


	Description	Currently available	Future possibilities	Examples
<p>NOVEL INFRASTRUCTURE AND VEHICLES</p>				
<p>Intelligent vehicle-highway systems</p>	<p>Co-operative intelligent vehicle-highway systems (CIVHS) enable vehicles to receive information from the roadway and respond appropriately, and vehicles can detect and report hazards to the roadway, for dissemination to other travellers¹.</p> <p>Automated highway system – a lane or set of lanes where specially equipped cars, trucks and buses can travel together under computer control. Alternatively, under a mixed traffic system fully automated vehicles would share the road with partially automated or manually driven vehicles. Vehicles either could be “free agent” operating independently or platooned, operating in closely co-ordinated groups.</p>	<p>Current autonomous systems rely on vehicle based sensors to “see” the surrounding environment and detect dangerous situations. Adaptive cruise control, forward collision warning, side collision warning, lane departure warning systems are available now.</p> <p>Systems of active control of the vehicle to automatically control vehicles will be available within 5 years, and early collision avoidance systems are being sold in Japan.</p> <p>Most experts agree that automation of highways is technically feasible even with existing technology but there are many factors that might prevent such systems from becoming truly practical – cost, liability, societal and institutional issues.</p>	<p>Process would probably begin by converting part of existing highway, along with the construction of special ramps, transition lanes and barriers.</p> <p>Most of new technology would be packed into future cars – e.g. magnetometers for steering, forward looking sensors and/or video cameras to detect dangerous obstacles and other vehicles ahead, accelerometers to control steering, breaking and throttling and allowing “hands-off, feet off” driving! Lateral and longitudinal crash avoidance technologies may take longer to deploy, because of issues related to taking direct vehicle control.</p> <p>Commercial vehicles are early adopters of many automated handling aids. In addition anti-rollover devices, electronic braking systems that shorten the stopping distance, reduce skidding and avoid jack-knifing are widely available.</p> <p>Electronic towbar systems could be in operation by 2010 thus opening the way to “HGV trains”.</p>	<p>In the US, California DOT (Caltrans) is leading CIVHS research - the key impetus is vehicle congestion relief, using vehicle-vehicle and vehicle-infrastructure communications. Key functions are driver alerts that traffic is slowing ahead, hazardous road conditions (ice) and poor visibility. DSRC for toll collection is seen as a key enabling technology - thus the toll tag could be the device used for vehicle-infrastructure communications. A key function for vehicle-infrastructure systems is in intersection collision avoidance (ICA) and the favoured approach is for the infrastructure to sense a problem and send a message to a car.</p> <p>Public transit authorities in Houston are investigating adding automation to the Katy Freeway HOV lane so that platoons of buses could increase capacity.</p> <p>In France, the La Route Automisee program is considering advanced forms of CIVHS for automated guidance and management of traffic over a 20-yr timespan¹. PPPs between car manufacturers and private road operators offer a way forward here.</p> <p>Electronic towbar EU Project CHAUFFEUR² is addressing truck platooning which aims to develop a virtual electronic linkage amongst several heavy goods vehicles in convoy with a single driver.</p> <p>Japan has a significant CIVHS program (SmartCruise 21³) focusing on vehicle-highway co-operative systems to maximise safety. In the recent Demo 2000 an extensive array of advanced systems were in operation in a test track environment – focusing on pedestrian avoidance, staying safely on the road, and avoiding crashes straight ahead or when changing lanes. Deployment is planned in 3 stages – information/warning only (ahs-i 2003-2005), active vehicle control (ahs-c 2005-2007), and fully automated vehicles (ahs-a 2007-2015). Key challenges seen are increasing public acceptance, full system design (reliability etc) and acceleration of the infrastructure-vehicle role sharing system (integrated standards etc).</p>

