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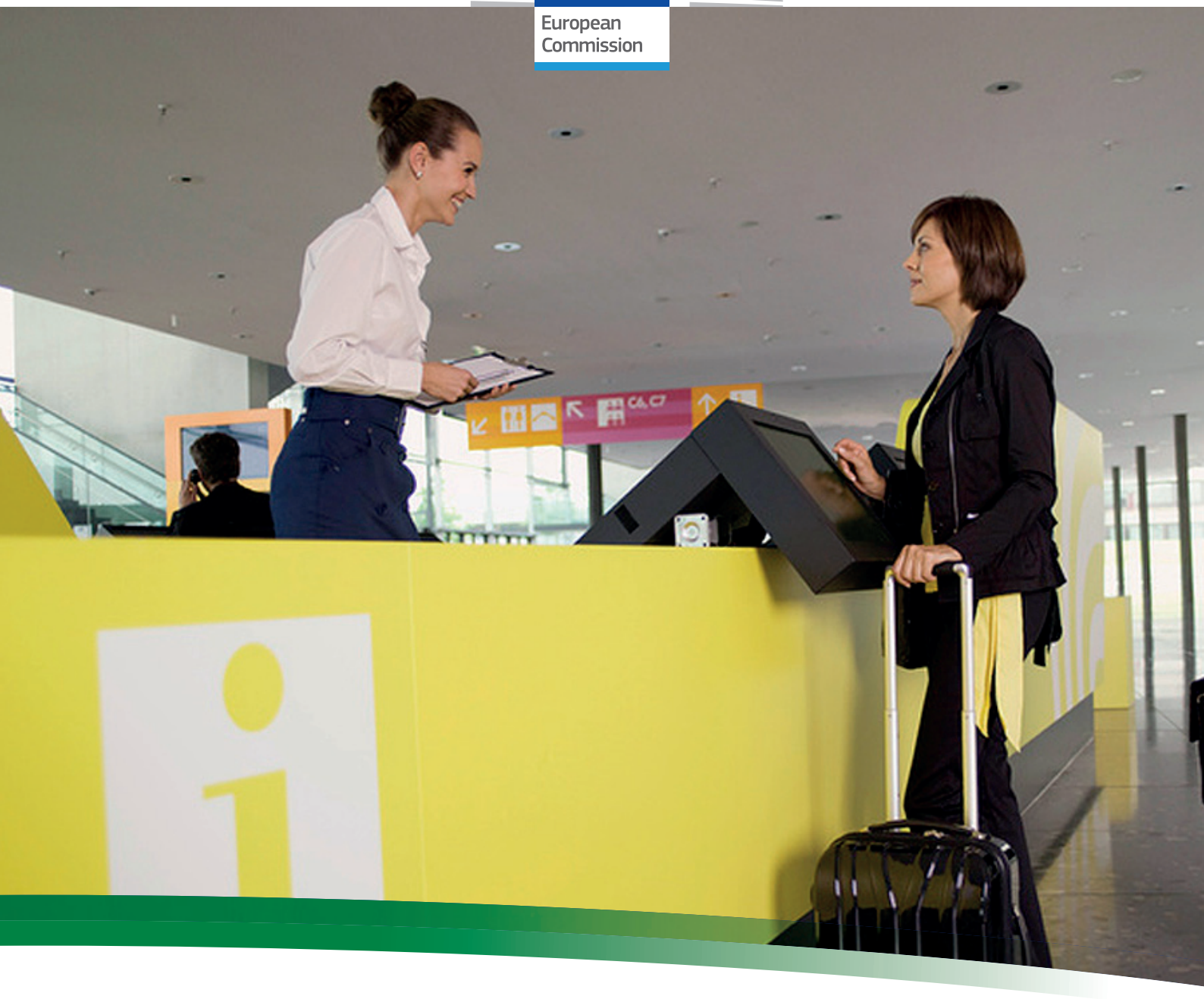

Thematic Research Summary

Awareness, information and user rights

COMMUNICATING TRANSPORT RESEARCH AND INNOVATION

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This publication was produced by the Transport Research and Innovation Portal (TRIP) consortium on behalf of the Directorate-General for Mobility and Transport (DG MOVE). It was compiled by Tina Bessel (KIT, Germany) and Eckhard Szimba (KIT, Germany). The project team wishes to thank Helen West for review of the document.

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Table of Contents

Preface

This Thematic Research Summary (TRS) has been produced as a part of the activities of the Transport Research and Innovation Portal (TRIP) project. TRIP collects, structures, analyses and disseminates the results of EU-supported transport research and research financed nationally in the European Research Area (ERA), and selected global research programmes. The main dissemination tool used by TRIP is the public web portal www.transport-research.info.

The Thematic Research Summaries provide a structured guide to the results of research projects carried out mainly at EU level, either as part of a framework programme or as a study commissioned by the European Commission (EC). These summaries are intended for policy makers at European, national and local levels, stakeholders and researchers.

The Thematic Research Summary on Awareness, information and user rights is one of 24 themes, which provides:

- an overview of research activities in a specific aspect of transport focusing on EU-funded projects;
- analysis and compilation of research findings and recommendations.

An overview of the Thematic Research Summaries is presented in Table 1.

Table 1: Transport themes used in TRIP

Domains	TRIP Themes
Sector	Passenger transport
	Freight transport
Mode	Air transport
	Rail transport
	Road transport
	Urban transport
	Water transport (sea and inland)
	Multimodal transport
Policy	Financing, pricing and taxation
	Regulation, competition and public services
	Infrastructure and TEN-T
	Land use and transport planning
	Climate policy and energy efficiency
	Security and safety
	International cooperation and EU Neighbourhood Policy
	Awareness, information and user rights
Technology	Intelligent transport systems
	Innovative technologies
	Transport management
Evaluation	Long-term perspectives
	Assessment and decision support methodologies
	Environmental impacts
	Economic and regional impacts
	Accessibility, social and equity impacts

1. Introduction

Maintaining and increasing freedom to travel in the EU will only be possible by making transport more efficient, cleaner, safer and more reliable (EC, 2011b). EU transport policy is directed to developing a competitive and more environmentally sustainable transport sector (EC, 2011a). In order to contribute to these targets, it is essential that EU citizens adjust mobility behaviour and mode choice. Thus, alternatives to motorised private transport have to be better communicated, and public transport needs to be more reliable and more convenient. At the same time, motorised private transport has to become safer and more resource-efficient.

