consists of Academic research organisation, SMEs and Project Management and Communication specialist. Thus, it has mobilised all the resources required for the envisaged work. All required counter-financing of each partner will stem from its own resources. The Consortium will have recourse to sub-contracting in order to achieve the work plan described above. No other third parties financing is planned or required.

There is also a good and balanced distribution of the budget among the development, evaluation, demonstration phases and the accompanying activities of management, dissemination and exploitation.

Regarding the costs categories, the table below is presenting the budget for all participants in the projects CATS.
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<thead>
<tr>
<th>Category</th>
<th>LOHR</th>
<th>ERT</th>
<th>CUS</th>
<th>GEA</th>
<th>INRIA</th>
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The first cost category in terms of volume is the personnel costs 284,5 person months. The travel costs have been limited to a reasonable appropriate amount by deciding that technical meeting will be held in the same period of time than Steering Committee Meetings. The justifications of the costs for other direct costs and subcontracting are explained below. No equipment is required by the CATS consortium.

2.4.2. JUSTIFICATION OF MAJOR COSTS ITEMS

The following table below presents a justification of major cost items. Subcontracts are also presented in details in Section 2.3.1.

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<th>WP</th>
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<td>Transitec 100K€</td>
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<td>3</td>
<td>LI</td>
<td>Tecnomade 50K€</td>
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<tr>
<td>6</td>
<td>ERT</td>
<td>Dissemination tools and workshops 10K€</td>
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<td>1</td>
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</table>

Justification of Major Costs Items table

3. IMPACT

3.1. EXPECTED IMPACTS LISTED IN THE WORK PROGRAMME

3.1.1 EXPECTED IMPACT OVERALL

The results of the CATS Project will certainly contribute - mainly to the EU-25 and "zero accident" vision as well as to significant improvement of efficiency of the urban transport systems. This will integrate with other novel initiations in the field Cybernetic Transportation Systems (CTS) intended to bring about radical change in urban transportation. These environmental friendly systems have the feasible potential of drastically improving the current situations, by offering solutions to the problems that we encounter in them today. They will yield much more effective organisation of the urban mobility, less congestion and air pollution, lower noise, reduced CO2 emissions and better accessibility and safety. The result will be a higher quality of living and an enhanced integration with the spatial and societal developments.

In summary, the CATS Project is intended to yield the following impacts:

- Drastic reduction of energy dependency, pollutants and carbon dioxide emissions,
- Technological progress,
- Better productivity and competitiveness, social prosperity and business opportunities,
- Societal satisfaction, substantial gain of time and comfort for travel.

3.1.2 EXTERNAL FACTORS THAT MAY DETERMINE WHETHER IMPACTS WILL BE
ACHIEVED

We have learned from human behaviour that causing people to change their habits is extremely laborious. There are numerous examples in traffic, that safe and overall sustainable travel behaviour is not usually adopted on a voluntary basis. For example: road safety including issues of speed limits, and sustainability campaigns are often not futile, resulting in waste of time and money. The CATS principles are based on safety, comfort, efficiency, progress and sustainability. The promotion of ADAS functions has been also a slow process; people do not want to invest in them even though they are regarded as useful. This may seem, at first glance, an insecure attempt of the CATS Project. However, there is growing awareness of drivers and passengers that are willing to use and benefit from safety and more effective functions. It is important to note here that there is a rapidly growing interest in car sharing systems (or ‘collective use’ or self service’). In addition, the system based on the Cristal vehicles also offers the flexible shuttle service, with the great advantage of dual mode operation. Thus we are entering the positive circle, where decreasing price levels are increasing the number of improved functions purchased. We are approaching the critical penetration rate in the next years enabling mass use of different wireless services while driving.

Furthermore, it can be argued that the number of devices or functions does not yet prove their positive impacts. This is true, indeed, but there are, for example, stronger motivations needed for environmentally friendly transport than just the functions that assist in it.

