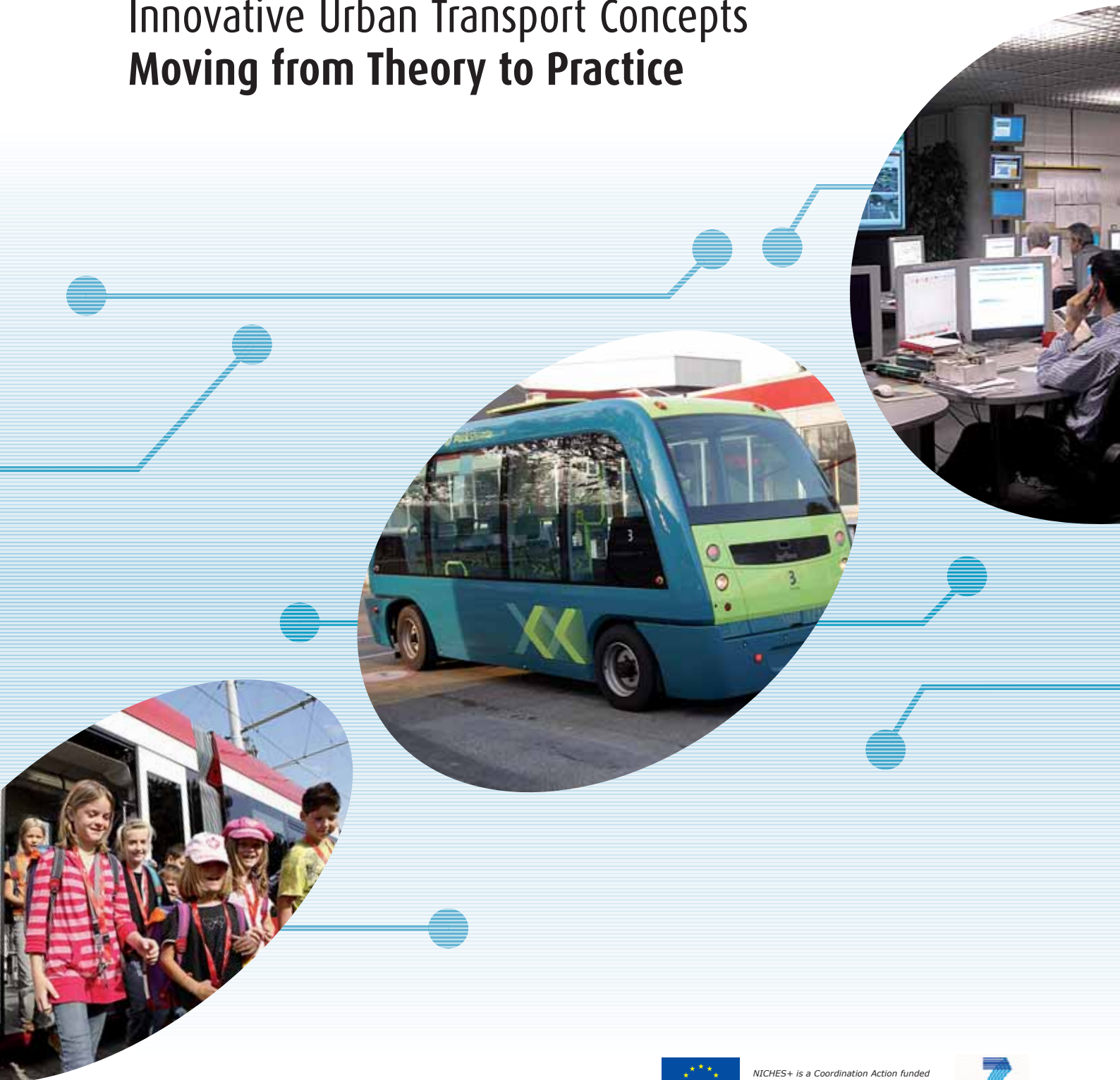


# Innovative Urban Transport Concepts Moving from Theory to Practice





# Index

● <b>Mainstreaming Urban Transport Innovation</b> .....	5
● <b>Innovative Concepts to Enhance Accessibility</b> .....	6
Travel Training for Public Transport .....	6
Neighbourhood Accessibility Planning .....	8
Tailored Traveller Information for Persons with Reduced Mobility .....	10
● <b>Efficient Planning and Use of Infrastructure and Interchanges</b> .....	12
Passenger Friendly Interchanges .....	12
Innovative Cycling Facilities for Interchanges .....	14
Infrastructure for Innovative Bus Systems .....	16
● <b>Traffic Management Centres</b> .....	18
Financing and Implementing Traffic Management Centres .....	18
Mobile Travel Information Services for the Public .....	20
Using Environmental Pollution Data in Traffic Management .....	22
● <b>Automated and Space Efficient Vehicles</b> .....	24
Group Rapid Transit .....	24
Personal Rapid Transit .....	26
Using Electric Vehicles in City Car Share Schemes .....	28
● <b>Further Information</b> .....	30



# Mainstreaming Urban Transport Innovation

The continuous increase of traffic constitutes a major challenge to the viability of our cities. New strategies are needed to make urban transport more accessible, more efficient and more sustainable. NICHES+ is an EU funded project which studies and promotes the uptake of the most promising innovative concepts, in order to transfer them from their current “niche” position to a mainstream urban transport application.

This brochure – which is available in English, French, German, Spanish and Polish – aims to introduce local authorities and urban transport professionals to twelve innovative concepts in four thematic areas, which are summarised in the table below. Each concept is illustrated with good practice examples, key benefits, decision criteria for implementation, and useful references.

● Innovative Concepts to Enhance Accessibility	<ul style="list-style-type: none"><li>• Travel Training for Public Transport</li><li>• Neighbourhood Accessibility Planning</li><li>• Tailored Traveller Information for Persons with Reduced Mobility</li></ul>
● Efficient Planning and Use of Infrastructure and Interchanges	<ul style="list-style-type: none"><li>• Passenger Friendly Interchanges</li><li>• Innovative Cycling Facilities for Interchanges</li><li>• Infrastructure for Innovative Bus Systems</li></ul>
● Traffic Management Centres	<ul style="list-style-type: none"><li>• Finance Models for Traffic Management Centres</li><li>• Mobile Travel Information Services for the Public</li><li>• Using Environmental Pollution Data in Traffic Management</li></ul>
● Automated and Space Efficient Vehicles	<ul style="list-style-type: none"><li>• Personal Rapid Transit</li><li>• Group Rapid Transit</li><li>• Using Electric Vehicles in City Car Share Schemes</li></ul>

In order to demonstrate how these innovative concepts can be successfully integrated into urban transport policies, NICHES+ closely cooperated with seven local and regional authorities: Artois-Gohelle (France), Burgos (Spain), Cork (Ireland), Daventry (United Kingdom), Trondheim (Norway), Skopje (Macedonia) and Worcestershire (United Kingdom). With the support of European transport innovation experts, each of these “Champion Cities” has developed an implementation scenario to prepare for the local introduction of selected innovative transport measures.

For more information on the NICHES+ innovative transport concepts and how they can be implemented in your city, we invite you to visit the project website at [www.niches-transport.org](http://www.niches-transport.org), where you can also consult the outcomes of the previous NICHES project, which examined and promoted another 12 innovative concepts in the field of seamless mobility services, city logistics, non-polluting and energy efficient vehicles, and transport demand strategies.

We wish you a pleasant and informative read!

# Innovative Concepts to Enhance Accessibility

## Travel Training for Public Transport

### Key Characteristics

Travel training enables passengers to use public transport independently, without fears or concerns. The principal target groups are older people, people with disabilities or learning difficulties, and school children.

The content of the training needs to be tailored to the needs of the trainees and can cover a range of different aspects, e.g. physical accessibility, planning of a trip, handling of information sources, ticketing and behavioural aspects.

The format of the training needs to be tailored to the specific target group, e.g. short-term courses, longer-term buddying or travel games for children.

There is an important marketing component to this activity: a good training scheme can help to gain new or keep current customers in public transport.

The concept is becoming more and more popular, but is still not mainstream in public transport. Due to low costs and easy implementation, it is highly transferable.



**Travel training for children in Freiburg**

Photo: VAG Freiburg



**Travel training for older people in Salzburg**

Photo: StadtBus Salzburg

### Key Benefits

#### **Travel training for public transport:**

- makes a variety of target groups with individual needs feel more comfortable, safe and secure when using public transport;
- enables independent mobility by public transport and enhances social inclusion;
- keeps existing and gains new customers;
- achieves image gains for public transport operators;
- may reduce the need for special transport services, e.g. through buddying schemes for people with special needs.