In the light of these requirements technological developments, including passenger information systems, provide an opportunity for improvements and changes (EC, 2011b). Furthermore, information and awareness-arising initiatives play an important role in influencing individual perceptions and travel behaviour (EC, 2009). At the same time, the availability of adequate, reliable and up-to-date information on travel time and routing alternatives is relevant to ensure seamless door-to-door mobility (EC, 2013a). A priority in EU transport policy is to improve the overall quality of transport and the convenience to users, and to protect and strengthen user rights in public transport (EC, 2009).

In meeting the EU target of a more environmentally sustainable transport sector, EU-funded research focuses on raising awareness on the ecological impact of travel choices and awareness on alternatives to conventional individual transport (EC, 2011a). Another research priority contributing to the target is the development of advanced in-car information and navigation systems, which support drivers in avoiding congestion, reducing emissions and saving energy. Moreover, research addresses intelligent systems for interoperable and multimodal scheduling and information supply to achieve greater integration of modal networks and facilitate sustainable mobility.

In order to achieve wider use of public transport modes, public transport needs to be more reliable and more convenient and has to be accompanied by an appropriate set of passenger rights (EC, 2011a). Following EU regulations on passenger rights have been established (EC, 2011c):

- Regulation 889/2002 on air carrier liability in the event of accidents (EU, 2002);

- Regulation 261/2004 on establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights (EU, 2004);
- Regulation 2111/2005 on the establishment of a Community list of air carriers subject to an operating ban within the Community and on informing air transport passengers of the identity of the operating air carrier (EU, 2005);
- Regulation 1107/2006 concerning the rights of disabled persons and persons with reduced mobility when travelling by air (EU, 2006);
- Regulation 1008/2008 on common rules for the operation of air services in the Community (EU, 2008);
- Regulation 1371/2007 on rail passengers' rights and obligations (EU, 2007);
- Regulation 392/2009 on the liability of carriers of passengers by sea in the event of an accident (EU, 2009);
- Regulation 1177/2010 concerning the rights of passengers when travelling by sea and inland waterway (EU, 2010);
- Regulation 181/2011 concerning the rights of passengers in bus and coach transport (EU, 2011).

EU-funded research has evaluated the achievements of regulations on user rights in the transport sector and identified needs for further improvement of the legal rights of passengers.

Even though the number of road fatalities in the EU was almost halved in the last decade, 30 268 people were killed on EU roads in 2011 (EC, 2013b). Directed to enhancing road safety and reducing road fatalities, the EU is funding research on new technical concepts for safety information systems. A primary focus is the analysis and improvement of the driver-vehicle interaction and the functionality of driver assistance and information systems. Research is also directed to promoting the application of advanced vehicle safety technologies and the use of safety equipment. Moreover, research includes training of all road users to raise awareness of road safety.

To ensure high quality, efficiency and competitiveness of the transport sector, skilled and qualified employees are needed. Largely due to demographic changes, almost 30% of

employees in the transport sector are over the age of 50, and will be retiring in the foreseeable future (Davydenko et al., 2009). However, as the transport sector has been less successful in recruiting younger workers (EESC, 2011), research focuses on raising awareness of employment opportunities in the transport sector, especially for graduates.

Research projects and studies presented in this TRS are grouped in three sub-themes:

- Raising Awareness
- Passenger Information Systems
- User Rights.

2. Sub-Theme: Raising Awareness

Raising awareness involves informing and educating citizens and thus, influencing their mobility behaviour, choice of transport mode and individual perceptions of mobility issues. In meeting the EU targets for more sustainable and safer transport and a competitive transport industry, the EU supports research to raise awareness of EU citizens.

In a well-developed transport network citizens may take mobility for granted and may overlook issues in the transport sector. Involving citizens more closely with transport-related issues, such as sustainability and safety, requires target-oriented communication to the society at large. For this, awareness-raising initiatives play a key role. Target audiences and communication channels vary according to the focus of the initiative. However, the overall goal of awareness campaigns is to enhance knowledge and understanding and thus, to influence citizens' perceptions, attitudes and behaviour. Awareness-raising campaigns contribute to achieving various goals of EU policy. Projects to raise passenger and citizen awareness are divided into three clusters as follows:

- **Raising awareness to improve sustainable mobility** covers research to increase understanding of the ecological impacts of mobility behaviour and to encourage more sustainable travel options. Projects included also communicate results of EU research on sustainable and climate friendly transport systems to the general public.
- **Raising awareness to enhance road safety** includes projects that promote the use of advanced vehicle safety technologies and active safety systems. Projects in this cluster also deal with training on speed management, and evaluation of road safety campaigns.
- **Raising awareness of job opportunities in the transport sector** includes projects to communicate job opportunities in the transport sector, such as in surface transport, aeronautics and vehicle electrification industry.

Raising awareness to improve sustainable mobility

CATCH (Carbon Aware Travel Choices, FP7, 2009–2012) developed and promoted a knowledge platform and an integrated set of visual tools designed to encourage carbon

friendly travel choices in cities and thus to contribute to reducing CO_2 emissions from the transport sector. The online and interactive tools of the knowledge platform provide both empirical and theoretical evidence about carbon, and its effects on human populations and the environment. The platform has increased awareness of the negative impacts of carbon intensive mobility and of potential options for travellers to adopt sustainable transport choices.

