



# DECOMOBIL Deliverable 2.1 Roadmap of Information & Communication Technology design for clean and efficient multimodal mobility

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## **Deliverable 2.1**

### **Roadmap of Information & Communication Technology design for clean and efficient multimodal mobility**

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## Abbreviations

Abbreviation	Meaning
ADAS	Advanced Driver Assistance System
ARAS	Advanced Rider Assistance System
AVERE	European Association for Battery, Hybrid and Fuel Cell Electric Vehicles
CEN	“Comité Européen de Normalisation” European Committee for standardisation
ECTRI	European Conference of Transport Research Institutes
ERSAP	European Road Safety Action Programme
ESoP	European Statement of Principles
FERSI	Forum of European Road Safety Research Institutes
FEHRL	Forum of European National Highway Research Laboratories
GPS	Global Positioning System
HMI	Human Machine Interaction
HSI	Human Service Interface
ICT	Information and Communication technology
ISO	International Standardisation Organisation
ITS	Intelligent Transport System
IVIS	In-vehicle Information System
ND	Nomadic Device
NHTSA	National Highway Traffic Safety Administration
NoE	Network of Excellence
OBIS	On-Bike Information System
OEM	Original Equipment Manufacturer
PTW	Powered Two Wheelers
R&I	Research and Innovation
VCE	Virtual Centre of Excellence
VRU	Vulnerable Road User

## Executive summary

The scientific seminar on *“Roadmap of Information & Communication Technology design for clean and efficient multimodal mobility”* organized by Ifsttar in the framework of the European project DECOMOBIL, has been held the 28<sup>th</sup> of May 2013 in Munich, Germany. The aims of the event were to overview perspectives of research in the domain of ICT and green transport, with presentation of the main key issues, the on-going major projects, some outstanding results and the scientific and technical lacks of knowledge to overcome, in order to debate about future steps to follow to reach identified and consensual objectives in this domain.

Speakers have been identified as key experts in the ecomobility research areas, with diversified points of view and approaches, in order to give to the audience a holistic vision of this issue. During this seminar, an overview of European projects on ecomobility such as eCoMove, compass4D, Adasis, Amitran, has been provided. Experience gained from the iMobility WG on ICT for clean and efficient mobility, which aims providing a vision on eco-friendly mobility, has been presented. Priorities for road safety research in Europe have been defined through the presentation of the PROS project, and transport cross-modal considerations on safety and human factors have been discussed through the presentation of the EXCROSS project. Perspectives on Powered-Two-Wheels contribution to ecomobility in addition to sustainable driving/riding training for a safe and cost efficient behavior have been drawn. Finally, main issues related to design, integration and safety of mobile service for ecomobility and concept of cooperative services have been presented and discussed.

A round table allowed the audience to interact in a fruitful way with all the speakers of the day.

After summarizing the context linked to ecomobility at a European level, this report gathers a summary of each presentation in addition to the full set of slides displayed at the seminar.

Furthermore, all the presentations (slides and video recordings of the speakers) are available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

## Announcement and Agenda of the Roadmap Workshop



**May, 28<sup>th</sup> 2013, Munich, Germany**

**WORKSHOP**

**ROADMAP OF ICT DESIGN FOR CLEAN AND EFFICIENT MULTIMODAL MOBILITY**

- **10:00** Welcome
- **10:15** HUMANIST Virtual Centre of Excellence, a vision toward 2020, *Angelos Bekiaris, President of Humanist, CERTH/HIT, Greece*
- **10:30** European projects on ecomobility, *Jean-Charles Pandazis, Head of Sector EcoMobility, ERTICO, Brussels*
- **10:50** ICT for Clean and Efficient Mobility, *Luca Pascotto, Mobility Director, FIA Region I, Chair of the WG IMobility, Brussels*
- **11:10** Coffee Break
- **11:40** Priorities for Road Safety Research In Europe, *Peter Urban, Coordinator of the PROS project, FKA, Germany*
- **12:00** Perspectives on PTWs contribution to ecomobility, *Dr. Veneta Vassileva, Safety Coordinator of ACEM, Brussels*
- **12:20** Lunch
- **14:00** Cross-modal considerations on Safety and Human Factors, *Dr. Simone Pozzi, Coordinator EXCROSS project, Italy*
- **14:20** Perspectives on sustainable driving/riding training aiming at a safe and cost efficient behavior, *Stella Nikolaou, CERTH/HIT, Greece*
- **14:40** Design, integration and safety of mobile service for ecomobility, *Dr. Annie Pauzie, ifsttar/LESCOT, France*
- **15:00** Cooperative service concept and human Service Interface: innovative approach for a sustainable transport system, *Prof. Jose Menendez, UPM, Spain*
- **15:20** Round Table with all the speakers, chaired by *Erik Bessmann, DAEI/ifsttar*
- **16:00** End of the day