However, the situation today is such that gasoline prices are sharply increasing and some countries even plan to put on more taxes on fuel. We have good grounds to expect that environmentally friendly and efficient driving will catch drivers’ interest eventually.

In that context, methods to assist for sustainable travel are expected to gain new ground. So, the Project will challenge the combined effect of more expensive car use, in order to also stimulate functions supporting safety, comfort and less energy consuming driving, and to have a strong impact on travel behaviour in the coming years.

The impacts of more safety and improved situation awareness on driving are more evident and not so dependant on external factors as perhaps “green driving”. Very often, the cause of an accident for so-called normal drivers has been missing awareness of possible hazardous incidents or misinterpretation, as it is described: “the hazardous situation just occurred unexpectedly”. For eliminating this surprise effect, new assistance functions provide ample possibilities and solutions. Another point that is worthwhile to note here that that the growing community of the car sharing systems cares more about the issues of safety and ecology.

3.1.3 COMPETITIVENESS

Recently, concern has been expressed on several public forums about retarding European competitiveness compared to the USA, in terms of technology and to Asia, both in terms of technology and production strength, respectively. Effective road transport industry and services is vital to European industries.

In addition to this logistics aspect, from the point of view concerning electronics, communication, sensors, software, manufacturing technologies and sustainable technology solutions – novel safety systems provide ample work opportunities as well as a competitive edge in terms of road traffic operations. The success of CTS in the transport sector would boost and create new opportunities also for sectors earlier seen as separate from traditional traffic and vehicle technology sectors. Additionally, this is due to a growing trend towards ubiquitous and ambient intelligence, where actors’ capabilities to relate to the surrounding world is essential. This is being realised above all
by means of information technology: sensing, communication, adaptive HMI, new types of actuators and the like needed in upcoming cooperative driving. This means additionally that more opportunities are arising for countries and companies not traditionally regarded as strong in the transport sector. An example of this serves new business sector called service operators and providers that can manage huge amounts of data in an inexpensive, efficient and secure way – as needed in future transport systems.

The CATS Project and the Cristal vehicle system are in the mainstream of creating opportunities for CTS industries in Europe. The work aims at providing contents both for more safety, efficient communication, true cooperative driving and sustainable clean environment.

The Project fits well in the family of intelligent traffic projects.

The work contributes especially to safe and efficient driving in the road environment. Consequently, the methodology that will be elaborated in CATS will stimulate European industries to further develop their competence in these areas and establish a leading position in the market. Moreover, considering the size of transport sector, the possibilities to equip cars and infrastructure with integrated socio-economic know how are enormous, even though it is impossible to come up with precise figures at this stage. The dual mode system of self serve and flexible shuttle is at the front edge of innovations in Intelligent Transportation Systems (ITS). The opportunities for a breakthrough that will maintain this edge are evident.

3.1.4. EMPLOYMENT

The proportion of electronic systems in a vehicle has exceeded 30% during last years, and there is still an ongoing trend to more demanding electronic control systems – not necessarily more electronics – and systems for cooperative driving (such as V2I). New technologies for embedded systems such as micro-sensors or wireless communication may also enable additional products in other business areas such as automation industry or consumer market in general. Sensors embedded in road environment open up totally new frontiers in this business area.

In addition to communication systems and related HMI components and software, the CATS Project, with its novel concept of the dual mode Cristal vehicle system, will create possibilities to implement innovative services based on information from continuous traffic and infrastructure monitoring. The described scenarios for traffic safety and investigations of the needs of various user groups lay a basis for establishing new business activities for service providers and companies, and constitutes a huge dynamic impulse for massive and qualified employment.

3.1.5. CLEANER ENVIRONMENT

The CATS Project will have a strong effect of environmental improvement, by introducing a better traffic flow with more positive effects of several parameters than currents patterns and systems of urban transport. This will be a direct result of implementing the Cristal vehicles fleet, with the intelligent management and control systems.

One of the most significant effects will be achieved, however, by avoiding most of the accidents at intersections. Since the traffic flow is significantly improved.