MOVE TOGETHER (Raising Citizens Awareness and Appreciation of EU Research on Sustainable Transport in the Urban Environment, FP7, 2008–2009) focused on raising citizen awareness and appreciation of research on sustainable transport in the urban environment. The project made knowledge and everyday experience with local urban and environmental problems more explicit through dialogue and by expanding the knowledge base with research results. MOVE TOGETHER used media events, a travelling exhibition, town exhibitions and other standard dissemination activities (e. g., newsletter) in cities throughout Europe to promote use of public transport alternatives, including mass public transport, flexible on demand services, and car-pooling.

DEMOCRITOS (DEveloping the MObility CRedits Integrated platform enabling travellers to improve urban TranspOrt Sustainability, FP7, 2009–2011) introduced the Mobility Credits Model as a transport-specific platform to increase understanding of the implications of climate policy, changing attitude and mobility choices, and to identify new opportunities in urban mobility. The rationale of this model is setting quantitative target for a sustainable load of greenhouse gases in a study area. The greenhouse gas load was converted to a total amount of mobility credits distributed over all travellers in the area. The Mobility Credits Platform allows travellers to experience the effects of changing attitudes and choices in mobility and thus to raise passenger awareness of sustainable transport.

SUNSET (SUstainable social Network SErvices for Transport, FP7, 2011–2014) is developing and evaluating a set of services that use social networks and incentives to encourage people to travel more sustainably in urban environments. The project is focusing on services that reduce congestion, increase safety, protect the environment and increase personal wellbeing. Concerns about the externalities of increasing mobility are being alleviated in a new approach to urban mobility management that uses the latest information and communication technologies (ICT). The focus is on cooperation by information sharing and providing incentives for travellers, road authorities and other parties.

PRESS4TRANSPORT (Virtual Press Office to improve EU Sustainable Surface Transport research media visibility at national and regional level, FP7, 2009–2011) improved the media visibility of European sustainable surface transport (SST) research at national and regional level. Professional journalists worked in the Virtual Press Office to transform inputs from project consortia into professional press releases. The project supported national and regional SST project consortia to communicate their research results through mainstream European media. More accessible and understandable information about research results on sustainable transport raises awareness and encourages a change of attitude and in mobility choices.

GREENTRANSPORT-TV (Enhancing Public Awareness on the Results of European Research Actions on Climate Friendly Transport Systems through the Professional use of Television Media, FP7, 2009–2010) enhanced public awareness for the results of European research on climate friendly transport systems through the use of television. The project created 12 free-of-rights video news releases, original articles and interviews on the major results and discoveries of EU sustainable surface transport projects. Broadcasts were made over international networks, and national and local TV stations in 34 countries worldwide.

Raising awareness to enhance road safety

ESAFETY CHALLENGE (eSafety Challenge and Awareness Raising, FP7, 2010–2011) promoted and highlighted the life-saving potential of advanced vehicle safety technologies. Yearly events took place in Italy, the UK and Austria and targeted policy makers, fleet managers, driving school organisations, automobile clubs and media. The project brought forward discussion on eSafety deployment strategies in Europe and internationally. Through the eSafety awareness campaigning, which were directed to end users and policy makers, the project promoted the deployment and use of intelligent vehicle systems to enhance road safety in Europe.

ShLOW (Show Me How Slow: Mobilising Evidence from Transport Research into Speed, FP7, 2008–2010) deployed know-how from transport research on speed management in Europe. Within the project, 50 students from ten countries were selected to receive training in speed management, and to run small-scale projects in their own countries to demonstrate how speed can be reduced. These actions raised awareness and

helped to achieve significant reductions in excessive and illegal speeds on road networks in the EU.

CAST (Campaigns and Awareness-raising Strategies in Traffic Safety, FP6, 2006–2009) conducted road safety campaigns, with major road safety groups in the EU working together to improve road safety campaign strategies. An evaluation tool for public awareness campaigns was developed to measure the effects of these campaigns on driver behaviour. A manual to design, implement and evaluate awareness campaigns was developed. The project results have contributed to improving awareness campaigns on traffic safety.

SCVP (Smartest Cars Video Project, FP7, 2008–2010) produced a high quality one-hour TV programme which was broadcast throughout Europe. The broadcast of this documentary to hundreds of thousands of European citizens has demonstrated the effectiveness of the TV to engage and motivate the public to consider purchasing eSafety systems. The project has raised public awareness about the dangers on the road and the greater safety offered by active safety systems.

iCAR SUPPORT (Intelligent car Support, FP7, 2009–2012) supported implementation of actions and recommendations resulting from the iMobility Forum and the Intelligent Car Initiative. The project supported the work of national iMobility initiatives in Member States and EU initiatives. iCAR encouraged the press and new media to play a key role in presenting innovative transport solutions to the widest possible audience. The project increased awareness, understanding and support of EU citizens for intelligent transport systems (ITS) and safety applications.

Raising awareness for job opportunities in the transport sector

TECH-CLINIC SST (Setting-up of effective Technological Clinics to address real knowledge needs of Surface Transport industry, FP7, 2008–2009) gave some 90 students practical work experience and the opportunity to work closely with the surface transport sector. The project organised Cafés Scientifiques for school and university students to raise awareness about surface transport, and contributed to changing attitudes to the sector by demonstrating that it is an innovative sector, active in developing and

using new technologies. The project also demonstrated opportunities in the educational system, and in research and development.

RESTARTS (Raising European Student awareness in Aeronautical Research through School-labs, FP7, 2009–2012) developed teaching materials about current research topics in aeronautics including aerodynamic fundamentals and challenges in aeronautical research. Initiatives were adopted and lessons conducted in three primary schools and four secondary schools. Two school-labs were established at research institutes to give school classes hands-on experience in the laboratory. Additional visits to the laboratories of the project partners and their industrial partners were conducted. The educational work and school-labs contributed to raise awareness among young people and particularly young women for career opportunities in aeronautics.