**Registration FREE of CHARGE** <http://fr.amiando.com/ecomobility>

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## Announcement and Agenda of the Roadmap Workshop



May, 28<sup>th</sup> 2013, Munich, Germany

WORKSHOP

ROADMAP OF ICT DESIGN FOR CLEAN AND  
EFFICIENT MULTIMODAL MOBILITY

DECOMOBIL project (user centred Design for ECO-multimodal MOBILity)

*Support Action funded by the DG Connect (2011-2014)*

The objective of DECOMOBIL project is to develop and to widely disseminate knowledge in the area of human centred design of ICT for sustainable transport by organising scientific seminars and international conferences, developing a research roadmap and participating to the Joint Research Initiative setting up. Contribution to acceptability and usability of ICT for cleaner and safer mobility is made through animation of discussion with the relevant stakeholders involved in this area and dissemination of updated data and know-how in Human Machine Interaction and Human Centred Design areas towards the ITS community at a European and international level.

Speakers of the workshop belong to the following organisations and projects:



Humanist



fka

## **1. Introduction**

### **1.1 Aim and context of the DECOMOBIL Roadmap workshop**

Activities developed since many years in eSafety, then iMobility forum, and other ICT committees for transport and mobility, have been showing the critical importance of Human Machine Interaction (HMI) and Human Factors Engineering knowledge and know-how for the development and deployment of ICT for mobility and transport system and services (eSafety RTD Working Group Strategic Research Agendas, Working Group HMI-ESoP, Nomadic Devices Forum, Cooperative Systems Alliance, FoTs, SafeAPP...).

In this framework, the objective of DECOMOBIL project aims to develop and to widely disseminate knowledge in the area of human centred design of ICT for sustainable transport by organising scientific seminars and international conferences, developing and discussing research roadmaps and participating to the Joint Research Initiative setting up.

Contribution to acceptability and usability of ICT for cleaner and safer mobility is made through animation of discussion with the relevant stakeholders involved in this area and dissemination of updated data in Human Machine Interaction and Human Centred Design areas towards the ITS community at a European and international level.

The goal of this specific DECOMOBIL “Roadmap” Workshop is, firstly, to identify key issues for future research and innovation activities in the area of clean and efficient multi-modal mobility in Europe as well as at an international level and, secondly, to set up priorities of research and innovation activities in relation to identified scientific bottle necks, lack of knowledge in some areas and priorities at European high level.

During the running of the NoE/VCE HUMANIST, several actions, under the Task Force “Roadmap”, have been already conducted, aiming at having a deep understanding of, on one hand, the available knowledge gathered through on-going activities and, on the other hand, the lack of knowledge not covered by existing activities in a road mapping purpose in this area. This Task Force, created in 2008, produced several outputs since then, some of them presented at the plenary session of the French Presidency European Union event on Sustainable Transport & Mobility, Research and Climate Change Challenge, the 12 December 2008, in Lyon, France. Other workshops have been organized on a regular basis since then, in Brno, Czech Republic on 14-15 May 2009, in Vienna, Austria on 26-27 November 2009, in Berlin, Germany on 29-30 April 2010, in Paris, France on 9 November 2010. A report has been also produced, gathering 12 “research hot topics” for ICT design, with, for each of them, the description of the scope of the topic, the context in terms of European and international research, the research issues, the objectives, the method and expected results/benefits, and the potential impact on major transport stakeholders.