The Project environmental impacts are summarised as follows.

🎉 Reduction of CO2 pollutants emissions and noise at least in compliance with EU legislation

The Cristal vehicle is electric, ZEV, thus in the city centre where it will run there will neither be any emission of pollutants nor of CO2. As regards emissions in power plants
for the electricity generation, the novel system will require minimal energy utilization as explained henceforth, which yields also reduced emissions. Noise: Electric vehicles are obviously quiet. Here it might be necessary to add artificially some noise in order to warn pedestrians when the vehicle is approaching. This issue will be studied in the Project.

- **Increased energy efficiency by at least 20% in urban transport and improved transport safety**

The novel system, based on the Cristal vehicles, will be designed such as to optimise its operation and performance and to minimise its energy demand. This will be achieved by a control system that will satisfy user needs, leading to minimal energy production in power plants for the system operation. This is accompanied by the current and future advances of increasing the efficiency of electric power production, e.g. by the combined cycle (steam – gas turbine). Moreover, it is evident now that electricity will be generated more and more by renewable energy sources.

- **Proposals must ensure at least a neutral impact on climate change**

As mentioned above, CO2 emissions (the main greenhouse gas emitted from road transport) will be reduced: compared to current urban transportation systems, the CO2 emissions due to electricity production will be decreased. In addition, the more efficient technologies for electricity generation ensure an even more reduction of CO2 emissions.

### 3.2. DISSEMINATION AND/OR EXPLOITATION OF PROJECT RESULTS, AND MANAGEMENT OF INTELLECTUAL PROPERTY

#### 3.2.1. DISSEMINATION OF PROJECT RESULTS

The dissemination of results will be the main task for Work Packages 6. As explained in the work description of WP 6, the dissemination activities will be carried out around three main activities.

- The first is the production of dissemination tools to ensure a good communication of the project and make Stakeholders aware of the Project.
- The second type of activity focuses on the scientific results of the project. They are aimed at widely spreading these results towards the scientific community.
- The third action will be to foster interactions with stakeholders.

The communication of the project is based on the use of traditional institutional communication tools such as a logo, leaflet and posters. To increase the legibility of the project and to ensure a coherent communication, recommendations and templates for project documents will be issued during the first month of the project.

The CATS web site will be designed and implemented at an early stage of the project. Its objectives are to provide general information about the project and to communicate the results of the project to a wide audience. The web site will also include a private part aimed at easing communication amongst partners of the project.

Information produced by project communication activities are tailored to the needs of various target audiences including:

- Public entities, policy-makers, local transport operator (RATP, CTS, AREMOL transportation company)
- Researchers, experts and professionals working in the transport field;
- University and high school students;  
- Environmental associations
Association of Municipalities
Citizens.

Different communication products will be elaborated as regards to the specific target they will apply to; the degree of documents’ deepening will therefore fit user characteristics.

A dissemination database of useful contacts will be drawn up and updated throughout the project.

With the demonstration of the system Cristal in Strasbourg and the show cases in Ploiesti and in Formello respectively, the audience described as above will be reached and especially through press release, TV, newspaper article. This is in effect foreseen as a very useful work to prepare public and market acceptance.

The communication of project results to a wide scientific community will be done via the organisation of special sessions and the presentation of papers during targeted conferences detailed in WP6. The special sessions have been chosen as a means of disseminating the project results because most of the European stakeholders are attending the major European conferences on Urban Mobility. It is therefore very efficient to present the outcomes of the projects in these conferences. The Stakeholders will have direct access to these outcomes and thus the knowledge developed during the project will be widely disseminated.

Lastly, to ensure the widest dissemination to the scientific community, the CATS partners will communicate the project results through the course of the project and after by participating and presenting papers in targeted European and International conferences and by publishing papers in relevant scientific journals.

The partners of the CATS project will take care to disseminate the project results to the relevant Stakeholders and to facilitate the transfer of knowledge from the scientific community towards the research users.