### Good Practice: Salzburg (AT)

Older people are an increasingly important user group in public transport. The ageing society poses new challenges to public transport operators in ensuring that this customer group is provided with a high quality service. Falls and accidents are a serious threat to older people during public transport trips. In order to encourage older people to take the bus, and to give them tips and tricks on how to prevent accidents, the Salzburg bus operator StadtBus Salzburg in co-operation with the local NGO ZGB Salzburg started a training scheme for older passengers in 2004.

Participants of the training are invited to the bus depot in small groups, where a bus is made available for the training session. Additionally, a transport safety handbook was developed together with a variety of other marketing measures that address older people. Many older people use the bus more frequently and feel safer after having participated in the training. The travel training for older people does not only get positive feedback from the users, but also receives international attention from others who want to learn from these experiences. The concept has constantly been refined over time.

## Key Aspects for Implementation

### Check list

<b>City size</b>	No restrictions
<b>User needs</b>	<ul style="list-style-type: none"> <li>• Potential target groups: older people, people with disabilities, people with learning difficulties, immigrant communities and children;</li> <li>• Acquiring knowledge and confidence on how to use public transport;</li> <li>• Knowing who to address in case of problems or obtaining information;</li> <li>• Feeling personally safe and secure;</li> <li>• Being taken seriously as a customer;</li> <li>• Wide range of different needs for people with permanent or temporary impairments (e.g. disabilities).</li> </ul>
<b>Costs</b>	<ul style="list-style-type: none"> <li>• A comparatively low-cost measure that can be expanded from a small scheme to a wider range of activities;</li> <li>• Mainly staff costs plus moderate costs for marketing material.</li> </ul>
<b>Time horizon</b>	<ul style="list-style-type: none"> <li>• Planning of scheme and preparation of materials within a few months;</li> <li>• Quick implementation.</li> </ul>
<b>Key stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Transport operators and authorities as well as public transport associations;</li> <li>• Schools;</li> <li>• Interest groups;</li> <li>• Charities;</li> <li>• Local authorities.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Dedicated team and cooperation;</li> <li>• Tailored scheme for each target group;</li> <li>• Good communication with users to build confidence;</li> <li>• Budget to get started and secure long-term funding perspective.</li> </ul>
<b>Excluding factors</b>	None



**Bus school for children in Freiburg**

Photo: VAG Freiburg



**MobiRace playful travel training for children, Munich**

Photo: MVG Photo, Kerstin Groh



**Manchester Travel Training Partnership for young people with special needs – individual buddying concept**

Photo: MTTP

### Weblinks – selected target groups

#### **Salzburg, StadtBus AG - older people**

[http://www.salzburg-ag.at/nc/verkehr/stadtbusservice-kontakt/obus-senioren/sicherheitskurse/?sword\\_list\[\]=training](http://www.salzburg-ag.at/nc/verkehr/stadtbusservice-kontakt/obus-senioren/sicherheitskurse/?sword_list[]=training) (German) and

[www.aeneas-project.eu/docs/KrakowTraining/AENEAS\\_WS\\_Angelika\\_Gasteiner.pdf](http://www.aeneas-project.eu/docs/KrakowTraining/AENEAS_WS_Angelika_Gasteiner.pdf) (English presentation)

#### **Freiburg, VAG – children**

[www.vag-freiburg.de/schueler.html](http://www.vag-freiburg.de/schueler.html) (German)

#### **Munich, MVG MobiRace – children**

[www.mvg-mobil.de/mobi-race.htm](http://www.mvg-mobil.de/mobi-race.htm) (German)

#### **Manchester, MTTP – young people with special needs**

[www.lancasterian.manchester.sch.uk/travel-training.htm](http://www.lancasterian.manchester.sch.uk/travel-training.htm) (see online video)

#### **AENEAS project on urban mobility of older people**

[www.aeneas-project.eu](http://www.aeneas-project.eu)

### NICHES+ Contact

**Sebastian Bührmann, Rupprecht Consult**  
[s.buehrmann@rupprecht-consult.eu](mailto:s.buehrmann@rupprecht-consult.eu)

# Innovative Concepts to Enhance Accessibility

## Neighbourhood Accessibility Planning

### Key Characteristics

Neighbourhood Accessibility Planning (NAP) aims at improving local conditions for walking and cycling as well as facilitating safe access to local facilities (e.g. schools, shops) and public transport services. New mobility forms such as inline-skating and local demands towards the public transport network can also be considered.

A NAP scheme follows a participatory process with the local community to identify the main issues to be addressed.

During the process, a priority list of actions is drafted to enhance accessibility on a neighbourhood scale (e.g. engineering, education, marketing, encouragement, enforcement, environmental and policy initiatives).

The needs of more vulnerable groups such as the disabled, older people and children are taken into account.

Despite its high relevance and potential to not only improve daily mobility but also social interaction in a neighbourhood, the concept is still not mainstream in Europe.

### Key Benefits

#### **Neighbourhood Accessibility Planning:**

- improves conditions for walking and cycling and leads to the improved design of local bus services;
- creates more lively neighbourhoods, better use of public space and social inclusion;
- enables better understanding of citizens' needs and thus the design of more appropriate measures to improve neighbourhood accessibility through participatory processes;
- allows for better co-ordination within local administration and with external partners;
- may reduce car use on short distances.



**Extensive citizen participation in the Munich approach to improve accessibility in an inner city neighbourhood**

Photos: KOMMA.PLAN, Kerstin Langer, Simonne Schipper

### Good Practice: Munich (DE)

A neighbourhood mobility concept ("Stadtviertelkonzept Nahmobilität") was piloted in a selected Munich city centre area in 2003. Transport professionals from various organisations (different city departments, the transport operator, consultancies) and citizens from the area Ludwigsvorstadt-Isarvorstadt worked together to identify problems, assess them, and develop concrete proposals to improve the situation.

The aim was to find effective, simple and reasonable measures to improve conditions for walking, cycling and other forms of non-motorised transport as well as for the local bus network. A key element of the approach was extensive citizen participation, which not only involved local interest groups, but also "ordinary" citizens. The target group were all the citizens of the neighbourhood, while children and older people in particular benefited from the proposed measures.

The focus was on small measures on an organisational rather than technical level, for example the re-location of bus shelters, new benches, pedestrian crossings and improved lighting.

## Key Aspects for Implementation

### Check list

<b>City size</b>	No restrictions, can be applied to different land use patterns.
<b>User needs</b>	<ul style="list-style-type: none"> <li>• Quality of public space and liveability of neighbourhood;</li> <li>• Road safety, independent and healthy mobility;</li> <li>• Citizen participation;</li> <li>• Strong local economy;</li> <li>• Tailored solutions.</li> </ul>
<b>Costs</b>	Costs depend on time and effort for the participatory process and the budget available for implementation.
<b>Time horizon</b>	<ul style="list-style-type: none"> <li>• Several months for preparation;</li> <li>• Several months for participation process;</li> <li>• Measure implementation possible in short to long term.</li> </ul>
<b>Key stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Local authority: different departments, e.g. mobility department, infrastructure and public works, town planning;</li> <li>• Local interest groups;</li> <li>• Local businesses;</li> <li>• Public transport operators;</li> <li>• External moderators and planners (optional).</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Stakeholder participation and a well working structure and mentality for co-operative processes;</li> <li>• Confirmed political strategy and budget to back up process;</li> <li>• Well-designed methodology and professionally organised participation process;</li> <li>• Predefined budget for process and swift implementation.</li> </ul>
<b>Excluding factors</b>	Lack of political support (priority list that cannot be implemented may lead to frustration among citizens).

*Cars parked on sidewalks can be a real barrier to people with prams or wheelchair users. Parking management is applied in Munich to tackle this problem.*

Photo: Rupprecht Consult



*Zurich, high quality of public space*

Photo: Urs Walter, Zurich



### Weblinks

#### **Munich, Germany, "Stadtviertelkonzept Nahmobilität"**

[www.muenchen.de/buendnis-fuer-oekologie](http://www.muenchen.de/buendnis-fuer-oekologie) (German)

[www.niches-transport.org/index.php?id=230](http://www.niches-transport.org/index.php?id=230) (site visit report in English)

#### **Zurich, Switzerland, public space/ human powered mobility**

[www.stadt-zuerich.ch/ted/de/index/taz/mobilitaet.html](http://www.stadt-zuerich.ch/ted/de/index/taz/mobilitaet.html)

#### **Bern, Implementation of "Begegnungszonen" (similar to home zones)**

[www.bern.ch/leben\\_in\\_bern/wohnen/wohnen/begegnung](http://www.bern.ch/leben_in_bern/wohnen/wohnen/begegnung) (German); [www.begegnungszonen.ch](http://www.begegnungszonen.ch) (general website in German and French)

#### **London, Walking Plan**

[www.tfl.gov.uk/corporate/projectsandschemes/2895.aspx](http://www.tfl.gov.uk/corporate/projectsandschemes/2895.aspx)

#### **Vienna, Gender mainstreaming approach:**

[www.bestpractices.at/main.php?page=vienna/best\\_practices/gender/gm\\_pilot&lang=en](http://www.bestpractices.at/main.php?page=vienna/best_practices/gender/gm_pilot&lang=en)

#### **AENEAS project, older people and mobility, stakeholder involvement handbook (2009)**

[www.aeneas-project.eu/docs/AENEAS\\_StakeholderInvolvementHandbook.pdf](http://www.aeneas-project.eu/docs/AENEAS_StakeholderInvolvementHandbook.pdf)

### NICHES+ Contact

**Sebastian Bührmann, Rupprecht Consult**  
[s.buehrmann@rupprecht-consult.eu](mailto:s.buehrmann@rupprecht-consult.eu)

# Innovative Concepts to Enhance Accessibility

## Tailored Traveller Information for Users with Reduced Mobility

### Key Characteristics

This concept aims to provide tailored public transport travel information to people with reduced mobility.

