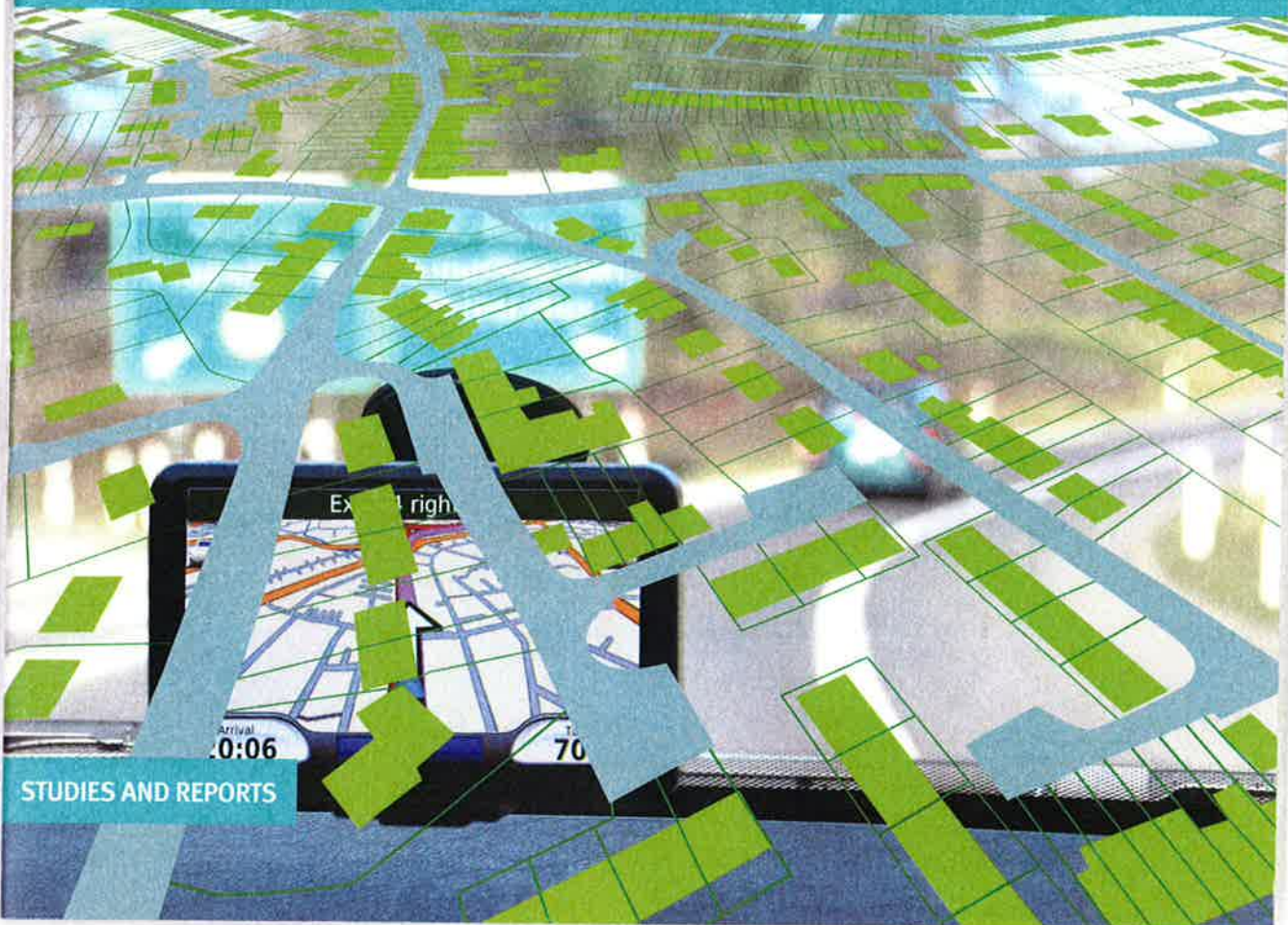




EUROPEAN / European  
COMMISSION / Research Area / Transport

# Intelligent transport systems

EU-funded research for efficient,  
clean and safe road transport



STUDIES AND REPORTS

## CITYMOBIL

Towards advanced road transport for the urban environment.