	Description	Currently available	Future possibilities	Examples
Dedicated lanes - double-deck highways	<p>One way of increasing road capacity is to provide separate lanes for cars and trucks. Because cars are smaller and lighter, cars-only lanes can be double-decks, either above the road surface or in tunnels beneath high value real estate.</p> <p>Special-purpose lorry lanes would permit larger, heavier vehicles than at present and would allow these vehicles to bypass congested all-purpose lanes facilitating just-in-time deliveries.</p>	<p>Extra lanes could be “squeezed” out of existing pavement by narrowing certain lanes for car-only use.</p> <p>Various initiatives are looking at ways of increasing use and occupancy of HOV lanes.</p>	<p>AHS concepts could include segregation of cars and trucks. Cars-only highway infrastructure would be cheaper than building entire road network to heavy truck standards. Visual intrusion of double deck roads will be problematic.</p> <p>Advances in tunnelling technology will reduce the cost of tunnels.</p>	<p>Paris and Los Angeles are developing new urban expressways using these concepts. In LA, inner lanes have been narrowed to create an extra cars-only lane. Around Paris COFIROUTE plans tunnels for the missing link of the A86 Paris ring road in which similar tubes are planned west of Versailles, one for mixed traffic of 2 lanes and the other a cars-only tunnel with 2 decks of three lanes each. The cars-only tunnel will have 8.5 foot ceilings and lanes just under 10 feet wide!</p> <p>Zwolle, NL wants to integrally restructure motorway A28 and its surroundings to strengthen its economic position, to secure the accessibility through the motorway and to improve the urban structure in a sustainable way. One suggestion is for a multifunctional double-decker carrier at the heart of the city’s transport system. During rush hour this carrier would be suited for transporting people and in non-peak hours it would quickly change into cargo carrier. The layered motorway would also separate flows of (inter) national, regional and local traffic.</p>
Dual mode	<p>RUF (Rapid Urban Flexible)⁴ consists of electric vehicles that can be operated both on the conventional street system and on a rail facility. They can be privately owned or publicly owned for general use.</p> <p>RUF could be designed as the backbone of high-capacity inter-urban arteries combining the flexibility of an individual car with mass transport capacity.</p>	<p>Prototype systems for both passengers and freight are under development. Infrastructure costs are substantial. However, flexibility to switch between guided and unguided operation-avoiding change of vehicle and transport mode is a major advantage.</p>	<p>An electric, privately owned RUF vehicle could be parked at a person’s home, ready for making short trips using battery power. Or it can be driven to a nearby RUF station where it can enter the RUF-rail facility. The driver positions the vehicle at the entrance to the RUF-rail and then turns control over to the RUF control system. The driver is now in a “hands-off” mode. After travelling some distance the vehicle can exit the RUF-rail and return to the conventional street system or switch to another rail line and continue the trip to a more distant location.</p>	<p>Considerable work has been done in Denmark on the RUF concept and an initial test track became operational in June 1990. MEGARAIL⁵ is developing an elevated duo rail automated transport system for personal cars, automated public transit cars and automated cargo containers in Texas.</p>