Information on barrier-free travel options via the Internet (and hotline), as a convenient means for planning a trip in advance, is a key characteristic of the concept.

The concept includes static traveller information on the accessibility of the public transport system, e.g. accessibility of rail stations and rolling stock and/or routing information, e.g. barrier-free travel-chains.

The information services target a range of different user groups, e.g. the disabled, parents with prams, older people and impairment types, e.g. physically impaired, sensory impaired.

The service provides accurate, useful, up-to-date and understandable information that meets specific user needs.

Tailored online information and information via a hotline for mobility impaired travellers is still the exception in Europe, but has a lot of potential to improve the daily mobility of many users.



**Station map in RMV online travel information system for mobility impaired travellers**

Source: RMV

### Benefits

#### **Tailored traveller information for users with reduced mobility:**

- has a positive impact on the independent living of people with reduced mobility (including the temporary impaired, e.g. people with prams) through easier planning of barrier-free trips;
- is a valuable tool to raise the public profile of major investments in accessible infrastructure, e.g. lifts;
- could reduce the need for costly special transport services;
- gives a better image to public transport.

#### **Good Practice:**

##### **Frankfurt (Rhein/Main) and Berlin-Brandenburg regions (DE)**

The BAIM/BAIM Plus project is one of the most advanced examples of online traveller information for mobility impaired travellers in Europe. It enables users to plan a barrier-free trip in advance.

Two public transport associations, the RMV in the Frankfurt Rhein-Main region and the VBB in Berlin-Brandenburg, developed a mature journey planner in co-operation with other partners. It gives information on barrier-free travel chains in public transport.

The system provides tailored traveller information for different target groups. The user can enter specific requirements for barrier-free travelling for a planned trip. The journey planner provides information on connections that are barrier-free and also gives additional details on the accessibility of interchanges, stops and vehicles (e.g. interactive station plans). Detailed interchange maps visualising critical information, help the user to get an easier overview.

The information is provided in different formats according to the user's needs, e.g. description of public transport interchanges in text format, which can be read via screen reader by blind people. The services are available online at [www.rmv.de](http://www.rmv.de) and [www.vbbonline.de](http://www.vbbonline.de).

## Key Aspects for Implementation

### Check list

<b>City size</b>	<ul style="list-style-type: none"> <li>Regional scale within the boundaries of a public transport service area;</li> <li>The larger the area the better.</li> </ul>
<b>User needs</b>	<ul style="list-style-type: none"> <li>Detailed and up-to-date information on barrier-free travel options, tailored to different needs, e.g. blind, physical impairments, cognitive impairments;</li> <li>Accessibility details for stations and stops;</li> <li>Routing information for barrier-free trip-chains (costly);</li> <li>Adequate format of information provision (e.g. website).</li> </ul>
<b>Costs</b>	<ul style="list-style-type: none"> <li>Costs depend on complexity and data requirements;</li> <li>Barrier-free routing information (trip chains) is more costly to provide than static information, e.g. fully accessible lines and stops.</li> </ul>
<b>Time horizon</b>	Several months of preparation and data gathering before implementation.
<b>Key stakeholders involved</b>	<ul style="list-style-type: none"> <li>Public transport operators and public transport associations (key stakeholders);</li> <li>Public authorities;</li> <li>User representatives;</li> <li>Companies or research institutes that support the technical and organisational implementation.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>Assess user needs with user participation throughout project life;</li> <li>Avoid excluding users by focusing only on technical solutions, personalised services still needed;</li> <li>Choose right level of complexity and data requirements for local context;</li> <li>Combine with other measures to improve accessibility of network.</li> </ul>
<b>Excluding factors</b>	Lack of even basic accessibility of vehicles and interchanges may be a severe barrier.

**The Prague Public Transport Operator provides static information on metro stations and vehicles**

Source: Dopravní podnik hl.m.



**Users with mobility impairments need to know in advance whether a stop or vehicle is accessible**

Photo: SMT Artois-Gohelle



### Weblinks

#### **BAIM/ BAIM Plus Projects**

[www.baim-info.de](http://www.baim-info.de) (German)

#### **Berlin, VBB journey planner with barrier-free routing**

[www.vbb-fahrinfo.de/hafas/query.exe/en](http://www.vbb-fahrinfo.de/hafas/query.exe/en) (English)

#### **Frankfurt, RMV journey planner with barrier-free routing**

[www.rmv.de/baim/bin/jp/query.exe/dn?L=vs\\_rmv.vs\\_baimprofile](http://www.rmv.de/baim/bin/jp/query.exe/dn?L=vs_rmv.vs_baimprofile) (German)

#### **Prague public transport operator – barrier-free**

[www.dpp.cz/en/barrier-free-travel/](http://www.dpp.cz/en/barrier-free-travel/) (English)

#### **Paris infomobi website**

[www.infomobi.com](http://www.infomobi.com) (French)

#### **London, Transport for London accessibility website**

[www.tfl.gov.uk/gettingaround/transportaccessibility/1167.aspx](http://www.tfl.gov.uk/gettingaround/transportaccessibility/1167.aspx)

### NICHES+ Contacts

**Sebastian Bührmann, Rupprecht Consult**  
[s.buehrmann@rupprecht-consult.eu](mailto:s.buehrmann@rupprecht-consult.eu)

# Efficient Planning and Use of Infrastructure and Interchanges

## Passenger Friendly Interchanges

### Key Characteristics

A number of traffic flows of a different nature meet and cross each other at an intermodal interchange.

Enhanced transport functions are focused on providing solutions for smart and efficient interaction of these flows in interchanges. There are different points of view as to what we call a passenger friendly interchange. From the point of view of daily commuters, a short transfer path is the most important. For tourists the availability of information (positioning, up-to-date) is most relevant, while for families, children and older people safety and easy access are crucial. Finally, we must not forget mobility impaired people, or those who want to spend their waiting time usefully, before or after travelling.

All these different user groups come together in intermodal interchanges. Passenger friendliness of these interchanges is crucial to further developments in public transport.



**Birkenhead Bus Station**

Photos: Merseytravel, Alan Murray-Rust

### Benefits

#### **Passenger friendly interchanges:**

- minimise overcrowding and congestion;
- help the efficient use of space;
- optimise the design and location of key facilities;
- provide shorter routes for passengers;
- provide better access for different groups;
- create conditions for integrated traveller information;
- provide an appropriate context for integrated ticketing systems;
- provide a better design for intermodal facilities (P+R, B+R);
- provide a location for supplementary services;
- increase passenger satisfaction;
- increase public transport modal share.

### **Good Practice: Birkenhead Bus Station, Merseyside (UK)**

The Birkenhead bus station is one in a programme of new infrastructure developments built and managed by Merseytravel, the Merseyside Passenger Transport Executive. It was built in anticipation of significant increased usage of the Birkenhead shopping and leisure centre with new developments, including a multiplex cinema and a leisure park.

The Merseyside Police Crime Reduction Officer identified good visibility as a key feature in making passengers feel safe when using the bus station and deterring potential perpetrators of crime.

The bus station was designed to enhance the passenger's experience and perceptions of personal security. There are clear sightlines with much of the station's structure made from large panels of clear, toughened glass.

## Key Aspects for Implementation

### Check list

<b>City size</b>	Can be implemented in a small station as well as for large interchanges.
<b>User needs</b>	<ul style="list-style-type: none"> <li>Brightness, good visibility, avoiding dark "culs de sac" or dead ends;</li> <li>Well-trained, customer-minded facility staff;</li> <li>Sustainable design;</li> <li>Short, straight and weather protected pathways;</li> <li>Accessible environment: "easy to reach" and "easy to use".</li> </ul>
<b>Costs</b>	The information system and design might bring a higher cost than a conventional interchange. Efficient space use and rental of shop space can save money or generate income.
<b>Time horizon</b>	<ul style="list-style-type: none"> <li>Short term (less than 3 years);</li> <li>Reconstruction works should not exceed 1-2 years.</li> </ul>
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>Interchange owner/manager;</li> <li>Local authority;</li> <li>City planning;</li> <li>Public Transport Operators.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>Political will;</li> <li>Integration of ticketing and information system;</li> <li>Predictable offer of public transport over the longer term.</li> </ul>
<b>Undesirable secondary effects</b>	In case of poor regulations, additional (leisure) services and city functions may marginalise the prior transport functions.