As a follow up of this activity, the objective of the work conducted in the DECOMOBIL “Roadmap” is to develop a synthesis on the perspectives of research more focused on the specific area of ICT design for clean and efficient multi-modal mobility.

#### **Identification of lacks and scientific bottlenecks**

- Identify which issues could have a major potential impact for eco-mobility
- Define in which areas there are lack of knowledge and scientific bottle necks

#### **Exchanges with main key stakeholders and HUMANIST VCE members**

- Organize a workshop involving relevant stakeholders: scientific with human sciences and engineering backgrounds, industrials, public authorities, EC, experts (Milestone 1) and produce a report gathering the main outputs of the workshop (Deliverable D2.1, this report).

- **Setting up priorities**
- Propose a set of priorities for research to be conducted in the future according to the output of the workshop, including comments and various points of view from relevant stakeholders concerned by the field of clean multimodal mobility (Deliverable D2.2, May 2014).

## **1.2 Context and issues of roadmap of ICT User Centred Design for eco-multimodal mobility according to the European vision**

### **1.2.1 The European vision**

Ensuring sustainable mobility and transport is one of the main societal challenges for Europe. The long term vision for ICT for mobility and transport R&I is a transportation system with close to zero accidents, minimized unreliable delays, near zero environmental impact and fully informed travellers and shippers (eSafety forum position paper, 09/05/2011, ICT for mobility and transport research and innovation -R&I- in the common strategic framework). Attaining this vision will require the development of a fully integrated multimodal transportation network, ensuring efficient and safe movement of people and goods in Europe. Europe has to transform its transportation system with the wide-spread adaptation and use of ICT based technologies and services, bringing closer the long term vision of an accident free and carbon neutral sustainable transportation system. Since 2009, the European Green Car Initiative has combined funding from several programs including the ICT program. A substantial contribution in both safety and energy efficiency is expected to come from cooperative mobility, where the research was started already in 2006. Cooperative driving solutions support foresighted driving and the early detection of dangers and hazards, while cooperative traffic information exchange between vehicle and infrastructure improve traffic flow and support eco-driving.

Research in the area of sustainable road transport needs to address the needs of **road users** in addition to road operators. It also needs to be focused on the development of systems for roads, vehicles, transport and logistics services while addressing the new challenges and opportunities that arise from **the use of electric and hybrid vehicles**.

In the area of sustainable urban mobility, a coordinated, efficient and integrated intermodal approach is required to address **the development of safe and sustainable urban mobility**.

Road transport safety remains a major goal for the EU. An additional effort should be made to achieve the targets for reducing the number of road fatalities and severe injuries. The **mitigation of driver distraction and the driver's role in increasingly automated systems continue to grow in importance**. Investment in the development of **electrical vehicles** is also opening up novel areas of investigation on **safety** related applications.

On the matter of deployment, Field Operational Tests must be developed further. Advances modeling and simulation must be considered in important areas such as traffic modeling, emission models and air quality, communication modeling and **behavior and HMI modeling**.

Research has also to focus on **assessment methods**, quality standards, business models and deployment aspects, legal and ethical issues, **training and education**, **human factors** and organizational perspectives and **international R&D collaboration**.

### **1.2.2 The DECOMOBIL "Roadmap" workshop experts**

This paragraph presents the experts that have been invited to the workshop. A brief overview of their institutions profile and their main responsibilities give a useful background to better understand their point of view related to road map for ICT design and ecomobility.

**Angelos Bekiaris, Research Director at CERTH/HIT (Centre for research and Technology Hellas/Hellenic Institute of Transport), President of Humanist.**

## Support action to contribute to the preparation of future Community research programme in user centred Design for ECO-multimodal MOBILity - DECOMOBIL

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The Centre for research and Technology Hellas (CERTH) – Hellenic Institute of Transport (HIT) is a public entity constituted under private law, established as an entity for research and technology consisting of 5 institutes, with registered office in Thessaloniki.

The basic scope of HIT is to provide a centre of excellence in the field of Transport with highly specialised research services offered to government and other public and private organisations and bodies, and to provide support for the conduct of Transport research in Greece. It is also devoted to providing support to Ministries and other government bodies for the formulation of Transport policy.