JOBVEHELEC (Job opportunities in vehicle electrification, FP7, 2011–2013) raised the awareness of young people about employment in vehicle electrification and the educational paths to these jobs. The project evaluated and demonstrated job creation in the vehicle electrification. Through awareness events and information campaigns, young people were encouraged to seek employment in electrification of road transport.

3. Sub-Theme: Passenger Information Systems

Passenger information systems are designed for drivers and travellers, for instance to provide information about alternative modes of transport, route options and traffic warning. To make public transport safer, more attractive and resource-efficient, the EU supports the development of passenger information systems.

Advances in data-collection technology and improvements in data processing and distribution to users have made real-time information readily available to passengers. Accurate and up-to-date information provided by passenger information systems empowers drivers and travellers to make well-informed decisions before and during their journey. Thus, advanced passenger information systems have the potential to reduce congestion, increase travel time reliability and improve road safety. Research directed to improving and developing innovative passenger information systems includes analysis of passenger interaction with information systems and future requirements for such systems.

Research projects are grouped into three clusters as follows:

- **Passenger information systems to facilitate multimodal travel** comprises projects that develop passenger information systems to support multimodal travel choice. Research also includes analyses of social behaviour and future mobility patterns.
- **Passenger information systems to increase road safety** comprises projects that analyse and improve the driver-vehicle interaction and functionality of driver information and assistance systems to increase road safety.
- **Passenger information systems to support environmentally friendly transport** comprises research on advanced information and navigation systems to avoid congestion, to reduce emissions, and energy consumption in traffic.

Passenger information systems to facilitate multimodal travel

EMOTION (Europe-wide Multi-modal On-trip Traffic Information, FP6, 2006–2008) defined ICT infrastructure for pan-European travel and traffic information services that are standard-based, interoperable and multimodal. This framework has enabled stepwise integration of information services, such as real-time information for road traffic and public transport, and dynamic and multimodal routing services. The project created innovative integrated information services for travellers on all transport modes in Europe and these services are accessible via mobile devices and in-car-systems.

IM@GINE IT (Intelligent Mobility Agents, Advanced Positioning and Mapping Technologies, Integrated Interoperable multimodal location based services, FP6, 2004–2006) created a platform to provide an access point for travel-related user services. The platform supports travel by car, inter-urban and urban transport modes, ships, airlines and airport facilities. This multi-agent system provides a single platform for location-based, intermodal transport information, mapping, routing and navigation services. Furthermore, innovative user learning and localisation algorithms are embedded in the system to enable personalised services on routes selected by users.

ITRAVEL (Service Platform for the Connected Traveller, FP7, 2008–2009) developed a pro-active and context aware virtual travel assistant that uses time and context-specific information, such as location, proximity to transport services, journey purpose, time of day or calendar entries, to plan a journey and co-pilots the traveller along the itinerary. The service helps a traveller to link journey stages with different modes. If a chosen journey cannot continue as planned, for instance due to delays or accidents, the ITRAVEL system offers travel alternatives and makes the necessary arrangements.

VIAJEO (International Demonstrations of Platform for Transport Planning and Travel Information, FP7, 2009–2012) designed and validated an open platform to facilitate cross-modal journey planning with information exchange between transport operators. The wide range of flexible and standardised interfaces enables data integration, aggregation and exchange for a mix of provider and user stakeholders, and for a various data types. The project integrated the open platform with local components and its use was demonstrated in Athens, São Paulo, Beijing, and Shanghai. VIAJEO enables harmonisation of individual operation strategies and optimised transport modelling, and long-term policy evaluation.

i-TOUR (intelligent Transport system for Optimized URban trips, FP7, 2010–2013) developed a user-friendly travel information system for optimal multi-modal passenger trips. The i-TOUR framework is based on open source technology and low-cost portable localisation technologies. Recommendations on routes, transport modes and points of interest are based on information provided by users and take account of user preferences as well as real-time information on road conditions, weather and public transport networks. The client application promotes sustainable travel choices and suggests, in a user-friendly way, the use of different forms of transport.

WISETRIP (Wide Scale Network of E-systems for Multimodal Journey Planning and Delivery of Trip Intelligent Personalised Data, FP7, 2008–2010) developed and deployed an international multimodal door-to-door journey planner. The main innovation was combining existing independent systems for journey planning to create a global journey planner system that provides and personalises multimodal travel information for urban and long-distance journeys. Dynamic personalised information can be accessed by travellers anywhere and at anytime through various mobile and fixed devices before and during the journey.

ENHANCED WISETRIP (Enhancing Intermodality of Content, Personalised Information and Functionality of WISETRIP Network of Journey Planning Engines, FP7, 2011–2014) is building on the knowledge developed in the previous WISETRIP project on planning, booking and travelling multimodal journeys. The criteria considered include environmental impact, specificities of older people and the disabled, as well as factors such as time and cost. To manage unexpected situations, real-time data sources and information on extraordinary conditions are being integrated, such as strikes, disasters and bad weather. New decision management mechanisms are being considered for traveller alerts and journey redesign.

eCOMPASS (eCO-friendly urban Multi-modal route PlAnning Services for Mobile uSers, FP7, 2011–2014) is introducing and establishing a methodological framework to optimise route planning using a holistic approach to address the environmental impact of urban mobility. A comprehensive set of tools and services for end users is being developed. The focus is on the design and development of intelligent on-board management systems, which employ intelligent traffic prediction and traffic balancing methods, while taking into account driving behaviour. Web and mobile services are being developed to provide multimodal public transport route planning that incorporates contextual information, such as location and time, and various restrictions and/or user constraints.

COMPASS (Optimised CO-Modal PASSenger Transport for Reducing Carbon Emissions, FP7, 2011–2013) is identifying key socio-economic trends in mobility patterns based on current and future passenger needs. ICT and information technology services applications are being analysed to meet the new demands including integrating multimodal and co-modal transport solutions. The project will produce a Handbook on ICT solutions for improving co-modality in passenger transport, and will assess the potential impact of ICT solutions on a co-modal transport system.