**Leipzig Hbf**

Photo: [www.db.de](http://www.db.de)



### Weblinks

**Deutsche Bahn**

[www.db.de](http://www.db.de)

**Merseytravel**

[www.merseytravel.gov.uk](http://www.merseytravel.gov.uk)

**PROCEED Guidelines**

[www.proceedproject.net](http://www.proceedproject.net)



**State of the art design at Nelson interchange**

Photo: Des Fildes, SBS Architects, Manchester

### NICHES+ Contact

**Dr. János Monigl, Dr. Zsolt Berki,  
András Székely, TRANSMAN  
[transman@transman.hu](mailto:transman@transman.hu)**

# Efficient Planning and Use of Infrastructure and Interchanges

## Innovative Cycling Facilities for Interchanges

### Key Characteristics

The depletion of cheap and easily available fossil fuels will help to bring non-motorised transport modes to the forefront of urban transport policy, especially for short distance trips in local areas. Bicycle use is a promising alternative to the car as feeder transport to interchanges, if bicycles can be parked in a safe, secure place. From an environmental perspective, the combined use of cycling and public transport offers one of the best alternatives to the car and provides an additional travel choice for passengers.

Cycling is flexible, individual, and competitive to car use in terms of journey times in urban areas. In order to get the desired effect, the offered bicycle services at interchanges are to be comprehensive and should include bicycle rental, guarded bicycle storage (an easy to use parking system), maintenance services, and the construction of extra cycle lanes and entry points to get easy access to the station. These measures have a key role in promoting a mode shift from car towards public transport.



**Underground bike parking in Zutphen (NL)**

Photos: [www.fietsberaad.nl](http://www.fietsberaad.nl)

### Benefits

#### Cycling facilities at interchanges:

- increase the combined usage of public transport and bike;
- help shift trip-makers towards sustainable modes;
- make the travel chain more flexible;
- help to manage space in the often crowded area near public transport interchanges;
- offer a location for renting and repairing bikes;
- provide attractive points for tourists (by offering a new means of transport);
- revitalise the area;
- reduce car usage;
- reduce the necessity for car ownership.

#### Good Practice:

##### Combination of cycling and public transport in the Netherlands

In the Netherlands, public transport stations and stops (metro, tram, bus) are very well equipped with bicycle storage facilities. As 88% of all Dutch households own at least one bike, but the majority have two or more, cycling plays a complementary role for the last mile of journeys, from rail and metro stations, or bus and tram stops to the final destination.

In October 2006, the town of Zutphen opened the first free guarded NS parking facility in the Netherlands. Underneath the station square, an ideal parking facility was constructed for 3,000 bicycles. At ground level, a beautiful pedestrian area was created.

## Key Aspects for Implementation

### Check list

<b>City size</b>	Any kind of interchange could be equipped.
<b>User needs</b>	<ul style="list-style-type: none"> <li>• Easy access;</li> <li>• Guarded storage;</li> <li>• Additional services (public bike, maintenance).</li> </ul>
<b>Costs</b>	Cheapest investment among transport investments.
<b>Time horizon</b>	Short term (within 1 year).
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Local authority;</li> <li>• Public transport operator;</li> <li>• Interchange owner/manager;</li> <li>• Cyclist associations;</li> <li>• Cycling service providers.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Topography;</li> <li>• Public transport network density;</li> <li>• Modal share;</li> <li>• Car drivers behaviour;</li> <li>• Overall cycling infrastructure.</li> </ul>
<b>Excluding factors</b>	Totally impossible context conditions for cycling make the measures unviable (lack of infrastructure, culture/behaviour of car drivers, inappropriate topology or climate, etc.).



*The Finsbury Park Transport Interchange in London offers secure, covered parking for 125 bicycles*

Photos: [www.eltis.org](http://www.eltis.org), [www.ctc.org.uk](http://www.ctc.org.uk)



### Weblinks

#### **Chambéry bike stations**

<http://www.chambery-metropole.fr/>

#### **Fietsberaad**

<http://www.fietsberaad.nl/>

#### **MétroVélo**

<http://www.metrovelo.fr/>

### NICHES+ Contact

**Dr. János Monigl, Dr. Zsolt Berki,**  
**András Székely, TRANSMAN**  
[transman@transman.hu](mailto:transman@transman.hu)

# Efficient Planning and Use of Infrastructure and Interchanges

## Infrastructure for Innovative Bus Systems

### Key Characteristics

A more efficient use of urban space, and especially urban space allocated to transport, can improve operational conditions for public transport. Giving priority to buses in congested cities has proven to be a very effective strategy. In its simplest form, a bus lane can be implemented on a short stretch of road, as a through- or by-pass for a congested zone. In many cases however, bus lanes are connected to a separate road network with its own traffic management system, traffic signals, and bus stop facilities.

Bus Rapid Transit (BRT) and bus lanes are not only implemented to pass through congested road sections, but to connect several districts or suburban areas with each other. They operate in central (often congested) urban areas with the reliability of light rail, and with the flexibility of buses in peripheral areas.



**BusWay in Nantes**

Photos: Nantes Métropole

### Benefits

#### Innovative bus systems:

- reduce travel times (reduce the need to have differential journey times between peak and off-peak hours);
- provide a comfortable way of travelling;
- provide a reliable service and schedule (enable timetables to be constructed with greater certainty);
- enable users to rely on advertised journey times, increasing confidence in the service;
- use high capacity and low emission vehicles;
- are cheaper in terms of operation and implementation than a similar tramway investment;
- help the shift towards sustainable modes (60% increase in bus passengers in Nantes courtesy of the system);
- reduce the complexity of the driving task;
- increase traffic safety.

#### Good Practice: BusWay in Nantes (FR)

In 2005, France started its own concept "Buses with a high level of service" (BHLS - Bus à Haut Niveau de Service) to improve sustainable and affordable mobility in urban areas. The City of Nantes is a conurbation with nearly 600,000 inhabitants. The so-called "BusWay", launched in 2006, is a 7km long stretch with 15 stops. It connects the ring road to the centre of Nantes in less than 20 minutes, with a frequency of 4 minutes at peak hours. The operation speed is between 21 and 23 km/h. This bus system adopted the elements which made the "tramway" a success: dedicated lanes, well-designed and equipped stations, priority at intersections, high frequency and extended hours, and park and ride facilities.

## Key Aspects for Implementation

### Check list

<b>City size</b>	<ul style="list-style-type: none"> <li>No size restrictions;</li> <li>The actual scope and importance of the measures and network will depend on the city size.</li> </ul>
<b>User needs</b>	<ul style="list-style-type: none"> <li>User friendly ticketing system;</li> <li>Reliable and frequent service;</li> <li>Attractive design of buses and stops;</li> <li>Passenger friendly staff;</li> <li>Accessible information.</li> </ul>
<b>Costs</b>	Relatively high cost at implementation stage (infrastructure, vehicles) but cheaper than trams/light rail, operation costs are lower too.
<b>Time horizon</b>	Short term ( less than 2 years).
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>Local authority, road operator;</li> <li>Bus manufacturers;</li> <li>System provider;</li> <li>Operator.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>Political will to reallocate road space, despite competition with cars in this regard;</li> <li>Financial support from private and public sector.</li> </ul>
<b>Excluding factors</b>	<ul style="list-style-type: none"> <li>In case of low appreciated demand the measure is not viable;</li> <li>In case of a very high appreciated demand, a tramline could be considered.</li> </ul>
<b>Undesirable secondary effects</b>	Restrictions for car users (infrastructure).



**The BRT System in Amsterdam: Zuidtangent, buses at work**

Photos: [www.busfoto.nl](http://www.busfoto.nl)



### Weblinks

#### **Zuidtangent**

[www.zuidtangent.nl](http://www.zuidtangent.nl)

#### **Nantes BusWay**

[www.nantesmetropole.fr](http://www.nantesmetropole.fr)

#### **BHLS**

[www.bhls.eu](http://www.bhls.eu)

#### **PROCEED Guidelines**

[www.proceedproject.net](http://www.proceedproject.net)

### NICHES+ Contact

**Dr. János Monigl, Dr. Zsolt Berki,**  
**András Székely, TRANSMAN**  
**[transman@transman.hu](mailto:transman@transman.hu)**

# Traffic Management Centres

## Financing and Implementing Traffic Management Centres

### Key Characteristics

Collaboration between public and private partners enables industry to innovate, think long term and influence the public sector. The private sector can manage a 'public' Traffic Management Centre (TMC) to improve efficiency and reduce costs.