	Description	Currently available	Future possibilities	Examples
Maglev	<p>Maglev systems offer opportunities for improved passenger and freight transport either above or underground. Maglev systems are the fastest way to travel long distances - several systems aim at long distance inter-urban transport with high maximum speeds of up to 400-500km/h.</p> <p>All systems have guided vehicles on a dedicated track. Magnetic based contactless technology is used for levitation, guidance, propulsion and braking. Trains are environmentally friendly as they generate little noise and vibration at high speeds.</p>	<p>There are proposals for Maglev systems in US⁶, Japan⁷ and Europe⁸.</p> <p>The Swiss are developing a Maglev tube transportation system. The prime motive is to obtain the benefits of a high-speed passenger system in a region where there are major environmental constraints.</p> <p>Infrastructure requirements are costly at present –the US is seeking to tie the new technology of precision steel fabrication necessary to construct the maglev guideway to other possible uses such as ship hull manufacture and other large-scale metal fabrication.</p>	<p>Maglev systems have a huge potential to change the modal split for inter-urban traffic. Expectations are high that Maglev will some day replace conventional railroads.</p> <p>The first full-scale Maglev projects could be operating by 2010 in the US, Japan and Europe.</p> <div data-bbox="1072 592 1375 794" data-label="Image"> </div> <p>Japanese Maglev mock-up</p>	<p>In the US, seven cities have been given the go-ahead for Maglev feasibility studies - to complete preliminary engineering, and to define a PPP willing and able to finance, construct and operate the project. Out of these, a single project will be selected for possible deployment in Spring 2001.</p> <p>Japan has a 1.5km High Speed Surface Transport test track (HSST) for developing Maglev trains. The train levitates 8mm above the tracks and can reach speeds of up to 100km per hour. In Aichi it is hoped that the proposed 8.9km TobuKyuryo line will be the first full-scale operation of a Maglev system in time for the 2005 World Expo.</p> <p>Swissmetro is planned as a high-speed high frequency inter-urban public transport system. A pilot line of 15km will be built for testing and approval studies. Construction of the full system would start in 2010.</p>
Guided people mover	<p>Automated people movers are driverless and provide quick, frequent services in small vehicles on a dedicated track. Systems may have on-board or off-board propulsion systems, elevated or ground level structure, mono or duo rail etc.</p>	<p>Especially suited for regular but moderate transport flows within relatively short distances.</p> <p>Many alternative types exist at least at demonstration phase, but installation costs are high.</p>	<p>Applications likely to be mainly intra-urban. Most are adapted to low to medium transport flows so can't compete with the capacity of a metro service.</p>	<p>Cable Liner in Vienna is a detachable funicular railway with vehicles drawn by a continuously moving cable loop integrated into the guideway. 4000 passengers/hour can be transported.</p> <p>American "People Movers" – electrically powered through infrastructure on elevated rails. Automatically driven, automatic guideway.</p>
Road-based people movers	<p>Road based people movers are vehicles which can hold up to 16 people. They run on normal roads with rubber tyres. The propulsion system is electric with either batteries or contactless transmission of energy by a magnetic track.</p>	<p>At low speed and dedicated infrastructure these systems are already in operation. At higher speed and mixed traffic, technical feasibility still needs to be proven.</p>	<p>Applications likely to be mainly intra-urban. Allow economical and feasible public transport at low volume transport links – e.g. access and egress transport to and from public transport junctions, large parking places and city centres.</p>	<p>The best known examples are the Schipol Parkshuttle and the Rivium People Mover in the Netherlands and Serpentine in Switzerland.</p>

	Description	Currently available	Future possibilities	Examples
Elevated public transport	These systems are characterised by an elevated structure of the guideway and its stations. The vehicles either hang on a suspended track or straddle an elevated beam.	Several operational systems exist although public acceptance has been difficult. Systems can reduce congestion without interfering with the surface traffic.	Potential high capacity system which is electrically driven. Could be built above existing infrastructure.	Representative systems include Wuppertaler Schwebbahn which was built in 1900. Alweg-Monorail development and test facility near Cologne , several systems in operation around the world e.g Tokyo airport, DisneyWorld Florida. Von Roll-Monorail has about 20 systems in operation, mostly in theme parks plus Sydney Harbour, Newark Airport . The monorail service at Gatwick between its North and South Terminals is also an example.
Automated freight-train and -road concepts	These concepts are systems for freight transport that do not necessarily make use of a driver. They can be implemented at the urban level or at a long-distance level. The key issue of all container based transport innovations is to use a container of standard size to make the switch between modes easy and efficient.	There are prototype systems which use existing infrastructure or dedicated infrastructure.	There may be increased scope for using "microtunnels" for freight transport beyond traditional pipelines, particularly given advances in microtunnel technology.	In London , the Royal Mail is developing a fully automated freight transport system "MetroFreight", both under and above ground. It comprises small vehicles which can transport standardised units. The vehicles move electrically using rechargeable batteries and by means of external conductors they can cruise and follow their own route max speed is 100km/h. In Japan the "Automated Underground Tube Network" is designed to use underground tubes or tunnels with a diameter of 5.5m in which electrically driven automatic guided freight wagons will travel. Tokyo and the SST concept of Deutsche Bahn are systems based on unmanned freight trains which are intended to increase the capacity of the railway infrastructure and to save costs. The IPOT programme in the Netherlands is a design for a national Underground Transport and Tube system of about 10,000km with 14 major junctions for both general cargo and liquids and gases. The concepts include automation of transshipment and standardisation of load units.
Airships	Airships are aerodynamically shaped, controllable, lighter-than-aircraft which use a lifting gas for permanent buoyancy and a propulsion system for moving and manoeuvring. Airships are environmentally friendly. They may be rigid (zeppelins), semi-rigid or non-rigid (blimps). Non-rigid airships have limited potential for passenger and freight transport due to safety concerns.	To date most airships have been rigid. However semi-rigid airships which use strong, lightweight materials (carbon fibres, kevlar) are gaining favour as they are lighter than rigid airships and thus have a higher payload. Airships cruise at a low altitude (1000 - 2000m) which helps avoid interference with other modes. They require little ground infrastructure and could link to other transport modes.	Airships could form an integral part of sustainable passenger and freight transport. The majority of new concepts for medium and large airships rely on rigid structures for providing a maximum payload capacity, safety and efficiency. Larger airships targeting unique market segments like bulky and heavy freight transport will require innovative solutions addressing logistic aspects of this concept.	The CargoLifter AG "CL160" is an example of a large semi-rigid freight airship for point-to-point delivery of heavy and bulky loads – "air crane" concept. With a payload capacity of 160 tons and a range of 10,000km this offers an option for transport of bulky goods which might otherwise require bridges to be temporarily removed or loads to be disassembled and reassembled. First full scale prototype to fly in summer 2001! The Dutch are developing the " Holland Navigator ", a rigid airship capable of transporting passengers (luxury leisure travel) and freight (35 tons payload). The basic design of the airship is meant to establish a versatile vehicle that could cover applications from regular short distance to long range leisure travel as well as freight shipments, promotional or surveillance tasks. There are other developments in Russia and the US .