USEMOBILITY (Understanding Social Behaviour for Eco-friendly Multimodal Mobility, FP7, 2011–2013) applied a new approach to identifying the reasons for behavioural change in citizen mobility in Europe. This approach was based on the behavioural change that has already taken place. An interview survey of citizens was conducted in ten regions in five European countries to establish reasons for mobility changes. Based on the results of the analysis, a mix of measures was suggested to adapt the transport services offered and the framework conditions to the customer needs. The findings have been used to produce scenarios for environmentally friendly, multimodal mobility, including demographic, economic, and social trends, and the needs of different social groups.

DECOMOBIL (Support action to contribute to the preparation of future community research programme in user centred Design for ECO-multimodal MOBILity, FP7, 2011–2014) is contributing to the development and the widespread implementation of user-friendly and innovative ICT based mobility and transport services. This is being done by organising scientific seminars, for instance on long-term impacts and effects of ITS and nomadic transport services for multimodal mobility, and an international conference on Human Centred Design for ITS to identify, discuss and disseminate update knowledge and knowhow on human-machine interface (HMI), and human-centred design areas for the ITS community in European and internationally.

Passenger information systems to increase road safety

AIDE (Adaptive Integrated Driver-vehicle Interface, FP6, 2004–2008) addressed the human-machine interface in large-scale deployment of intelligent road safety systems. Driver adaptation was studied with regard to advanced driver assistance systems, in-vehicle information systems and nomadic devices (e. g., mobile phones). Based on these findings, a generic adaptive integrated driver-vehicle interface was developed to

maximise efficiency, and the safety benefits of advanced driver assistance systems. The innovative interface minimises the workload and distraction of in-vehicle information systems and nomadic devices, and ensures benefits in terms of mobility and comfort without compromising safety.

INTERACTION (Differences and similarities in driver INTERACTION with in-vehicle technologies, FP7, 2008–2012) studied driver interaction with in-vehicle technologies. A limited set of mature technologies was considered which have been adopted by car drivers in Europe, such as communication and navigation systems, and speed and distance control systems. The research approach included methodologies, such as focus groups, questionnaire surveys, and in-depth observations, to identify driver use patterns of these systems in Europe. In addition, 'Naturalistic Driving' studies were conducted. The long-term effects of the use of in-vehicle technology on driver behaviour, performance and safety were analysed to gain more understanding of driver interactions in order to reduce misuse of systems and thus to increase road safety.

ISI-PADAS (Integrated Human Modelling and Simulation to Support Human Error Risk Analysis of Partially Autonomous Driver Assistance Systems, FP7, 2008–2011) supported design and safety assessment of new generations of driver information and assistance systems. An innovative tool-supported methodology was developed to facilitate risk-based design and approval of partially autonomous driver assistance systems. This new methodology focuses on eliminating and mitigating driver error in integrated driver-vehicle-environment modelling. ISI-PADAS has produced innovations in risk-based design and advances in driver behaviour modelling including evaluation of hazards associated with human error and/or inadequate driver behaviour.

EUROFOT (European Large-Scale Field Operational Test on Active Safety Systems, FP7, 2008–2011) focused on the impact of driver assistance systems. Various intelligent in-vehicle systems were tested in Europe. Data gathered under real-time traffic conditions with selected drivers were analysed to test functionalities of intelligent vehicle systems, such as adaptive cruise control and forward collision warning systems, navigation systems, blind spot information systems, speed regulation systems and curve speed warning systems. A link was established between these systems and improvements in driver behaviour, fuel efficiency and traffic safety, and in overall cost savings.

HIGHWAY (Breakthrough Intelligent Maps and Geographic Tools for the Context-aware Delivery of E-safety and Added-value Services, FP6, 2004–2006) created an innovative information system to provide car drivers and pedestrians with eSafety services and when needed, interaction with multimedia and value-added location-based services. The system sends up-to-date information on driving conditions, accidents, traffic congestion and road works to in-car devices and/or mobile phones. In addition, the system provides information on the likelihood of sudden deterioration in driving conditions due to changing weather conditions. A key innovation was the integration of data from various sources into a navigable digital map to deliver smart and dynamic maps.

EVADER (Electric Vehicle Alert for Detection and Emergency Response, FP7, 2011–2014) is investigating the interior and exterior sound scape of electric vehicles for safe operation, taking into account driver feedback, possible pedestrian reactions, driver and pedestrian warning systems, and pedestrian safety. Innovative methods to improve the acoustic detectability of electric vehicles in urban scenarios are being analysed. Methods to warn vulnerable users of a moving vehicle nearby and to increase driver awareness of critical situations are being analysed.

SAFERIDER (Advanced telematics for enhancing the SAFEty and comfort of motorcycle RIDERs, FP7, 2008–2010) developed and demonstrated the feasibility and effectiveness of five functions of an advanced assistance system for motorcycle riders: speed alert; curve warning; frontal collision warning; intersection support; and lane change support. These functions are supported by optimal and concise warning concepts and strategies, and by new haptic elements, and an integrated smart helmet. In pilot tests, information and feedback from test riders have been collected and will be used to improve the assistance system.

Passenger information systems to support environmentally friendly transport

ECODRIVER (Supporting the driver in conserving energy and reducing emissions, FP7, 2011–2015) is investigating how to obtain driver support for more energy-efficient driving and how to optimise feedback on green driving. Feedback covers a preview of the upcoming situation, optimisation of the current driving situation and post-

drive feedback and learning. To increase system effectiveness and driver acceptance, the human-machine interface could be adapted to the driving style, traffic conditions, power-train and vehicle type. The feedback and adaption methodology will be evaluated in driving simulators and in real-time driving tests.