Identifying an appropriate financial and management model is crucial for implementing, improving or upgrading a TMC.

A potential method for financing the development and day-to-day operations of TMCs is through a form of working alliance requiring co-operation of public and private partners. These working collaborations enable the public sector to share financial burden and risk with the private sector.

They have been applied to a diverse range of projects within the transport sector, with varying levels of effectiveness and are dependent on the political, legislative and financial regimes within a city or country.

Traditionally collaborations involve a public authority entering into a partnership with a consortium of financial institutions, consultants, engineers, technology suppliers, highway authorities and transport operators.



**Traffic Information Display**  
Photo: Siemens

### Benefits

#### Innovative finance models for TMCs:

- enable a new facility to be implemented at shorter notice than with a publicly financed project;
- allow an existing facility to be upgraded;
- enable appropriate Intelligent Transport Systems (ITS) to be sourced;
- allow appropriate management and day-to-day operation to take place;
- import knowledge about the establishment and management of other TMCs;
- spread the financial burden and risk between public and private partners;
- help cities identify and implement appropriate traffic management policies;
- form a technological platform upon which additional services can be developed by private partners;
- may provide additional revenue streams for private partners;
- ultimately enhance the overall accessibility, safety and environmental quality of a city.

### Good Practice: National Traffic Control Centre (UK)

The National Traffic Control Centre (NTCC) based in the West Midlands is an ambitious telematics project aimed at providing free, real-time information on England's network of motorways and trunk roads, allowing road users to plan routes and avoid congested areas. The National Traffic Control Centre is a Private Finance Initiative (PFI) project as part of the UK Government's Public Private Partnership (PPP) policy.

In order to achieve the main goals of reducing congestion and improving journey time reliability, a real-time traffic monitoring and modelling system has been installed along with supporting technology and structures designed to dispense this information to road users and national agencies.

The centre opened in March 2006, cost £160m to build and covers 5,130 miles of the primary road network in England.

## Key Aspects for Implementation

### Check list

<b>City size</b>	City or region-wide.
<b>User needs</b>	<ul style="list-style-type: none"> <li>• The key users are the implementers of the TMC (see Stakeholders);</li> <li>• The main aim is to set up a new structure in a reasonable timeframe with minimal financial risk.</li> </ul>
<b>Costs</b>	<ul style="list-style-type: none"> <li>• For new TMC: high capital outlay, including tender cost, building, ITS;</li> <li>• For upgraded TMC: costs are marginal, based around new ITS;</li> <li>• Running and maintenance costs.</li> </ul>
<b>Time horizon</b>	3 years (from planning to full operation).
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Local authorities;</li> <li>• Public transport authority/operators;</li> <li>• Private sector funding bodies/service provider;</li> <li>• Technical advisor;</li> <li>• Legal advisor;</li> <li>• Financial institutions;</li> <li>• Police and emergency services.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Discouraging taxation/legislation;</li> <li>• Rules and regulations that counteract the use of biofuels.</li> </ul>
<b>Excluding factors</b>	Financial burden falling on local authorities.
<b>Undesirable secondary effects</b>	Financial burden falling on the taxpayer.



*5T Traffic Management Centre, Torino was developed using public funds (Italian ministry, EU) and private funds (industrial partners)*

Photo: 5T

### Weblinks

**National Traffic Control Centre, UK**  
[http://www.roadtraffic-technology.com/projects/traffic\\_control/](http://www.roadtraffic-technology.com/projects/traffic_control/)

**5T, Torino**  
<http://www.5t.torino.it/5t/en/docs/sistema5t.jspf>

**VMZ, Berlin, Germany**  
<http://www.vmzberlin.de/vmz/>  
<http://www.urbantransport-technology.com/projects/berlin/>

### NICHES+ Contact

**Simon Edwards,**  
**University of Newcastle**  
**Simon.edwards@ncl.ac.uk**

# Traffic Management Centres

## Mobile Travel Information Services for the Public

### Key Characteristics

Delivery of travel information to mobile devices provides new options for travellers on the move. Mobile travel information services (MTIS) provide comprehensive information for a traveller during a trip.

On-trip information services have existed for many years in the form of on-platform and on-board announcements on buses and trains, whilst for the motorist variable message signs (VMS) and radio travel broadcasts are increasingly commonplace.

Improved on-board and at station information is essential for public transport users, especially when considering accessibility for all.

More exciting is the use of Internet technology to provide integrated, location-based, multi-modal, real-time travel information and alerts to an individual's mobile device. Information can also be tailored to an individual's particular needs.

MTIS can enhance the convenience of travel by public transport.

They can thus contribute towards "green choices" by making public transport a more attractive option.

They require integration of mobile communication, wireless, Internet, satellite and computing technologies.



**KAMO user**

Photo: <http://www.gizmag.com>

### Benefits

#### **For the traveller, MTIS:**

- improve public transport services e.g. shorter journey duration by offering options in the event of travel problems;
- enhance public transport accessibility for many different users;
- provide a wide range of information on the move, and in real time;
- increase travel efficiency and feeling of being in control of the journey.

#### **For operators, MTIS:**

- are a tool to change operations or justify improvements to infrastructure;
- improve safety through better co-ordinated emergency response;
- prioritise public transport;
- enhance environmental objectives by providing the information needed for people to make "green choices".

### **Good Practice: KAMO, Helsinki (FI)**

KAMO is a mobile guide for public transport users in Helsinki providing journey planning, stop-specific timetable information and fare payment. Users can track the progress of any buses, trams or underground trains included in real-time positioning-based monitoring.

The service also enables journey planning and tracking via Near Field Communication (NFC)-enabled mobile phone. Once loaded into the mobile phone, KAMO can be accessed using the phone's menu. Touching a radio frequency identification (RFID)-tag with a phone opens the application on the display independently of the menu.

KAMO was funded by Helsinki City Transport (HKL) and the City of Oulu and is set to be expanded to other towns and cities.

## Key Aspects for Implementation

### Check list

<b>City size</b>	City or public transport network.
<b>User needs</b>	<ul style="list-style-type: none"> <li>• Obtain up-to-date (if possible real-time) on-trip information by different means;</li> <li>• Make public transport more accessible and better utilised.</li> </ul>
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Depend on the level and type of services to be provided by the system;</li> <li>• Marginal once system is up-and-running.</li> </ul>
<b>Time horizon</b>	3 years between planning and implementation.
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Local authority, government department or transport operator;</li> <li>• Technology suppliers (e.g. network operators, computer specialists);</li> <li>• Passenger groups;</li> <li>• Data owners;</li> <li>• Media;</li> <li>• Emergency services.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Understand user needs;</li> <li>• Quantify benefits;</li> <li>• Source appropriate technology.</li> </ul>
<b>Excluding factors</b>	<ul style="list-style-type: none"> <li>• Limited complexity of the network;</li> <li>• Availability of alternative travel options.</li> </ul>
<b>Undesirable secondary effects</b>	Improved information may encourage new trips, including those made by car.



*Hand-held device providing travel information*

Photo: UNEW



*iBus provides next-stop audio-visual announcements, information on points of interest and final destinations, and bus priority*

Photo: Julian Walker

### Weblinks

#### ***i-Bus, London***

<http://www.tfl.gov.uk/corporate/projectsandschemes/2373.aspx>

#### ***KAMO, Helsinki***

<http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=04629793>

<http://www.vtt.fi/uutta/2007/20070521.jsp?lang=en>

[http://www.innovations-report.com/html/reports/information\\_technology/report-84738.html](http://www.innovations-report.com/html/reports/information_technology/report-84738.html)

### NICHES+ Contact

**Simon Edwards,**  
**University of Newcastle**  
**Simon.edwards@ncl.ac.uk**

# Traffic Management Centres

## Using Environmental Pollution Data in Traffic Management

### Key Characteristics

There is a wide range of pollutants in urban areas, many of them by-products of transport activities. The ability to gather, manage and process pollution data enables a local authority to fully understand the impact of transport in their city.

Provision of environmental data in meaningful formats can be used to agree policy decisions, and can be disseminated to the public to help them make informed travel decisions and “green choices”.

As data gathering, management and processing becomes more sophisticated, the data that emerge, become more comprehensive and precise. This means that detailed environmental profiling becomes possible, for example the location of pollution hotspots.

In this way policy can be targeted at specific local needs or objectives, and can ultimately inform other departments e.g. for health. Appropriate policy responses can also be formulated for short term ‘events’ (e.g. extreme weather conditions or major sports events).



