Editorial

The Action Plan on Urban Mobility: implications for CityMobil

Shortly after work started on DGRTD’s CityMobil Integrated Project, DGTRRN published its Green Paper on Urban Mobility (COM(2007) 551). This heralded an extensive debate on the requirements for future urban transport policy and the role of the Commission in a policy area which it had previously seen as the responsibility of national and local governments. The intention was always to produce an Action Plan in late 2008 in response to the debate. Following extended political negotiations within the European Parliament, this Action Plan was finally published in September 2009 [http://ec.europa.eu/transport/urban/urban_mobility/action_plan_en.htm]. Not surprisingly, it does not mention CityMobil by name, but what are its implications for the project’s work and future applications?

The Action Plan starts by reiterating the need for the EU to have an involvement in urban transport. Urban areas account for 72% of the Union’s population and 85% of its GDP and a coherent policy on urban transport is thus important in supporting social, environmental and economic goals. The approval of the Action Plan indicates that this argument is now accepted, at least by the majority of governments. This implies that the Commission should have a legitimate interest in ensuring that the recommendations from CityMobil are disseminated and applied.

How this might be done is, however, not wholly clear. The Action Plan contains 20 specific actions, none of which relates specifically to the role of new technologies. Instead we are left to infer the opportunities from a series of more general statements. These appear to arise in three of the Action Plan’s six themes.

Theme 1 concerns the promotion of integrated policies, and envisages support for local authorities in the development of sustainable urban mobility plans. These should relate closely to the work already done in CityMobil Sub Project 2 on the specification of objectives and the assessment of alternative strategies which include new technologies. The City Application Manual (Deliverable 2.2.4) should be of assistance to local authorities in the preparation of such plans, though they will of course be expected to consider a wider range of policy options than those covered within the project.

Theme 2 focuses on citizens and includes actions on provision for those with reduced mobility, access to green zones, improving travel information and awareness campaigns to promote sustainable mobility behaviour. CityMobil has a contribution to make to all of these. It can contribute directly to the first two by providing an accessible form of transport for those with mobility handicaps and by providing non-polluting access to protected areas. Indirectly, the services which it offers need to be integrated into any travel information service, and into the alternatives offered by awareness campaigns.

Theme 3 considers the greening of urban transport from two standpoints: the promotion of zero emission vehicles and the introduction of pricing regimes which reflect external costs. It is disappointing that the first of these refers principally to “green cars”. It will be for CityMobil to stress that cybercars and PRT systems are also zero emission options. The pursuit of road pricing will continue to be a political challenge but should, as Sub Project 2 has demonstrated, further enhance the case for new technologies.

The other three themes also offer some potential. Theme 4 deals with financing, which of course will be an essential input to the early city-wide demonstrations of new technologies. Theme 5 covers the sharing of knowledge and experience, and potentially offers a vehicle for promoting the project’s results. Theme 6 looks to the longer term development of urban freight policies, which CityMobil has briefly considered.

Taken as a whole, the Action Plan is a positive contribution to the work of CityMobil. It does not offer an immediate opportunity to introduce new technologies to urban transport, but it does open up a number of new avenues for dissemination and exploitation of the project’s findings. It will be important for the CityMobil Board and the General Assembly to reflect on these and decide how best to capitalise on them.

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Project update

From showcase to full-scale demonstration in La Rochelle

The success of the CityMobil showcase in La Rochelle in September 2008 convinced the local administration to move towards a full-scale demonstration of an automated system. Plans for the demonstration of CyberCars in La Rochelle are proceeding well and the 3-6 month demonstration will likely start in 2010. The route chosen covers a 1km stretch with the option of a 200 metre detour and will comprise 5 stations. It will connect various university faculties, an entertainment mall and residential areas. The 'on-demand' service is scheduled to operate from 08.00 until 20.00 and will require a total of 3 Cybercars: 2 operating at any one-time while the third is recharging. The 3 CyberCars constructed for the demonstration, called UpGo, have 6-8 seats and run on batteries with a 100km range (considered sufficient for a full day's operation of 12 hours). A partial recharge will also be conducted when each vehicle stops at a station. The demonstration will be evaluated from an economic, energy, environmental, societal and technical perspective. Should the results of the demonstration be positive, La Rochelle is considering various options, including, geographical extension, extension to goods delivery and turning La Rochelle into a region of Cybercar expertise. For further information, contact: jacques.mollard@ville-larochelle.fr

Two further successful showcases

Two major demonstration objectives in the CityMobil project were accomplished in 2009: the second and third cybercars showcases, carried out in the cities of Vantaa (Finland, May) and Trondheim (Norway, August).