The specific areas of HIT's priority activities can be described as follows:

- Scientific and research support for transport policy formulation, to Ministries and other Organisations involved in Transport Policy and control in Greece,
- Specialised research in the field of Transport,
- Organisation and operation of a documentation centre in the field of Transport,
- Development and maintenance of databases covering important areas of Transport Operation in Greece,
- Transport research evaluation and appraisal,
- Support of standardisation work in the field of Transport, and issuance of hand-books, rules and guidelines concerning the operation of the Transport system,
- Representation of Greece, in Transport Research and other relevant scientific fora abroad,
- Investigation of user requirements and adaptation of (transport) research results to industry,
- Technology transfer and dissemination of research results to the transport industry and the transport users,
- Organisation of training and professional education Seminars and Programmes,
- Contribution to quality control in the field of Transport,
- Publication and dissemination activities (including Conferences and regular publications),
- Promotion of bilateral as well as multilateral co-operation between Greece and other countries in the field of Transport, with emphasis in the countries of South East Europe,
- Facilitate exchange of personnel, especially young scientists, between relevant organisations and companies.

Although all areas of Transport research are 'covered' by the Institute's activity and scope, special attention is given to problems addressing Greek conditions and requirements that influence the development and operation of transport infrastructure in Greece.

**Jean-Charles Pandazis, ERTICO, Head of sector EcoMobility, coordinator of the EcoMove project.**

### - ERTICO

ERTICO – ITS Europe was founded at the initiative of leading members of the European Commission, Ministries of Transport and the European Industry and is a network of Intelligent Transport Systems and Services stakeholders in Europe. Its aim is to connect public authorities, industry players, infrastructure operators, users, national ITS associations and other organisations together and to work on a portfolio of activities to accelerate the development and deployment of ITS across Europe and beyond.

In the past, ERTICO has played a leading role in advancing:

- TMC standards;

- an open framework for telematics services;
- next generations of preventive safety systems;
- next generation of digital maps & associated applications;
- the technical framework for interoperable tolling in Europe;
- global implementation of ITS together with ITS America and ITS Japan.

- **Head of sector of EcoMobility at ERTICO**

Mobility is a vital component of modern society, but at the same time, mobility is placing increased pressure on our environment so ITS applications have a key part to play in making transport greener. They have the potential to reduce energy consumption, improve energy efficiency, cut greenhouse gas emissions and reduce our dependence on fossil fuels.

Activities in the EcoMobility sector focus on:

- Eco-smart driving: support drivers to adopt and then maintain a fuel-efficient driving behaviour.
- Eco-freight and logistics: enable freight routing and logistic operations to optimise fuel consumption and green goods transport.
- Eco-traffic management: implement traffic control and management systems improving global traffic network energy efficiency.
- Eco-vehicles: integrate hybrid and electrical vehicles into the transport and energy network.

- **Coordinator of the EcoMove project “Cooperative Mobility Systems and Services for Energy Efficiency »**

ICT (Information & Communication Technologies) applications & services specifically applied for environmental ends, or so-called “Green ITS”, have the potential to achieve cleaner and more energy-efficient mobility for people and goods.

The eCoMove project aim to test and validate a number of “Green ITS” technologies that can help drivers, freight and road operators save fuel, unnecessary kilometers driven and manage traffic more efficiently. The combination of these innovative systems and services has the potential to deliver a 20% reduction in fuel consumption and CO2 emissions.

The essence of innovation in eCoMove is that the developed services and applications will be integrated within an eco cooperative system to support:

- Drivers sustainably eliminate unnecessary fuel consumption through green driving and routing advice
- Fleet managers optimise their tour planning and cut down fuel costs through eco-driving support and truck-specific navigation
- Road operators balance traffic flows in the most energy-efficient way on the urban and interurban network.

These innovative solutions are enabled by the use of cooperative information exchange between vehicles and roadside, which improves the preview of the traffic situation ahead in order to determine the most energy efficient route or way or way of driving.