	Description	Currently available	Future possibilities	Examples
IMPROVING PUBLIC TRANSPORT				
Car sharing	Car sharing with low emission electric vehicles combines the flexibility, comfort and privacy of the individual car with the low space requirements and pollution of public transport.	Several trial schemes exist. Car sharing could reduce the need for parking space considerably as on average 10-15 participants use one car. Special parking lots have to be reserved for this kind of individual public transport. Extensive wireless communication between car/user and central unit (for reservation, accounting and assistance) is foreseen.	The car-rental concept could be adapted for inter-urban trips between cities, if organisational issues are resolved. Individual public transport complements public transport beyond main urban traffic corridors, being particularly suited to densely populated compact urban areas.	The systems Praxitèle, Tulip, Citycar and ICVS from different car manufacturers are similar and in test operation in France and Japan . In Edinburgh , the pilot City Car Club has recently ceased to operate. The trial involved a range of cars which could be hired by the hour by individuals from a number of on-street and off-street locations. Cars were accessed by members using an infrared key fob which unlocked the cars doors, no keys are required. The scheme operated round-the-clock and used computer and cellular phone technology to track all hires and provide a single monthly bill to each user for the car use logged.
Making public transport more attractive	Many current initiatives focus on urban services but many techniques could be applied to inter-urban transportation, e.g. demand responsive public transport in rural areas. Any policy aimed at discouraging car use must be supported by a noticeable improvement in the quality of public transport services. Door-to-door travel times must be competitive with car travel. Comfort, safety and security must also be improved.	Segregated rights of way help public transport vehicles to increase their speeds relative to mixed traffic flows, and thus adhere to timetables. Steady progress is being made in equipment design, accessibility (for people with impaired mobility), and environmental performance. "Flexroutes" in Gothenburg is a demand responsive public bus service providing door-to-door journeys for elderly people.	Dedicated lanes for inter-urban public transport services. Concept of open, standards-based traffic management equipment is well established. Subsystems and roadside equipment can be bought at different times from different vendors and interoperate. 	There are many examples of bus priority measures throughout Europe. The UK's first ever motorway bus-lane is on the M4 spur access to Heathrow airport ⁹ . In Gothenburg, Sweden a demand responsive "Flexbus" system has been introduced mainly for elderly people in the surrounding rural areas. ITS technologies are being used to optimise routes and schedules thus providing a regular door-to-door service. Leeds has sections of guided busway providing an effective means for buses to bypass traffic queues. Standard buses are fitted with small guidewheels to allow them to be steered automatically along concrete busways. Patronage has increased by over 40% since the opening of the first guideway in 1995. In Edinburgh "Greenways" aims to cut bus journey times through a series of green bus lanes (on main arterial routes into the city centre) which only buses, cycles and taxis can use. An electronic detection system has also been installed at 25 traffic signals giving buses fitted with transponders, priority at lights, further improving journey times. The city is also developing a segregated guided busway from Edinburgh airport eastwards towards the city. In Paris , the AIGLE system enhances safety in buses for both drivers and passengers, enabling a centralised monitoring of bus security and the management of security patrols.
			M4 Heathrow-spur bus lane	