The Vantaa showcase

The city of Vantaa is part of the Helsinki Metropolitan area, and the actual location of the Helsinki airport. As part of its future development, Vantaa is planning to build a new urban area named Marja-Vantaa. This area and the airport, currently not accessible by train, will be connected through a new railway line, currently under construction. The participation of Vantaa in the CityMobil project was motivated by the interest of decision-makers in the implementation of a cybercar-based feeder service for the future Marja-Vantaa railway station. The site selected for the showcase execution was in the city centre, near Vantaa’s City Hall and its main Railway station.

The Trondheim showcase

Trondheim is the third largest city in Norway. The city has a number of sub-centres that represent a major challenge for its mobility. The local consortium decided to study the cybercars application in one of these sub-centres, the St. Olav Hospital area, which is a major transport destination since it also provides services for many other municipalities in the region. After a major renewal operation currently undergoing, the Hospital will be spread over a larger surface. An electric bus called the Plus provides a temporary Park-and-ride solution in the site. However, with a new and more complex structure, both patients and their relatives will need a more personalized guidance to move around the Hospital. After the showcase, this would be the actual application of cybercars in Trondheim.

A similar showcase scheme was implemented in both cities. The showcases represented an on-demand cybercar service over a network. The track in Vantaa consisted of 3 stops linked in a network, whereas the Trondheim demonstration was a horizontal elevator with 3 stops in a row. When entering the vehicles, the users had the possibility to choose one of the two possible destinations on a touchscreen. The vehicle travelled non-stop to the selected destination while a recording explained the functioning of the vehicle in the local language. At the end of the trip, the passengers could visit a new exhibit, prepared in conjunction with the CityNetMobil project, where the goals and benefits of the use of advanced transportation systems in urban mobility were presented and where they could sit in a café to complete an evaluation survey.

In the framework of the showcases, both cities prepared a conference in order to share their plans and view of the future of their cities with state-of-the-Art advanced mobility experts from CityMobil and from other organizations. The participation of the Finnish Minister of Economy in Vantaa and the County Mayor of Trondheim show the interest that advanced mobility solutions raise at the highest decision-making level. This also called the attention of the press. In both cases, the showcases were presented in national, regional and local newspapers and TV news.

The showcases have proved their capacity to promote autonomous transportation systems among stakeholders and citizens. Other cities, aware of the potential of autonomous transportation systems to improve the quality of life of their citizens, will certainly join soon.

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Management strategies for transport automated systems

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Microscopic simulations of the various CityMobil systems, including Advanced City Cars (ACC), Dual Mode Vehicles (DMV), Personal Rapid Transit (PRT), Cybernetic Transportation Systems (CTS) and Hi-Tech Buses (HTB), have been investigated in CityMobil in order to study the requirements for new traffic management strategies. The findings are a CityMobil deliverable and are briefly summarised below.

**Cybernetic Transportation Schemes (CTS)** involve fully automated vehicles operating on either a dedicated road or in a mixed traffic environment in collective passenger mode. The main opportunity investigated for CTS schemes was for 20 seater vehicles operating an on-demand service based on an ‘agent’ approach i.e. when a passenger requests a vehicle at a bus stop, all the cybercars give a “bid” by presenting an estimated time of arrival resulting from the “experience” of the vehicle on the route in question. The passenger then effectively chooses the cybercar offering the smallest time. Simulation results showed the superiority of the cybercar agent approach over a conventional 30 seater shuttle bus service, in terms of the important factors of waiting time, travel time and fuel consumption / emission.