**Luca Pascotto, FIA, Mobility Director, Chair of the WG iMobility “ICT for Clean and Efficient Mobility”.**



- **Mobility Director at FIA (Fédération Internationale de l'Automobile)**

Founded in 1904, with headquarters in Paris, the Fédération Internationale de l'Automobile (FIA) is a non-profit making association. It brings together over than 230 national motoring and sporting organisations from more than 135 countries on five continents. Its member clubs represent millions of motorists and their families. One of the core responsibilities of the FIA is the development of motor sport worldwide. Through its national member clubs, the FIA is involved in every level of motor sport and its remit extends to the millions of amateurs and professionals who enjoy motor sport in all of its variety. The FIA has been dedicated to representing the rights of motoring organisations and motorcar users throughout the world via campaigns and activities that defend their interests. On issues such as safety, mobility, the environment and consumer law the FIA actively promotes the interests of motorists at the United Nations, within the European Union and through other international bodies. The FIA is also the governing body for motor sport worldwide. It administers the rules and regulations for all international four-wheel motor sport including the FIA Formula One World Championship, FIA World Rally Championship, FIA World Touring Car Championship and FIA World Endurance Championship.

- **Chair of the WG iMobility “ICT for Clean and Efficient Mobility”.**

The objectives of this Working Group are to identify the current state of mobility, to provide a vision of eco-friendly and sustainable mobility and a roadmap to achieve efficient transition. This will be achieved by suggesting and implementing technical, management and political measures. The Working Group will focus on reaching results in the period until 2020 in line with the EU 20% CO<sub>2</sub> reduction goal. Furthermore the Working Group will introduce a roadmap towards the ambitious CO<sub>2</sub> reduction goal for mobility (60%) in 2050.

The Working Group aims to give an overview of the measures that are in its scope and to prioritise or rank –the most promising (packages of) measures based on implementation and effectiveness, and it will identify where the knowledge gaps are. Finally the Working Group aims to give suggestions for business cases, effective combination of systems, techniques and political measures to be tested in a real-life test environment.

This activity will contribute to the competitive and resource efficient transport system as stated in the EU White Paper on Transport, supporting many priority actions of the ITS Action Plan, in particular area 1 (optimal use of road, traffic and travel data), area 2 (freight management on EU transport corridors) and area 4 (integration of vehicles into transport infrastructure). There is also a relation with the Forever Open Road initiative of FEHRL.

**Peter Urban, FKA, Coordinator of the PROS project**

- **Dr – Engineer at FKA (Forschungsgesellschaft Kraftfahrwesen mbH Aachen)**

The commitment of “Forschungsgesellschaft Kraftfahrwesen mbH Aachen” (fka) in improving vehicle safety is reflected in diverse activities. fka’s extensive research and development activities are oriented toward accident avoidance (active safety) as well as reducing the consequences of accidents (passive safety). The key focuses are:

- Active chassis systems and driving dynamics control systems
- Driver assistance
- Crash-optimised structural design
- Pedestrian protection

The company’s engineering competence in the chassis, body, electronics and driver assistance departments forms an essential basis for efficient handling of cross-disciplinary vehicle safety issues. In addition to carrying out technical development and testing of safety systems, fka analyses customer acceptance issues in order to assess the benefits of such systems.

fka's activities in the vehicle safety area are completed by studies of vehicle protection in low-speed collisions. In such situations, the primary considerations are ease of repair and damage tolerance, instead of protection of vehicle occupants and other road users.

- **Coordinator of the PROS project (Priorities for Road Safety Research in Europe)**

On 20 July 2010, the European Commission released its latest European Road Safety Action Programme (ERSAP) entitled 'Towards a European road safety area: policy orientations on road safety 2011-2020'. The ERSAP sets out the ambitious target of halving road fatalities in the European Union by the end of the decade.

In spite of all improvements in European road safety, more than 80 people are killed and about 4000 get injured on European roads each day. The progress made so far is to a large extent based on intensive, publicly funded road safety research activities. While many "low-hanging fruits" in road safety have already been picked, a multitude of more specific research issues remains. With ICT opening up an enormous potential for new integrated safety applications, the research area of road safety is becoming broader and broader with the risk of diluting efforts.