	Description	Currently available	Future possibilities	Examples
Seamless integration	<p>The “seamless” organisation of public transport is fundamental to achieving a modal shift from private to public transport. Measures such as interchange and fare integration are crucial.</p> <p>For inter-urban travel information on interchange at the edge of urban areas (e.g. Park’N’Ride) will become particularly valuable – e.g. informing drivers of journey times to city centres or alternative rail or bus journey times.</p>	<p>Technological advances in ITS are making it possible to provide travellers with real time information on timetables and waiting times, and to revolutionise pricing and automatic fare collection.</p> <p>Advanced traveller information systems (ATIS) are available in many cities world-wide which should lead to major improvements in planning, management and operations of transport systems.</p>	<p>Real-time traffic data is ubiquitously available (e.g. expanded use of ETC tags as traffic probes and the use of cellular equipped vehicles as probes) providing a key requirement for traffic management and traveller information services.</p> <div data-bbox="1077 528 1386 791" data-label="Image"> </div> <p data-bbox="1115 815 1361 874">Local transferium for Amsterdam</p>	<p>The Dutch “Transferium” entices travellers to exchange their cars for public transport for part of their journey on the outskirts of Amsterdam. Access unimpeded by tailbacks, car parking by means of a mechanical parking system and air conditioned waiting rooms are designed to make the change over a pleasant experience¹⁰.</p> <p>In Helsinki, the EU PROMISE project has provided personal mobile travel and traffic information by NOKIA mobile phone.</p> <div data-bbox="1424 469 2114 592" data-label="Image"> </div> <p>Smart-card payment systems have been trialled in Dublin and Marseilles using the “electronic purse” concept for integrated users.</p> <p>Dutch railways, regional networks and urban networks have introduced an integrated travel information service - OVR - via one national telephone number which offers callers comprehensive door-to-door information, irrespective of the number of transfers or the types of mode used.</p> <p>EU project SWITCH is studying the underlying principles of a seamless intermodal transport network by demonstrating innovative and co-ordinated applications including passenger information, developing integrated networks and ticketing, promoting sustainability through the development of integrated intermodal transport. The cities include Newcastle, Dresden, Pilsen, Rotterdam and Venice.</p>