ECOMOVE (Cooperative Mobility Systems and Services for Energy Efficiency, FP7, 2010–2013) created an integrated solution for energy efficiency in road transport to reduce unnecessary kilometres and fuel consumption, and to manage traffic more efficiently. Several applications have been developed and evaluated to improve the driver route choice and driving performance, as well as traffic management and control. The innovative tools are based on information exchange between the traffic system and the vehicle, and contribute to reducing fuel consumption and CO_2 emissions.

ECONAV (Ecological Aware Navigation: Usable Persuasive Trip Advisor for Reducing CO_2-consumption, FP7, 2011–2014) is improving navigation systems with innovative approaches and features to support users in making more sustainable travel choices. Travellers are provided with personalised multimodal navigation tools that integrate automated travel mode detection based on real-time GPS data into trip planning. Feedback is provided on the ecological footprint and exposure levels in planning, during travelling and car driving activities. Interface strategies are being used to give feedback on the ecological impact of individual behaviour and to make ecologically sound behaviour patterns visible and more attractive. The innovative tools enable, help and persuade passengers to travel and drive with attention to the ecological impacts.

4. Sub-Theme: User Rights

To ensure that public transport users benefit from the same basic standards of treatment wherever they travel in the EU, a comprehensive set of user rights has been established over the last 10 years. Various studies have been carried out to evaluate the impact of these regulations and to identify the need for further improvement to the legal rights of users.

To ensure users reliable and convenient public transport services, a common set of rights is required, regardless of transport mode and regardless of whether a journey is domestic within a EU Member State, international within the EU, passing through the EU or crossing EU borders (EC, 2013c). The scope of EU passenger rights covers many aspects of travelling, such as information about the journey, reservation, ticket fare, damage to baggage, delays and cancellations, denied boarding, or difficulties with package holidays. EU policy ensures that requirements of passengers with reduced mobility are met, and that passengers with reduced mobility do not have to suffer from unfairly refused carriage (EC, 2013c). To establish a European standard for user protection on all transport modes, uniform interpretation of EU law on passenger rights and harmonised and effective enforcement are required (EC, 2011a). EU-funded research projects and studies on passenger rights are summarised below.

BUSREP (Strategies for Better USer REPresentation in public transport, FP7, 2003–2008) analysed and evaluated the structures for transport user representation, and citizen participation in planning, quality management and customer care in various EU Member States. Tools and procedures for citizen participation in planning processes were analysed from an interdisciplinary perspective and the results were published in two books. As a result, recommendations were made to politicians, public transport and urban planners, and quality and customer relationship managers.

Report of the study Evaluation of Regulation 1371/2007 by Steer Davies Gleave on the application and enforcement in the Member States of the Regulation on rail passengers' rights and obligations (European Commission, DG MOVE, 2012) evaluated implementation the Regulation which defined measures to protect end extend passenger rights when travelling by rail. The study identified minor problems with the comprehensibility and clarity of the text and the enforcement of the Regulation in the Member States and in railway undertakings. For instance, the impact of the Regulation

has been limited by derogations adopted by Member States. A number of recommendations were made for further improvement of the Regulation, and for its implementation in the Member States.

Review of Regulation 261/2004 (European Commission, DG MOVE, 2007) reviewed implementation of the Regulation which introduced new rules on compensation for and assistance to air passengers in the event of denied boarding, cancellations, long delays and involuntary downgrading. The Regulation has had little or no impact on the number of delays, cancellations and denied boarding. Furthermore, a number of key elements in the Regulation are unclear and are hampering enforcement in the EU Member States. The study proposed adjustment to clarify these various aspects of the Regulation to ensure that passenger rights are adequately protected.

Evaluation of Regulation 261/2004 on the application and enforcement of the Regulation on air passengers' rights in the EU Member States (European Commission, DG MOVE, 2010) showed that the Commission and others have made significant efforts to address the problems in implementing the Regulation. However, key problems remained with regard to ensuring that passenger rights are adequately protected.

Exploratory study on the application and possible revision of Regulation 261/2004 (European Commission, DG MOVE, 2012) assessed the incremental economic burden that the Regulation imposes on air carriers in order to understand its current impact, and as a key input for assessing options for revision of the Regulation. The study identified various issues in implementing the Regulation. For instance, the penalties under the Regulation do not vary in relation to the journey length and the fare paid. As a result, penal costs are higher in relation to revenue for airlines operating shorter distances and with lower fares. A number of options, ranging from repeal of the Regulation to options that would significantly extend its scope, have been evaluated.

Evaluation of the application of Regulation 1107/2006 on the application and enforcement of the regulation concerning the rights of disabled people and persons with reduced mobility when travelling by air (European Commission, DG MOVE, 2010) examined implementation of the Regulation by airports and airlines. The study showed significant variation in the quality of service provided by airports, and in airline policies on carriage of persons with reduced mobility. National Enforcement Bodies was found not be active in monitoring implementation of the Regulation, and in

promoting awareness of passenger rights. Recommendations to improve implementation of the Regulation were made.

Report on the assessment on rules on penalties applicable to infringements to Regulation (EC) 1107/2006, concerning the rights of disabled persons and persons with reduced mobility when travelling by air (European Commission, DG MOVE, 2010) analysed the penalty schemes under article 16 of Regulation 1107/2006. The study concluded that the understanding of the Regulation varied from one Member State to another and that the penalty schemes are not uniform and not applied in practice. Four years after entry into force, the Regulation has not yet been fully implemented in the EU. Further implementation of the Regulation is needed to ensure the rights of people with reduced mobility travelling by air.

Study on the compensation thresholds for damaged or lost equipment and devices belonging to air passengers with reduced mobility (European Commission, DG MOVE, 2007) assessed the options to enhance passenger rights under EU, national and international law for loss or damage to wheelchairs and other mobility equipment during airport handling and transport on-board aircraft. The study found that compensation varied between air carriers. Most of the airports surveyed in the EU do not have specific procedures for handling wheelchairs and other mobility equipment and do not have specific policy regarding claims and compensation for these items. Regulatory and non-regulatory measures are needed to improve the situation of air passengers with reduced mobility.