The CITYMOBIL project builds on the results of recent European and national projects to create a complete automated city transport system with vehicles ranging from advanced city cars (with ADAS), and driverless track-guided PRT carrying up to four passengers, to mid-sized shuttles (cybercars) and hybrid buses/tramways combining automatic guidance with manual control. Large-scale public demonstrations are already well advanced at project sites in Heathrow Airport (PRT), London, Rome's new exhibition centre (cybercars) and Castellón, Spain (advance buses). First European test track trials could begin as soon as 2011. These will be followed by limited open-road testing – after which, Europe-wide roll-out could be possible by 2018.

Showcase activities launched under CITYMOBIL are being continued in the follow-up CITYNETMOBIL project, which hosted events in Formello, Italy, and Clermont Ferrand, France, during 2009.

**Coordinator: TNO – Netherlands organisation for applied scientific research (The Netherlands)**

Total budget / EUR 42 million

EU funding / EUR 11 million

Start/end / 01/05/2006 – 30/04/2011

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

Following eventual take-up on a sufficient scale, traffic management systems will for the first time have the ability to communicate with individual vehicles, and to optimise network efficiency with knowledge of every vehicle's position and trajectory, and even its desired destination. This opens the door to personalised routing guidance using real-time traffic information, safety alerts to vehicles in hazardous areas and speed recommendations to groups of vehicles. It will increase total network capacity and reduce localised congestion, thus also reducing the number of accidents. Traffic flowing more smoothly and with fewer stops will limit pollution and improve air quality. Special priority could be given to classes of vehicles involved in emergency or public transport services – or even to goods vehicles, where appropriate.

The same data can also be used to extend the functionality of in-vehicle safety systems – for example, by constructing integrated architectures to facilitate the exchange of information between road and vehicles regarding dangerous situations and driver behaviour. As well as giving drivers advance warning of problems and alerting authorities to irregularities, collated inputs from roadside and on-board sensors could be used to trigger automatic intervention by active driver aids to prevent accidents.

A problem to be faced is that equipping new vehicles alone for V2V and V2I will not achieve the level of deployment required to deliver significant benefits within a reasonable timeframe. Government intervention – such as tax incentives – will be necessary both to oblige automakers to act and to persuade existing car owners to retrofit.

### ICT for energy efficiency

As well as guiding and modifying driver behaviour, another important task for ITS in the context of green cars is to optimise the energy-efficiency of the vehicles themselves. Electronic components currently account for some 20-30 % of total production costs for all car categories, and reports suggest this figure could reach 40 % or more by 2015.

In conventional petrol- or diesel-powered vehicles, electronics improves fuel economy by managing the fuel injection, thermal systems and battery charge/discharge cycles. Moreover, hybrid vehicles, with their regenerative braking



and start-stop systems, have a substantially higher semiconductor content than regular passenger cars.

Fully electric vehicles also rely heavily on computerised systems to extend their autonomy and prolong battery life by monitoring and managing the complex packs of lithium-ion cells. Here, especially, the growing variety of functionality seen as essential to comfort and safety presents the problem of added power train compromising an already limited driving range.

The 'X-by-wire' concept, whereby hydraulic or mechanical power transmission systems are replaced by electrical/electronic systems utilising sensors and motors, will further accelerate the trend towards more comprehensive computerisation. In the interests of energy conservation, new intelligent systems will be needed for integrated control of the many sub-systems involved.

### 'Hands-off' driving

Although the idea of relinquishing control of a moving vehicle may be a daunting prospect, interactive X-by-wire technology already allows vehicles to be operated without any input from the person behind the wheel. This can be compared to the techniques used in aircraft, where automated systems routinely manage the flight controls, with the pilot acting as a supervisor/controller able to intervene or modify settings as necessary.

Automated metros, trains and airport shuttles have been in service for a number of years. New kinds of **automated transport systems** (ATS) are now being developed by researchers in the EU and throughout the world.

Since the late 1990s, there has been a strong resurgence of interest in the idea of **Personal Rapid Transit** (PRT): a form of demand-responsive ATS that was strongly promoted during the 1960s and '70s, but founded due to the lack of maturity of the technologies at that time. PRT uses small driverless electric vehicles – often called 'pods' – typically able to carry two to four passengers along dedicated rails or guideways.

In contrast to tramways and light rail systems, the principle is that users can summon a pod or join it at a convenient pick-up station, and instruct it to carry them in an unbroken journey to their selected destination. At the time of writing, a world premier public demonstration of the ULtra PRT system developed in cooperation with the CITYMOBIL project series is undergoing extensive testing at Heathrow airport, London. It is currently scheduled to commence commercial operation in autumn 2010.