	Description	Currently available	Future possibilities	Examples
DEMAND MANAGEMENT				
Road charging	<p>Current road user fees lead to inefficient utilisation of existing roadway capacity. A wide range of policies have the potential to selectively allocate the use of roadway capacity both through market based and regulatory means.</p> <p>Charging measures can be based on road use, vehicle use or vehicle ownership. Road use measures give the best price signals to consumers – e.g. tollgates, AVI systems, and area licensing.</p> <p>There are a variety of equity and legal issues to overcome but the principle of road pricing is gaining support.</p>	<p>Several countries collect tolls on inter-urban motorways e.g. US, France. On an 8-mile stretch of I-15 in San Diego, California there is a dynamic road pricing trial. Most of the lanes are free and move very slowly, but drivers who want a quicker trip can use special toll lanes. However the toll on a normal day may be anywhere between 50 cents and \$4. It can be adjusted every 6 minutes by 50 cents up or down to ensure a smooth flow of traffic.</p> <p>Singapore is the only example of area-wide road-pricing demand management. Since 1998 an automatic electronic toll system has been used. In Europe, the main examples are in Scandinavia.</p>	<p>Technology is unlikely to be a limiting factor in the future. Social, legal and institutional issues are likely to be more challenging.</p> <p>The full range of consequences from a scheme can be hard to predict in advance and some capacity must be left for the future.</p>	<p>Many US and European motorway operators charge tolls. French autoroutes increase their Sunday evening tolls when everyone is travelling back to Paris.</p> <p>Singapore now has electronic road pricing based on the earlier permit-based area licensing scheme.</p> <p>The Trondheim Toll Ring, surrounding the city centre came into operation in 1991. About 80% of cars are using an electronic tag. The fee system includes time-differentiated tolls, with a higher fee during the morning peak hours and free passage after 5pm and at weekends. The revenues are earmarked for a transport investment package financed by 60% user fees and 40% state funds.</p> <p>The aim of the Oslo Toll Ring System is to reduce car/vehicle traffic into the city centre and to raise money for financing urban infrastructure investments. The intention is to remove the tolls when sufficient revenue has been generated for infrastructure projects although it seems more likely that that the toll ring will be restructured in some way.</p> <p>In the UK, studies and trials of road pricing have been undertaken in Bristol, Leicester and London. In Bristol the electronic road-user charging trial will involve participants being charged for travel into the city centre along a main radial route. The trial area will include a HOV lane with the option for reduced charges for users.</p>
Access control	<p>Access control systems aim to restrict certain types of traffic from entering predefined areas at various times. Schemes are being introduced into European city centres mainly in response to deteriorating environmental conditions. Vehicular traffic is removed or reduced and space is reallocated to pedestrians and other users.</p>	<p>Most current applications are urban. A number of different access control techniques are being trialled in European cities – e.g. entry control via tag, beacon, video and permit systems; gate control permitting only authorised vehicles to enter; exit control systems and physical barrier control systems.</p>	<p>Access control is mainly used within cities, however the technology could be used to restrict vehicular traffic to major attractions on the inter-urban network e.g. “Smart access” to national parks, heritage sites.</p>	<p>There are several access control demonstrations in Barcelona which utilise systems that limit vehicular access by road to specific areas or zones. Electronic licenses or permits are pre-issued to specific groups of authorised users (typically residents and those owning parking spaces in the zone). Vehicles have to pass control gates which allow access if the vehicle is recognised as having a valid permit. More recently, access control has been extended to include loading and delivery operations.</p> <p>Similar systems exist in Bologna, which has introduced “non-stop” access control mainly based on numberplate recognition. In Rome the trials focus on an electronic system using “Telepass” technology developed for the Italian toll motorway company.</p>

	Description	Currently available	Future possibilities	Examples
ENVIRONMENTAL IMPACTS				
	Ways of reducing the environmental impacts of transport are being sought. There are many different ways to tackle the problems including technical, regulatory and planning options.	Technical options aim in particular at more energy efficient transport means and many technologies are under development including alternative energy sources, such as bio-fuels, natural gas and electricity. Current projects are looking at ways of smoothing traffic flows – preventing the on-set of stop-start driving etc. Regulatory options –such as access control, traffic calming and parking restrictions – can be highly effective if properly enforced.	Environmental concerns are likely to be more prominent thus major shifts in transport trends and policies may be necessary.	Various monitoring and control strategies on the M25 are “smoothing” traffic flows. Sensors every 500m measure traffic speeds and volumes which are constantly monitored by computers that employ algorithms to detect traffic build up and distinguish between congestion and incident causes. The “Motorway Traffic Viewer” will help to dissipate or even prevent shockwaves. Effective regulatory measures include those in Aalborg on car traffic restrictions and dedicated bus lane infrastructure. Edinburgh has introduced “Greenways” for bus priority and Leeds has HOV lanes. In Bristol the ELGAR project (Environmental Led Guidance and Restraint) is testing a variety of transport measures (VMS signs disseminating air quality information and promoting P&R, bus priority measures, and a trial of environmental road pricing) to encourage more motorists to switch to public transport, thus reducing environmental pollution. Athens and Turin have implemented the Integrated Road Transport Environment (IRTE) in an attempt to balance users’ demand for mobility with the level of service of the transport system. Within this concept an organisational and physical structure has been developed which resulted in an adaptive system aiming, through various techniques, at increasing throughput, enhancing the network, and thus optimising the system.
Alternative fuels	With depleting fossil fuel reserves, alternative fuel sources are being sought – e.g. natural gas, LPG, biofuels, hydrogen. They have strong environmental advantages over conventional fuels – lower emissions and noise. Priority could be given to “clean” or “safe” vehicles to use dedicated lanes etc.	Many promising prototype technologies exist to use alternative fuels Most are at an early concept stage.	Alternative fuel technology is unlikely to be the limiting factor. Challenge lies in making them affordable and acceptable. For the introduction of new fuels, a new fuelling infrastructure, parallel to existing ones may become a necessity.	In the Netherlands LPG is considered a third option alongside petrol and diesel (7% Dutch cars run on LPG) and is available at 2000 stations. There are also trials of natural gas light vehicles and buses. Alternative transport technologies are being trialled extensively in Europe – e.g. hybrid buses in Stockholm, Rotterdam, Luxembourg , and the use of biogas buses in Lille . Bucharest has introduced energy saving trolley buses.