Study on Consumer Protection against Aviation Bankruptcy (European Commission, DG MOVE, 2009) analysed the reasons for and situation regarding airline bankruptcy in the EU since 2000 and determined the impact on holders of pre-paid tickets. The adequacy of consumer protection against financial and personal risks was assessed. The study recommended a framework of general responsibility for government, industry and for the courts to create and provide rapid ad hoc responses if and when such emergencies arise.

Impact assessment of passenger protection in the event of airline insolvency (European Commission, DG MOVE, 2011) examined the level of passenger protection against airline insolvency. Such protection is available to passengers who purchase package tours, but not for the growing proportion of passengers who purchase tickets directly from airlines and through intermediaries. The study assessed the economic, social and environmental impacts of various options for protecting passengers in the event of airline insolvency and made recommendations for improving their legal position.

5. Future Challenges for Research and Policy

Well-informed EU citizens, who are aware of the challenges in the transport sector and of their comprehensive rights as passengers, are able to contribute to making transport more efficient, cleaner and safer. Under FP6 and FP7, the EU has launched various research projects and studies on awareness, information and user rights. While progress has been made, research projects and studies presented indicate various open issues and the need for further research.

Raising awareness

Transport awareness initiatives are a key element to changing attitudes and to adopting more sustainable and safer transport. Further research may focus on evaluating the effectiveness of awareness-raising initiatives and on developing new concepts for future campaigns. Consideration of the latest findings on mobility patterns, habits and decision-making may contribute to the success of new concepts. Furthermore, broad integration of social media into awareness campaigns may be expedient in initiatives to change attitude. However, a change in attitude alone may not always change behaviour. For instance, a positive attitude to sustainable transport modes will only lead to modal shift, if the experienced service quality meets the daily requirements and expectations of the passengers. Thus, a holistic approach, with awareness-raising initiatives as one key element, is needed in achieving EU objectives in the transport sector.

Passenger information systems

A wide range of passenger information systems has been developed under EU-funded research. Future research may evaluate the performance and user-friendliness of these systems, as well as the level of use and acceptance. New findings on mobility patterns, travel mode choice and individual driving style may be used to refine existing systems and should be considered for new developments. Research on passenger information systems should keep up with innovations in display media, smart technologies and social

media. The security of customer data in passenger information systems and the compatibility of disparate technologies and hardware may pose future technical challenges. New standards and guidelines are needed for EU-wide implementation of passenger information systems, especially regarding holistic systems for multimodal trip planning, travel scheduling and ticket purchasing. Further research and policy proposals for EU-wide standards and guidelines could be based on the outcome of public consultations.

User rights

EU regulations on user rights in the transport sector have improved the legal position of passengers in the EU. Future research on user rights may review and evaluate the implementation of regulations in the EU Member States, and assess the impacts and effectiveness of such regulations. Studies on passenger rights indicate various problems in implementing regulations. For instance, unclear and unspecified text components lead to varying interpretations of regulations in the Member States. Another issue is ineffective enforcement of regulations. Further research may identify requirements for future regulations in order to support the EU objective of a single EU framework regulation covering passenger rights for all modes of transport.

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Glossary

CO_2	Carbon Dioxide
DG MOVE	Directorate-General for Mobility and Transport
EC	European Commission
ERA	European Research Area
EU	European Union
FP6	Sixth Framework Programme
FP7	Seventh Framework Programme
GPS	Global Positioning System
HMI	Human-Machine Interface
ICT	Information and Communication Technology
ITS	Intelligent Transport Systems
SST	Sustainable Surface Transport
TEN-T	Trans-European Transport Network
TRIP	Transport Research and Innovation Portal
TRS	Thematic Research Summary
TV	Television
UK	United Kingdom

ANNEX: Projects by Sub-Theme

Sub-Theme : Raising Awareness				
Acronym	**Title**	**Funding Programme**	**Project Website**	**Duration**
CATCH	Carbon Aware Travel Choices	FP7	http://www.carbonaware.eu/	2009–2012
MOVE TOGETHER	Raising Citizens Awareness and Appreciation of EU Research on Sustainable Transport in the Urban Environment	FP7	http://www.move-together.net/	2008–2009
DEMOCRITOS	DEveloping the MObility CRedits Integrated platform enabling travellers to improve urban TranspOrt Sustainability	FP7	http://democritos.ipacv.ro/	2009–2011
PRESS4TRANSPORT	Virtual Press Office to improve EU Sustainable Surface Transport research media visibility at national and regional level	FP7	http://www.press4transport.eu/vpo/	2009–2011
GREENTRANSPORT-TV	Enhancing Public Awareness on the Results of European Research Actions on Climate Friendly Transport Systems through the Professional use of Television Media	FP7	http://www.proprs.com/p_greentv.html	2009–2010

ESAFETY CHALLENGE	eSafety Challenge and Awareness Raising	FP7	http://www.esafetychallenge.eu/	2010–2011
ShLOW	Show Me How Slow: Mobilising Evidence from Transport Research into Speed	FP7	http://www.shlow.eu/	2008–2010
CAST	Campaigns and Awareness-raising Strategies in Traffic Safety	FP6	http://www.cast-eu.org/	2006–2009
SCVP	Smartest Cars Video Project	FP7	N/A	2008–2010
iCAR SUPPORT	Intelligent car Support	FP7	http://www.imobilitysupport.eu/	2011–2014
TECH-CLINIC SST	Setting-up of effective Technological Clinics to address real knowledge needs of Surface Transport industry	FP7	http://www.techclinic.eu/	2008–2009
RESTARTS	Raising European Student Awareness in Aeronautical Research through School-labs	FP7	http://www.fp7-restarts.eu/	2009–2011
SUNSET	SUstainable social Network SErvices for Transport	FP7	http://sunset-project.eu/	2011–2014
JOBVEHELEC	Job opportunities in vehicle electrification	FP7	N/A	2011–2013