3.2.2. EXPLOITATION OF RESULTS

The partners of the CATS project will develop and implement an exploitation plan. This plan aims at ascertaining the ownership of results and at identifying the use of the results that are planned by partners. To have a complete vision of the exploitation plans the timing of exploitation as well as the access rights to other partners’ knowledge that are needed will be specified.

The project results will be registered in the table below during the lifetime of the project.

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<th>Project Results</th>
<th>Ownership</th>
<th>Exploitation</th>
<th>Timing</th>
<th>Access rights needed</th>
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</table>

This table will have to be updated during the lifetime of the project. This action will be achieved under Task 6.2.

3.2.3. MANAGEMENT OF INTELLECTUAL PROPERTY

The partners of CATS Project are informed about the “Draft Guide to Intellectual Property
rules for FP7 projects” issued by the European Commission services. Partners will consider and tackle IPR issues as soon as SWIFT project is approved and will negotiate any relevant questions with the other participants before starting the project. For this purpose, CATS project will use the Development of a Simplified Consortium Agreement (DESCA) which is widely used in the European Union FP7 research projects and covers intellectual property issues. DESCA offers a reliable frame of reference which seeks to balance the interests of all of the main participant categories in research projects. DESCA stipulates that contracting parties are permitted to exclude specific background from the obligation to grant access to other participants.

We anticipate that

- Foreground (generated science and technology resulting from the CATS project) will be owned by the partner who generated it. When foreground is generated jointly (i.e. where the separate parts of some result cannot be attributed to different participants), it will be jointly owned, unless the participants concerned agree on a different solution. Joint owners must agree among themselves on the allocation and the terms of exercising the ownership of the foreground.

- Background (information, technology and knowledge held by the partners prior to their accession to the EC grant agreement) which would be relevant to CATS consortium will require clear agreement on what would be available to each other (e.g. by defining background and/or specifying which background is excluded from the obligation to grant access).

Valuable background and foreground knowledge/technology will be protected in the CATS consortium.

4. ETHICAL ISSUES

Within CATS the only problems related to ethical issues are those related to individual privacy protection raised from data to be processed. Different surveys will be carried during the project CATS.

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<tr>
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<tr>
<td>• Does the proposal involve Human Embryonic Stem Cells?</td>
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<table>
<thead>
<tr>
<th>Privacy</th>
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</thead>
<tbody>
<tr>
<td>• Does the proposal involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)</td>
</tr>
<tr>
<td>• Does the proposal involve tracking the location or observation of people?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research on Animals</th>
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</thead>
<tbody>
<tr>
<td>• Does the proposal involve research on animals?</td>
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<tr>
<td>• Are those animals transgenic small laboratory animals?</td>
</tr>
<tr>
<td>• Are those animals transgenic farm animals?</td>
</tr>
<tr>
<td>• Are those animals cloned farm animals?</td>
</tr>
<tr>
<td>• Are those animals non-human primates?</td>
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</tbody>
</table>

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<tr>
<th>Research Involving Developing Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use of local resources (genetic, animal, plant etc)</td>
</tr>
<tr>
<td>• Benefit to local community (capacity building i.e. access to healthcare, education etc)</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Dual Use</th>
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</thead>
<tbody>
<tr>
<td>• Research having direct military application</td>
</tr>
<tr>
<td>• Research having the potential for terrorist abuse</td>
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</table>

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<tr>
<th>ICT Implants</th>
</tr>
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</table>
Does the proposal involve clinical trials of ICT implants?

I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL

Ethical issues table

5. CONSIDERATION OF GENDER ASPECTS

No evident gender issues are associated to the activities planned in CATS. In any case, CATS will follow the recommendations of the Commission. CATS will try to contribute to promote gender equality within the project.
Madame Claire NICLAUSE
Directrice
Cabinet ERT

Le Directeur Général

Strasbourg, le 24 avril 2008

Madame la Directrice,

Une expérimentation d'utilisation d'un nouveau moyen de transport est prévu à Strasbourg et à Ploiești. La Compagnie des Transports Strasbourgeois qui produit et promeut les transports publics urbains de voyageurs et les services associés sur l'ensemble du périmètre de la Communauté Urbaine de Strasbourg, est vivement intéressée à être le partenaire de cette opération expérimentale sur son territoire d'exploitation et à être associée à sa conception, à son pilotage et à sa mise en place. Notamment elle pourra mettre à disposition, pour mener l’expérimentation, des conducteurs formés au pilotage de ce nouveau véhicule.