**Air quality monitoring in Leicester using motes**

Photo: UNEW

### Benefits

#### Using environmental pollution data in traffic management can:

- provide greater understanding of the true environmental impacts of traffic, enabling more effective local and network traffic management;
- define policy and travel choices that make a measureable difference to health quality at the local level, both in the short and long term;
- improve environmental management over a whole area (e.g. implementation of smog or ozone plans and measures), or specifically targeted local measures;
- provide the opportunity, through near real-time pollution information, for travellers to select “green choices”;
- inform policy-making in other areas e.g. health;
- be combined with historic data to reveal long-term environmental trends;
- assist compliance with EU Air Quality and Noise legislation.

### Good Practice: Leicester (UK)

Leicester’s Area Traffic Control Centre (ATC) incorporates over 800 sets of signals, 31 car park guidance variable message signs, over 100 traffic cameras, and 13 pollution monitors.

The key for any city considering this concept is identifying appropriate uses for large amounts of collected environmental data, including how to manage them, and how to employ them as a traffic management tool.

As well as traffic and travel information, Leicester supplies environmental and meteorological information to the public, including levels of ozone, CO, NOx, SO<sub>2</sub> and particulates.

With historic and near real-time data available, specific policy actions are possible, for example displacement of congestion through adjusting traffic signals, or facilitating “green choices” through dissemination of information to the public.

## Key Aspects for Implementation

### Check list

<b>City size</b>	Environmental zone, city, region, hot spots.
<b>User needs</b>	<ul style="list-style-type: none"> <li>• Environmental managers need to comply with EU legislation for air quality and noise;</li> <li>• Traffic and environmental managers need to respond effectively to pollution;</li> <li>• Residents, trip-makers and vulnerable people need to make informed choices.</li> </ul>
<b>Costs</b>	Marginal if monitoring and processing infrastructure exists, otherwise considerable.
<b>Time horizon</b>	<ul style="list-style-type: none"> <li>• 3-5 years;</li> <li>• Quick-win partial measures can be accomplished at short notice.</li> </ul>
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Local authorities, notably traffic and environmental managers, planners and air quality managers;</li> <li>• Residents, trip-makers and vulnerable people;</li> <li>• Businesses and health authorities;</li> <li>• Technical developers, the research community, modellers, data processors.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Strong political support and leadership with joined-up thinking between departments;</li> <li>• Public engagement;</li> <li>• Availability of tools to prove results;</li> <li>• Appropriate staff training.</li> </ul>
<b>Excluding factors</b>	<ul style="list-style-type: none"> <li>• Financial burden falling on local authorities;</li> <li>• Room of lack of maneuver to take mitigating measures.</li> </ul>
<b>Undesirable secondary effects</b>	Possible disincentives in publicising pollution information.



**Airparif measuring station**

Photo: David Reverchon

### Weblinks

#### **Leicester Pollution Monitoring System**

<http://rcweb.leicester.gov.uk/pollution/asp/home.asp>

<http://rcweb.leicester.gov.uk/pollution/asp/reports.asp>

<http://www.leicester.gov.uk/your-council-services/ep/environmental-health-licensing/pollution-control/air-quality/review>

[http://www.airqualitynow.eu/comparing\\_city\\_details.php?leicester](http://www.airqualitynow.eu/comparing_city_details.php?leicester)

#### **Airparif**

<http://www.airparif.fr>

#### **Key Projects**

*Heaven (Healthier Environment through Abatement of Vehicle Emission and Noise) EU 5FP 1999-2001*

*Equal (Electronic Services for a Better Quality of Life) EU 2000-2002*

### NICHES+ Contact

**Simon Edwards, University of Newcastle**  
**[Simon.edwards@ncl.ac.uk](mailto:Simon.edwards@ncl.ac.uk)**

# Automated and Space Efficient Transport Systems

## Group Rapid Transit

### Key Characteristics

Group Rapid Transit (GRT) is a new form of collective public transport using small automated electric “cyberbuses” to provide demand responsive feeder and shuttle services connecting e.g. a parking lot with a major transport terminal and/or with other facilities such as a business or retail park, university, hospital, hotels, shopping or exhibition centre.

The system is rather like a lift or elevator in that the passenger presses a button to call the vehicle and then another on the vehicle to select the destination. The cyberbus will then go directly to that destination unless called by other users to pick-up or set-down along the way. The cyberbuses will normally follow a fixed route, but can turn round at intermediate points in order to minimise the journey times for travellers.

The vehicles are electric and provide clean, green, efficient and sustainable public transport with low waiting times. They are supervised by a central control system but use obstacle avoidance technology so they are capable of mixing with other traffic (cyclists, pedestrians, and possibly other vehicles), although only at lower speeds.

### Benefits

#### GRT offers:

- a flexible alternative to shuttle bus schemes;
- highly efficient operation, cyberbuses only operate when there is a demand;
- drivers are not required so operating costs are cheaper than for equivalent bus or tram schemes;
- both scheduled and on-demand services are possible depending on the need (e.g. peak versus off peak);
- accessible to all, and simple to operate, like a lift;
- low waiting times;
- electric vehicles mean clean quiet operations, no pollution is produced locally;
- automated i.e. safe and efficient operation.



**The Parkshuttle at Rivium (NL)**

Photo: '2getthere'

### Good Practice: Parkshuttle Rivium (NL)

The Parkshuttle at Rivium uses driverless electric cyberbuses to provide a connection for travellers between the Kralingse Zoom metro station and car park, and the Rivium business park about 2 km away.

The cyberbuses run there and back, segregated from pedestrians and other traffic on 4km of guideway with 5 stops. Six buses, operating at speeds up to 25kph, are available at peak times, providing a capacity of about 480 passengers per hour, and typically carrying about 2,200 passengers in the 16 hour operating period each day. The buses run to schedules in the peak, and on-demand in the off-peak periods. The average waiting time is 1.5 minutes in the peak, and 3 mins off-peak. The typical trip is 5 to 7 minutes.

Start up costs are reckoned to be more expensive than for a conventional bus scheme, but the operating costs are less.

## Key Aspects for Implementation

### Check list

<b>City size</b>	GRT schemes tend to be thought of as providing the “last mile” connectivity to business or retail parks, main line terminals, hospitals, university campuses etc, although the potential is greater.
<b>User needs</b>	Passengers require on-demand or frequent public transport services with low waiting times and low cost.
<b>Costs</b>	Less than for an equivalent bus scheme using drivers, and less than for a tram. Capital costs are needed to procure the cyberbuses, provide the control system/centre and a depot for vehicle maintenance/charging; and also to provide and equip the guideway, stops and security measures.
<b>Time horizon</b>	Short - medium term. A scheme might take up to 3, and in some cases more, years to implement.
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Operating company;</li> <li>• Site or infrastructure owner, e.g. local authority;</li> <li>• National government for safety certification;</li> <li>• Local community and users.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• High initial cost compared to an equivalent bus scheme;</li> <li>• But lower operating costs.</li> </ul>
<b>Excluding factors</b>	<ul style="list-style-type: none"> <li>• Legal issues: need to certify driverless bus schemes for safety;</li> <li>• New system, so considered to be a high risk solution.</li> </ul>
<b>Undesirable secondary effects</b>	Possible visual intrusion caused by elevated sections of guideway, or severance caused by guideway at street level.



**The GRT scheme from Robosoft being implemented at the New Rome (I) Exhibition Centre as part of the EC supported CityMobil project**

Source: City of Rome

### Weblinks

#### **Commuter Challenge (USA)**

[www.commuterchallenge.org](http://www.commuterchallenge.org)

#### **Parkshuttle**

<http://connectedcities.eu/showcases/parkshuttle.html>

#### **2getthere**

<http://www.2getthere.eu>

#### **Robosoft**

[http://www.robosoft.fr/eng/actualite\\_detail.php?id=1022](http://www.robosoft.fr/eng/actualite_detail.php?id=1022)

#### **CityMobil**

<http://www.citymobil-project.eu>

### NICHES+ Contacts

**Dr Nick Hounsell, Prof. David Jeffery**  
**Transportation Research Group**  
**School of Civil Engineering and the Environment**  
**University of Southampton**  
**nbh@soton.ac.uk**

# Automated and Space Efficient Transport Systems

## Personal Rapid Transit

### Key Characteristics

Personal Rapid Transit (PRT) is a new form of public transport using small automated electric “podcars” to provide a taxi-like service for individuals or small groups of travellers, and to provide demand responsive feeder and shuttle services connecting, for example a parking lot with a major transport terminal and/or with other facilities such as business and retail parks, universities, hospitals, hotels, shopping or exhibition centres.

The system is rather like a lift or elevator in that the passenger presses a button to call the vehicle and then another on the vehicle to select the destination. The “podcar” will then go directly to that destination without making any intermediate stops along the way.