	Description	Currently available	Future possibilities	Examples
TRANSPORT AND LAND USE				
Integrated planning and transport	Changing urban structures (suburbanisation and urban sprawl) have tended to increase the need to travel. Dispersed settlement patterns undermine the viability of public transport. Spatial needs of transport infrastructure continue to grow and often conflict with other land uses e.g. habitats, cultural and historical sites.	Integrated planning of transport strategies, infrastructure, urban and regional planning can help to reduce the need for travel. Emphasis needs to be placed on accessibility rather than mobility. Current initiatives include the development of car free residential areas, traffic calming measures, pedestrianisation and the development of cycle ways. Recent advances in telecommunications potentially could decouple land use patterns and transport volumes.	Land-use and transport policies need to make car travel less attractive (slower, more expensive) in order to achieve sustainable urban areas.	Examples on planning options include those of integrated planning such as Helsinki's "Area Transportation System Plan" and Graz integrated transport concept. Improved planning in Bremen has developed housing areas with less dependency on the car. The planned experimental "car-free" residential area in Gorgie, Edinburgh was the first of its kind in Britain. The aim is to encourage people who want to live a more sustainable lifestyle, without car dependency, and to move towards housing development which give priority to the pedestrian and marginalise the impacts of cars. Locational criteria are obviously important in the siting of car-free developments. These include proximity to wide service provision, proximity to high levels of public transport and flexible arrangements for limited/necessary car use (such as the City Car Club).

Other relevant factsheets

Vehicle design and technology

Energy Issues

Environmental concerns

European Projects

References

General

ELTIS Website (www.eltis.org) is consolidating European Case Studies on various transport concepts.

EUROPA Website (www.europa.eu/int) covers EC transport research programmes over the past 10 years.

EC RECONNECT Project “Reducing Congestion by Introducing New Concepts of Transport”. May 2000

EC CARISMA -Telematics Project. “Concerted Architectures for the Interconnection of Networks for Sustainable Mobility with Telematics Applications”.

EC CONCERT Project “Co-operation for Novel City Electronic Regulating Tools”.

EC CAPITALS Project “Capitals’ Project For Integrated Telematics On Large Scale”.

USA: US Department of Transportation (www.dot.gov) and US Federal Highway Administration (www.fhwa.dot.gov)

JAPAN: Highway Industry Development Organisation (HIDO) Website (www.hido.or.jp).

Specific

¹ Dick Bishop. “Co-operative Intelligent Vehicle-Highway Systems: Status of Activities World-wide, Stakeholder Perspectives, and Major Trends Interim Report”. Jan 2001

² Daimler Benz. “Promote CHAUFFER – a novel application of electronics”. (www.daimlerchrysler.com/specials/drawbar/drawbar3_e.htm)

³ (www.its.go.jp) “Advanced Cruise Assist Systems”. 2001

⁴ Palle Jensen. “RUF Personal And Group Dualmode Transportation Technology Overview”. Washington 2001.

⁵ (www.magarail.com)

⁶ US DOT. “Maglev Grant Announcement”. Pittsburgh, 2000.

⁷ Aichi Voice. “The Future Shape of Transportation”(www.pref.aichi.jp).

⁸ Swissmetro. (www.swissmetro.com).

⁹ DETR. “A New Deal for Transport: Better for Everyone”. 1998

¹⁰ R Oemrawsingh & M Westerhaus. “Local Transferium for Amstredam”. (www.archined.nl/archiprix/1998/transferium_e.html). 1998