Sub-Theme: Passenger Information Systems				
Acronym	**Title**	**Funding Programme**	**Project Website**	**Duration**
eMOTION	Europe-wide Multi-modal On-trip Traffic Information	FP6	http://www.emotion-project.eu/	2006–2008
IM@GINE IT	Intelligent Mobility Agents, Advanced Positioning and Mapping Technologies, Integrated Interoperable multimodal location based services	FP6	N/A	2004–2006
i-Travel	Service Platform for the Connected Traveller	FP7	http://itravelproject.wordpress.com/	2008–2009
VIAJEO	International Demonstrations of Platform for Transport Planning and Travel Information	FP7	http://viajeo.eu/	2009–2012
WISETRIP	Wide Scale Network of E-systems for Multimodal Journey Planning and Delivery of Trip Intelligent Personalised Data	FP7	http://www.wisetrip-eu.org/	2008–2010
ENHANCED WISETRIP	Enhancing Intermodality of Content, Personalised Information and Functionality of WISETRIP Network of Journey Planning Engines	FP7	N/A	2011–2014

eCOMPASS	eCO-friendly urban Multi-modal route PlAnning Services for Mobile uSers	FP7	http://www.ecompass-project.eu/	2011–2014
COMPASS	Optimised CO-Modal PASSenger Transport for Reducing Carbon Emissions	FP7	http://www.fp7-compass.eu/	2011–2013
USEMOBILITY	Understanding Social Behaviour for Eco-friendly Multimodal Mobility	FP7	http://usemobility.eu/	2011–2013
DECOMOBIL	Support action to contribute to the preparation of future community re-search programme in user centred Design for ECO-multimodal MOBILity	FP7	http://decomobil.humanist-vce.eu/	2011–2014
AIDE	Adaptive Integrated Driver-vehicle Interface	FP6	http://www.aide-eu.org/	2004–2008
INTERACTION	Differences and similarities in driver INTERACTION with in-vehicle tech-nologies	FP7	http://interaction-fp7.eu/index.php	2008–2012
ISI-PADAS	Integrated Human Modelling and Simulation to Support Human Error Risk Analysis of Partially Autono-mous Driver Assistance Systems	FP7	http://www.isi-padas.eu/	2008–2011
EUROFOT	European Large-Scale Field Opera-tional Test on Active Safety Systems	FP7	http://www.eurofot-ip.eu/	2008–2011

HIGHWAY	Breakthrough Intelligent Maps and Geographic Tools for the Context-aware Delivery of E-safety and Added-value Services	FP6	N/A	2004–2006
EVADER	Electric Vehicle Alert for Detection and Emergency Response	FP7	http://www.evader-project.eu/	2011–2014
SAFERIDER	Advanced telematics for enhancing the SAFEty and comfort of motorcy-cle RIDERs	FP7	http://www.saferider-eu.org/	2008–2010
ECODRIVER	Supporting the driver in conserving energy and reducing emissions	FP7	http://www.ecodriver-project.eu/	2011–2015
ECOMOVE	Cooperative Mobility Systems and Services for Energy Efficiency	FP7	http://www.ecomove-project.eu/	2010–2013
i-TOUR	intelligent Transport system for Op-timized URban trips	FP7	http://www.itourproject.com/web/	2010–2013
ECONAV	Ecological Aware Navigation: Usable Persuasive Trip Advisor for Reducing CO_2-consumption	FP7	http://www.econav-project.eu/	2011–2014

Sub-Theme: User Rights				
Acronym	**Title**	**Funding Programme**	**Project Website**	**Duration**
BUSREP	Strategies for Better USer REPresentation in public transport	FP7	http://www.busrep.net/	2003–2008
-	Study: Report of the study "Evaluation of Regulation 1371/2007" by Steer Davies Gleave on the application and enforcement in the Member States of the Regulation on rail passengers' rights and obligations	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2012-07-evaluation-regulation-1371-2007.pdf	2012
-	Study: "Evaluation of Regulation 261/2004" by Steer Davies Gleave on the application and enforcement of the Regulation on air passengers' rights in the EU Member States	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2010_02_evaluation_of_regulation_2612004.pdf	2010
-	Study: Exploratory study on the application and possible revision of Regulation 261/2004	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2012-07-exploratory-study-on-the-application-and-possible-revision-of-regulation-261-2004.pdf	2012
-	Study: "Evaluation of the application of Regulation 1107/2006" by Steer Davies Gleave on the application and enforcement of the regulation concerning the rights of disabled people and persons with reduced mobility when travelling by air	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2010_06_evaluation_regulation_1107-2006.pdf	2010

-	Study: Report on the assessment on rules on penalties applicable to infringements to Regulation (EC) 1107/2006, concerning the rights of disabled persons and persons with reduced mobility when travelling by air	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2010_09_24_assessment_on_rules_on_penalties.zip	2010
-	Study: Study on the compensation thresholds for damaged or lost equipment and devices belonging to air passengers with reduced mobility	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2007_06_30_compensation_thresholds.pdf	2007
-	Study: Study on Consumer Protection against Aviation Bankruptcy	DG MOVE	http://ec.europa.eu/transport/modes/air/studies/doc/internal_market/2009_01_bankruptcy_study.pdf	2009
-	Study: Review of Regulation 261/2004	DG MOVE	http://ec.europa.eu/transport/modes/air/studies/doc/passenger_rights/2007_02_passenger_rights.zip	2007
-	Study: Impact assessment of passenger protection in the event of airline insolvency	DG MOVE	http://ec.europa.eu/transport/themes/passengers/studies/doc/2011_03_passenger-rights-airline-insolvency.pdf	2011