The podcars run on a segregated guideway in order to avoid any interaction with other traffic, and provide clean, green, efficient and sustainable transportation. With the relatively high vehicle speeds and very small headways that are possible, PRT can provide fast, individual, on-demand and point-to-point public transport with very low waiting times. It comes very close to providing a level of service similar to the private car.

### Benefits

#### PRT offers:

- a flexible alternative to bus, or tram (light-rail transit) schemes;
- highly efficient operation as podcars only operate when there is a demand;
- lower operating costs than equivalent bus or tram schemes as drivers are not required;
- public transport, but personal, like a taxi;
- on-demand, direct, origin to destination services, i.e. no intermediate stops to pick-up or drop-off others;
- accessibility for all, and simple operation, like a lift;
- very short waiting times;
- a segregated guideway, so avoids congestion and delays (like a metro);
- high capacity (if required) by linking cars like a tram;
- clean, quiet, pollution-free operation;
- automated operation, promoting safety and efficiency.



**PRT at Heathrow Airport (UK)**

Photos: BAA

### Good Practice: Heathrow Airport (UK)

The pilot PRT scheme at Heathrow Airport (UK) is the first implementation of PRT in the world. It provides transport for travellers between the business car park and the new Terminal 5, about 2 km away.

21 automatic electric podcars, each with room for 4 persons and their luggage, transport users along a segregated guideway at up to 40kph. The trip takes about 5 minutes, the podcars operate on-demand, but are usually available immediately so that waiting times are zero for 70% of users and very low for the others.

The capital cost is reckoned to be about half that of an equivalent tram scheme and with the potential to provide a similar passenger-carrying capacity.

If the pilot is successful, it is planned to extend it eventually, to interconnect all the car parks and terminals with the bus, rail and metro stations, car rentals and hotels on the airport site.

## Key Aspects for Implementation

### Check list

<b>City size</b>	Initially for widening catchment areas e.g. for stations and terminals and serving dispersed sites, but city sized networks are possible.
<b>User needs</b>	Passengers require an on-demand taxi like public transport service with very low waiting times at low cost.
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Less than for an equivalent tram scheme;</li> <li>• Capital costs are needed to procure the podcars, provide the control system/centre and a depot for vehicle maintenance/charging; and also to provide and equip the guideway, stations and security measures.</li> </ul>
<b>Time horizon</b>	Medium term, 5 years or more may be needed to plan and implement a scheme in a city environment.
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• Operating company;</li> <li>• Site or infrastructure owner e.g. local authority;</li> <li>• National government for safety certification;</li> <li>• Local community and users.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• High initial cost compared to an equivalent bus, though not a tram, scheme;</li> <li>• But lower operating costs than both.</li> </ul>
<b>Excluding factors</b>	<ul style="list-style-type: none"> <li>• Legal issues: need to certify driverless podcar schemes for safety;</li> <li>• New, so considered to be a high risk solution.</li> </ul>
<b>Undesirable secondary effects</b>	Possible visual intrusion caused by elevated sections of guideway, and of severance caused by sections at-grade, although these can be mitigated by using 'cut and cover' tunnels.



*Vectus podcars on the test track in Uppsala*  
Photos: Vectus Ltd

### Weblinks

#### **Heathrow PRT**

<http://www.atsltd.co.uk>

#### **Vectus Ltd**

<http://www.vectusprr.com/prt/overview.php>

#### **2getthere**

<http://www.2getthere.eu>

### NICHES+ Contact

**Dr Nick Hounsell, Prof. David Jeffery**  
**Transportation Research Group**  
**School of Civil Engineering and the Environment**  
**University of Southampton**  
**[nbh@soton.ac.uk](mailto:nbh@soton.ac.uk)**

# Automated and Space Efficient Transport Systems Using Electric Vehicles in City Car Share Schemes

## Key Characteristics

City Car Share Clubs are well established, though many cities do not yet see them as a legitimate “public transport” offering, and only very few examples use electric vehicles.

Car share clubs mean shared vehicles, and consequently, a reduced number of privately owned cars on the roads and at the same time a proportional reduction in the number of parking spaces needed.

Shared cars cater for the occasional journeys that are not convenient by public transport (PT) e.g. the weekly shop at the supermarket, or visit to a friend or relative on the other side of town. Electric vehicles are green, clean and quiet, and offer obvious advantages over conventional fossil fuelled cars in city environments.

La Rochelle in France has pioneered the way for such schemes. The concept is now being taken up in London with the introduction of the first electric vehicles into existing car share clubs in January 2010, and in Paris with plans to implement Autolib, a scheme involving 3000 vehicles with 1000 pick-up points, starting in 2011. This clearly marks the beginning of a new age and type of public transport.



Photo: La Rochelle

## Benefits

### A City Car Share Club using electric vehicles offers:

- savings for users who share the costs of car ownership;
- a new public transport opportunity offering greater flexibility for users, especially to places and at times when other modes are not running;
- shared vehicles meaning reduced private cars on the roads, and hence less traffic;
- less traffic meaning reduced congestion and delays;
- less traffic also meaning less pollution i.e. emissions and noise, which is doubly helped because the replacement, i.e. shared cars, are electric;
- fewer cars also meaning a reduced requirement for parking spaces, with the opportunity to reclaim the land for other e.g. amenity, uses;
- more sustainable transport and improved quality of life in the city.

### Good Practice: Liselec (FR)

The Liselec scheme in La Rochelle, France, has been operating since 1999. It provides 50 electric cars (25 Peugeot 106s and 25 Citroen Saxos), parked in 7 recharging stations near high use locations in the city, such as the main train station, the bus station and the university.

The cars are available for pick-up round the clock, every day of the week. Users must have a driving licence in order to take out a subscription. In exchange, they receive a pass unlocking any of the 50 cars. Subscribers pay for car hire according to the usage time and mileage totalled during the month. Users can leave the cars at any recharging station, so they effectively have free parking in the city. The scheme operator must redistribute the cars if necessary at the end of the day.

## Key Aspects for Implementation

### Check list

<b>City size</b>	Bigger cities will generally need more vehicles, but start up schemes can be small and local.
<b>User needs</b>	To have a car available on demand, when required at a reasonable cost.
<b>Costs</b>	Capital costs are needed to provide electric cars, parking and recharging stations. These can be recovered through charges. Public private partnerships are possible.
<b>Time horizon</b>	Short term (schemes can be established within 2-3 years).
<b>Stakeholders involved</b>	<ul style="list-style-type: none"> <li>• City authority to promote scheme and provide parking/charging stations;</li> <li>• Electricity supply company to provide charging units;</li> <li>• Operating company to procure vehicles and manage operations;</li> <li>• Some car sharing initiatives target companies as clients for business trips.</li> </ul>
<b>Crucial factors</b>	<ul style="list-style-type: none"> <li>• Promotion and active encouragement by the city and scheme operator;</li> <li>• Sufficient cars and parking / charging spaces to meet demand.</li> </ul>
<b>Excluding factors</b>	<ul style="list-style-type: none"> <li>• Electric cars are more expensive currently, although this will change;</li> <li>• Charging infrastructure required.</li> </ul>
<b>Undesirable secondary effects</b>	Concerns that quiet electric cars might lead to more accidents are not supported by evidence from La Rochelle.



*Electric vehicle recharging site, Camden*

Photo: velcro

### Weblinks

#### **Liselec**

<http://www.comox.fr/1/200.aspx>

#### **Transport for London**

<http://www.london.gov.uk/mayor/publications/2009/docs/electric-vehicles-plan.pdf>

#### **Carplus**

<http://www.carplus.org.uk>

#### **Autolib**

[http://www.businessweek.com/globalbiz/content/aug2009/b2009087\\_330677.htm](http://www.businessweek.com/globalbiz/content/aug2009/b2009087_330677.htm)