Ce partenariat dans le programme Cristal nous paraît une action d'avenir pour permettre le développement des modes doux, les seuls durables.

En espérant que notre candidature sera retenue, je vous prie de bien vouloir recevoir, Madame la Directrice, l'expression de mes sentiments très distingués.

[Signature]

Jean-François SOULET
Directeur Général

COMPAGNIE DES TRANSPORTS STRASBOURgeois
55 rue de la Gare, 67000 Strasbourg - R/CPS 100/14578/0001 - E/S 2691 - Tél. 03 88 37 57 57 - Fax 03 88 37 10 69
S.A.U.M., au capital de 9 500 000 € - Registre des Entreprises 391 001 484 RCS Strasbourg - SIREN 391 001 484 - SIREC 670 004 - APE 69.07.4K
Il F.I.Z. GROUPE SYMBOIS 2 67000 Strasbourg - 391 001 484 RCS Strasbourg - SIREN 391 001 484 - SIREC 670 004 - APE 69.07.4K
To the attention of
Mrs. Claire NICLAUSE
Europe Recherche Transport
Coordinator of CATS project

The General Manager of Local Public Transport Company of Ploiești

Ploiești, May 5th 2008

Dear Madam,

An experiment is planned to use a new transport mean, called CRISTAL, in Strasbourg and Ploiești, as part of the European project CATS. The Local Public Transport Company of Ploiești (RATP), which produces and promotes the urban public transport system and the associated services on the Ploiești territory, is very keen to become a partner in this experiment and to be associated in its design, its management and its implementation.

The Local Public Transport Company of Ploiești is willing and will be able to provide all the appropriate support that the CATS project may requires.

This partnership in the CATS project is for us a promising action to enable the promotion of a soft, innovative and environmental-friendly transport mode, able to provide a viable solution to mobility questions in Ploiești, in complementarity with our existing network.

Yours faithfully,

Radu Popescu

General Manager
Roma, 24th April 2008
Our Ref. 30/04/2008 Aremol 2008 0000421

To the attention of
Mrs. Claire Nielens
Europe Recherche Transport
Coordinator of CATS Project
e/o INRETS
2 av. Du Général Malleret Joinville
F-94114 Arcueil cedex

SUBJECT: Letter of intent CATS Project

Dear Madam,

An experiment is planned to use a new transport mean, called CRISTAL, in Strasbourg, Ploiesti and Formello, as part of the European project CATS. The Regional Agency for Mobility in Latium (Italy), (AREMOL) was created to provide the Latium Region and its local authorities with an efficient technical operational organization. The agency was set up for the planning of local public transportation, the study of the evolving situation in the Regional transportation sector, the study of transportation networks and their infrastructures, the evaluation of services supplied by the public transportation suppliers, the quality, efficiency and safety of such transportation systems and their environmental impact on the Region. AREMOL is very keen to become a partner in this experiment and to be associated in its design, its management and its implementation in Formello (Italy) territory.
The AREMOL is willing and will be able to provide all the appropriate support that the CATS project may requires.
This partnership in the CATS project is for us a promising action to enable the promotion of a soft, innovative and environmental-friendly transport mode, able to provide a viable solution to mobility questions in Formello, in complementarity with our existing network.

Yours faithfully,

Ing. Antonio Mallama  

[Signature]

The Executive Director

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Via del Pescaccio n. 96/98 - 00166 Roma - Tel. 06.51687816 06.51687822 - Fax 06.51687812 - c.f. 08247691002