**Personal Rapid Transit (PRT) schemes** use smaller (i.e. 4 or 5 seater) fully automated vehicles running on a dedicated guideway for personalised journeys. The main opportunities for traffic management were considered to be from forecasting demand so that the distribution of vehicles in the network could be organised in advance to minimise waiting times. Simulation results showed that benefits were obtained from two demand forecasting strategies:
- a local demand prediction tactic for vehicle dispatching that would allow vehicles to be dispatched in advance to cover the travel time between a depot and a station and thus reduce passenger waiting time at a station; while
- a long term demand prediction strategy for global network operation that would allow the network operation (e.g. relocation of vehicles, number of vehicles in operation) to be ready for rising/falling demands in advance and thus reduce passenger waiting time across the network.

**Hi-Tech Buses (HTB)** schemes use dual-mode buses which can operate in automatic mode on all or parts of the route equipped with a specially designated, and usually segregated, bus lane. The main opportunities were considered to be from providing a demand adaptive service to minimise passenger waiting time. The opportunity was also taken to consider the benefits of a scheme using advanced buses, compared with traditional buses, and the impacts of the bus lane on conventional traffic. Simulation results confirmed benefits in terms of shortened trip times from improved docking and the use of reserved lanes, and showed that a demand adaptive service provides benefits by ensuring reasonable maximum waiting times for users, and that the overall system capacity (on average) is not exceeded.

**Advanced City Cars (ACC)** are small cars fitted with advanced driver assistance systems, e.g., automatic parking, intelligent speed adaptation etc, that make them specially suited for use in cities. The main opportunities were identified from the reduced road space taken up by the small vehicles and the benefits from Dynamic Route Guidance (DRG), both of which lead to increased capacity. Simulation results showed that the presence of smaller vehicles such as ACC can lead to improved performance of the traffic network in a city, and that vehicles fitted with DRG can improve their path because they are informed and have the opportunity of selecting better routes. Both systems provide benefits not only for the equipped vehicles but for all traffic.

**DMV** are dual mode vehicles e.g. ACC with the added ability to be driven in automatic mode on specially designated sections of road called e-lanes. For the e-lanes, an interim solution was investigated first. In this, the ‘open e-lane’ scenario, DMVs can share space with manually driven vehicles. Simulation results showed that traffic operation on an ‘open e-lane’ demonstrated similar phases such as free flow, near capacity and congestion as are typically found in traditional traffic operation, but that average travel times were reduced when the proportion of DMVs is low. When the proportion of DMVs reaches a critical level, e.g. capacity, travel time on the e-lane starts to increase. A system of Dynamic lane guidance is proposed to keep the proportion of DMVs at an acceptable level in order to achieve operational benefits.

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A ‘closed e-lane’ scenario was also studied in which only vehicles operating in automated mode were allowed. The main opportunities for traffic management were considered to be the organisation of platoons in the e-lane, and the access control strategy for metering vehicles into the road train at the entry points along the e-lane. Simulation results showed that a synchronous access control strategy that controlled the number of access vehicles based on demands at all entries of the network reduced overall delays to entry traffic, especially when traffic demand is close to the capacity of the dedicated e-lane network.

News from the demonstrators

Personal Rapid Transit in operation at Heathrow

The past six months have been spent finishing the infrastructure of the Heathrow Terminal 5 PRT system, transferring the Control Centre from the Cardiff Test Track, completing the fleet of 18 vehicles, and getting the system up and running. A major change has been the requirement to change the operating frequency of the communications system from 2.4GHz to 5.1GHz, in order to avoid any possibility of interference with the automated baggage handling system in Terminal 5. Although this redesign had been made over last winter, and appeared to be operating successfully on test in Cardiff, final transfer and installation at Heathrow has thrown up a whole sequence of additional problems, requiring changes in both software and hardware which have taken a considerable amount of additional effort and time to resolve. These problems now appear to be behind us, and the system is operating well with multiple vehicles, but they have added a substantial delay to the project. Given the late change in something so fundamental as the communications system, and the fact that the whole system is an entirely new technology and the first fully-operating PRT system in the world, problems and delays of this sort are to be expected, but this postpones full public operation until late spring/early summer next year, and obviously this is disappointing. Even so, although this pushes back the date of a passenger survey on the PRT system to summer of next year, for comparison with the March 2009 survey of passengers using the present transfer bus system, it will still be possible to evaluate the system and produce the remaining Deliverables before the end of 2010, well within the overall CityMobil timescale.