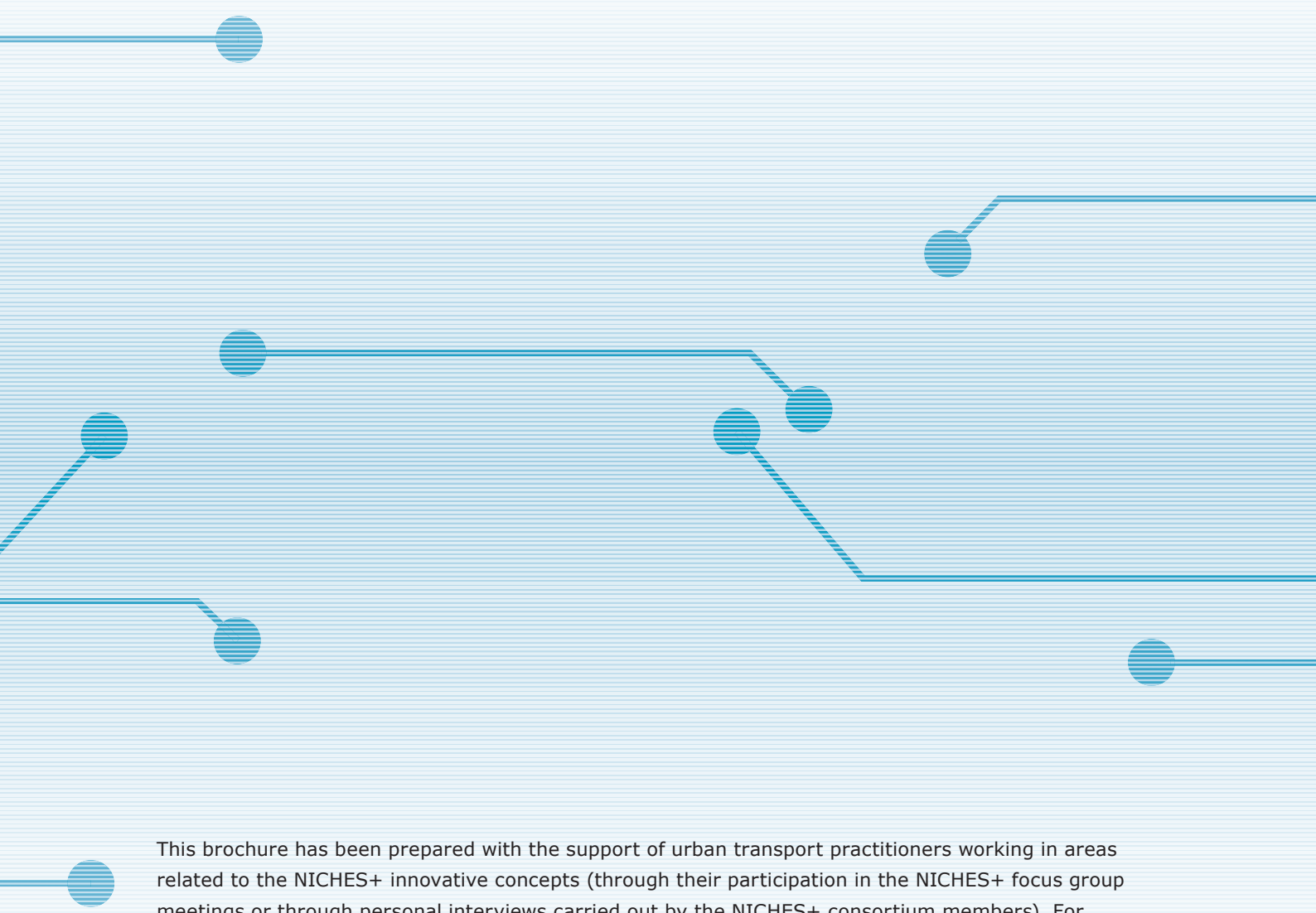
### NICHES+ Contact

**Dr Nick Hounsell, Prof. David Jeffery**  
**Transportation Research Group**  
**School of Civil Engineering and the Environment**  
**University of Southampton**  
**[nbh@soton.ac.uk](mailto:nbh@soton.ac.uk)**

## Further Information

Below you can find the contact details of the NICHES+ consortium partners, whom you can contact for more information on the NICHES+ project, its thematic areas and general information on the NICHES+ concepts.

NICHES+ CONSORTIUM Contact Details					
Name	Organisation	CC	Postal Address	Email address	Phone number
<b>NICHES+ GENERAL CONTACT POINT- PROJECT COORDINATION</b>					
<b>Ivo Cré</b>	Polis	BE	Rue du Trône 98, 1050 Brussels	icre@polis-online.org	T +32 2 500 56 76
<b>Sylvain Haon</b>	Polis	BE	Rue du Trône 98, 1050 Brussels	shaon@polis-online.org	T +32 2 500 56 71
<b>Karen Vancluysen</b>	Polis	BE	Rue du Trône 98, 1050 Brussels	kvancluysen@polis-online.org	T +32 2 500 56 75
<b>INNOVATIVE CONCEPTS TO ENHANCE ACCESSIBILITY</b>					
<b>Siegfried Rupprecht</b>	Rupprecht Consult - Forschung und Beratung GmbH	DE	Hatzfeldstrasse 6, 51069 Cologne	s.rupprecht@rupprecht-consult.eu	T +49 221 6060 55 0
<b>Sebastian Bührmann</b>	Rupprecht Consult - Forschung und Beratung GmbH	DE	Hatzfeldstrasse 6, 51069 Cologne	s.buehrmann@rupprecht-consult.eu	T +49 221 6060 55 14
<b>Michael Laubenheimer</b>	Rupprecht Consult - Forschung und Beratung GmbH	DE	Hatzfeldstrasse 6, 51069 Cologne	m.laubenheimer@rupprecht-consult.eu	T +49 221 6060 55 23
<b>EFFICIENT PLANNING AND USE OF INFRASTRUCTURE AND INTERCHANGES</b>					
<b>Janos Monigl</b>	TRANSMAN	HU	Hercegprimas u. 10, 1051 Budapest	transman@transman.hu	T +361 353 1484
<b>Andras Szekeley</b>	TRANSMAN	HU	Hercegprimas u. 10, 1051 Budapest	szekeley.andras@transman.hu	T +361 353 1484
<b>Zsolt Berki</b>	TRANSMAN	HU	Hercegprimas u. 10, 1051 Budapest	berki.zsolt@transman.hu	T +361 353 1484
<b>TRAFFIC MANAGEMENT CENTRES</b>					
<b>Simon Edwards</b>	Newcastle University	UK	Cassie Building 2.28, NE1 7RU Newcastle upon Tyne	simon.edwards@newcastle.ac.uk	T +44 191 222 8117
<b>AUTOMATED AND SPACE EFFICIENT VEHICLES</b>					
<b>Nick Hounsell</b>	TRG - University of Southampton	UK	Highfield, SO17 1BJ Southampton	nbh@soton.ac.uk	T +44 2380 592192
<b>David Jeffery</b>	TRG - University of Southampton	UK	Highfield, SO17 1BJ Southampton	nbh@soton.ac.uk	T +44 2380 592192
<b>DISSEMINATION</b>					
<b>Silke Moschitz</b>	EUROCITIES	BE	Square de Meeûs 1, 1000 Brussels	silke.moschitz@eurocities.eu	T +32 2 552 08 76
<b>Peter Staelens</b>	EUROCITIES	BE	Square de Meeûs 1, 1000 Brussels	peter.staelens@eurocities.eu	T +32 2 552 08 66

An abstract graphic consisting of several horizontal and diagonal blue lines of varying lengths, some ending in solid blue circles. These lines are scattered across the upper and middle portions of the page, creating a network-like or circuit-like visual effect.

This brochure has been prepared with the support of urban transport practitioners working in areas related to the NICHES+ innovative concepts (through their participation in the NICHES+ focus group meetings or through personal interviews carried out by the NICHES+ consortium members). For further information on the specific innovative concepts, you can contact the urban transport experts involved in the NICHES+ project. Their contact details are available on **[www.osmose-os.org](http://www.osmose-os.org)**, the portal for urban transport innovation launched in the framework of the first NICHES project.

## The mission of NICHES+ is

*to build on the success of the first NICHES project by stimulating a wide debate on urban transport innovation between relevant stakeholders from different sectors and disciplines across the EU and accession countries, in order to promote the most promising new urban transport concepts, initiatives and projects and transfer them from their current "niche" position to a mainstream urban transport application.*

## NICHES+ team

The NICHES+ consortium is composed of a variety of experts in the field of urban transport, ensuring the knowledge of the academic sector (Universities of Southampton and Newcastle), the expertise of consultants (Rupprecht Consult, TRANSMAN) and the multiplier effect of European networks (Polis, EUROCITIES).



*For more information contact the NICHES+ consortium partners (contact details available on the previous page) or visit:*

[www.niches-transport.org](http://www.niches-transport.org)  
[www.osmose-os.org](http://www.osmose-os.org)

### Authors:

Zsolt Berki - TRANSMAN  
Sebastian Bührmann - Rupprecht Consult Forschung & Beratung GmbH  
Ivo Cré - Polis  
Simon Edwards - Newcastle University  
David Jeffery - TRG - University of Southampton  
Janos Monigl - TRANSMAN  
Peter Staelens - EUROCITIES  
Andras Szekely - TRANSMAN  
Karen Vancluysen - Polis

### Cover photos:

Rivium Parkshuttle: '2getthere'  
Travel training for children in Freiburg: VAG  
ST Traffic Management Centre: ST

This document has been prepared by the authors in the framework of a project funded by the European Commission, DG Research. It does however not necessarily reflect the views of the European Commission.