A Conference, PRT@LHR, was held at Heathrow in late April, in conjunction with the Advanced Transit Association and the CityMobil General Assembly. Delegates were able to see the system operating with individual automatically-navigated vehicles, and to hear an interesting range of presentations on PRT and other aspects of automated transport. Delegates were clearly impressed by the system, and comments were universally favourable. When the system is in full public operation, we expect the response to be better still.

Castellón demonstrator update

The Castellón demonstrator is one of the three big demonstrators of the CityMobil project. The city of Castellón is located on Spain’s east coast, 150 km north of Valencia. This big demonstrator consists of the implementation of a segregated, optically guided electric public bus. Implementation has been successfully achieved on two of the four planned stretches (see picture below) – the stretch going from the university to the Parque Ribalta and the Calle Colón stretch in the city centre. Good operational results have been observed. The implementation of the other two stretches is scheduled to begin over the coming months.

The following image shows the four stretches mentioned above:

In the first stretch of the demonstrator (from the university to the Ribalta park) the buses make use of an aerial power supply

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system and are automatically driven and optically guided. The first stretch has 5 TRAM Stops which have been designed to integrate into the urban environment, with easily identifiable shelters; they are 3 metres wide and 20 metres long, and have access ramps on each side to enable easy access for people with reduced mobility.

The optical guidance system enables the bus to dock at the stops with a precision of centimetres making accessibility to the bus optimal. The system uses a camera and a computer to follow the ideal route painted on the road (see the white discontinuous stripes on the pictures). It operates not only when the vehicle docks at stations, but also right along the line.

Along the dedicated lane there are several road and pedestrian intersections where the bus has priority and which are regulated by white semaphores, similar to those used for tramways.

Related events

- **Annual Polis conference, Brussels, 10-11 December 2009**, [www.polis-online.org](http://www.polis-online.org)
- **3rd Transport Research Arena (TRA2010), Brussels, 7-10 June 2010**, [www.traconference.eu](http://www.traconference.eu)
- **Final CityMobil conference, March 2011**

Partner profiles

**28 organisations** representing industry, research and public authorities, are partners in CityMobil. Each issue of the CityMobil newsletter profiles three partners.

**SINTEF**
The SINTEF Group is the largest independent research organisation in Scandinavia. It is a non-profit multidisciplinary research foundation affiliated with The Norwegian University of Science and Technology in Trondheim and Faculty of mathematics and natural sciences at the University of Oslo. SINTEF generates new knowledge and solutions based on research and development in technology, the natural sciences, medicine and the social sciences. The transport area is located in the research division SINTEF Technology and Society and comprises 3 departments and 50 researchers.

The Centro Studi sui Sistemi di Trasporto S.p.A. (CSST) is a private company, operating in the field of transport and traffic studies. CSST has three offices (Turin, Rome and Naples) and is operating in six different areas: 1. Traffic Plans; 2. Traffic Control System and ITS in Urban and Extra urban Environment; 3. Feasibility Studies and Designs of Transport Infrastructures; 4. Freight Transportation and Industrial Logistics; 5. Environment and Safety; with a 6th vertical sector covering basic research for each field.

Ingegneria dei Trasporti SRL is a Rome-based transport consultancy founded in 1993. It specialises in transport system studies, transport planning, feasibility studies, models, planning of public transport networks, investigations of vehicle flows, and professional training. IT has participated as partner, subcontractor, and consultant in a number of European Commission transport research projects. The firm also develops software, and provides training, for a wide range of transport applications and is the only authorised reseller in Italy of the program TransCAD® for transport models.

What is CityMobil?

CityMobil is an Integrated Project, co-funded by the Sixth Framework Programme for RTD (FP6), whose main aim is to achieve a more effective organisation of urban transport by developing integrated solutions based on advanced concepts for innovative autonomous and automated road vehicles for passengers and goods, embedded in an advanced spatial setting.

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