As a result of the political focus on the greening and electrification of road transport, the focus of European road transport research funding has moved away from safety topics increasing the need to identify those safety research topics which public money will be invested in most efficiently.

Therefore, PROS is to establish a pan-European network to develop commonly agreed priorities in road safety research and overcome the current fragmentation in relevant stakeholder groups. This network will follow an integrated approach covering human, vehicle and infrastructure aspects and all phases from preventive to post-crash safety.

**Dr. Veneta Vassileva, Safety coordinator of ACEM ("Association des Constructeurs Européens de Motocycles" or "Motorcycle Industry in Europe")**

- **Safety coordinator of ACEM**

ACEM (the Motorcycle Industry in Europe) was created in 1994 by the merger of two Associations of manufacturers of motorised two-wheelers, namely COLIMO (Comité de Liaison de l'Industrie du Motocycle) established in 1962 and composed of eight national associations; and ACEM (Association des Constructeurs Européens de Motocycles) founded in 1990 by the eight main European companies in the field. Upon its creation, the manufacturers of motorcycles in Europe decided to maintain the name ACEM as a sign of continuity of their presence in Brussels, whose legal identity is Groupement Européen d'Interêt Economique according to European law.

ACEM is the professional body representing the interests and combined skills of 13 powered two wheelers (PTWs) manufacturers producing more than 30 brands, and 15 national associations out of 13 European countries, guaranteeing jobs to over 127.000 people. The aggregated turnover of the PTW sector (manufacturing, plus upstream and downstream activities) amounted to Euro 26 billion in 2010, manufacturers alone account for Euro 7 billion. The members of ACEM are responsible for 90% of the production and up to 95% of the European powered two-wheeler (PTW) market.

The product range goes from small 50cc town vehicles, up to motorcycles of 1000cc and over. Products are divided into different segments such as moped, scooter, street, classic, super-sport, touring, custom, supermoto and off-road bikes. Tricycles and quadricycles are also represented by ACEM.

The role of ACEM has expanded with the development of importance of European legislation and activities within all member countries. Therefore it is essential for ACEM to have a broad view of the complex economy, social, political, technical and legal issues surrounding European integration, regulation, harmonisation and trade. All these issues represent a great challenge for the motorcycle industry.

**Dr Simone Pozzi, Deep Blue, Coordinator of EXCROSS project.**

**- Human Factors and Safety R&D expert at Deep Blue**

Deep Blue is a research and consultancy company created by a group of senior researchers from major Italian Universities and Research Centres. It has a multidisciplinary team of specialists in Human Factors, Cognitive Psychology and Safety. The area of activity of the company is the analysis and evaluation of interactive systems, with particular focus on the interaction, integration and allocation of functions between the human, procedural and equipment components.

Most of the company's work is for European organisations, on a number of specific topics including:

- evaluation and validation of air traffic concepts and systems;
- evaluation of dependability of interactive systems;
- safety analysis of air traffic concepts and systems.

**- Coordinator of EXCROSS project (EXploiting safety results aCROSS transportation modes)**

EXCROSS (EXploiting safety results aCROSS transportation modes) is a Supporting Action of the European Commission to enhance cross-fertilization and synergies between safety research initiatives in the different transportation modes (e.g. road transportation, aviation, etc.).

EXCROSS addresses the fragmentation that exists in Europe between safety initiatives in the different transportation modes, with little cross-domain learning and sharing of experience. In particular, the objectives of this SA are:

- Identify synergies and opportunities for cross fertilization between different transportation modes;
- Identify research gaps common to the different transportation modes, to exploit synergies and remove discrepancies.

The activities are organised around the following main streams:

- Establish a common understanding of safety principles across the different transportation modes, by identifying tacit assumptions and making underlying principles explicit;
- Collection, selection and analysis of past research actions dealing with safety;
- Identification of the main stakeholders and preparation and dissemination of information tailored for their needs.

**Stella Nikolaou, CERTH/HIT (Centre for research and Technology Hellas/Hellenic Institute of Transport), Chair of iMobility WG “Vulnerable Road Users”**

**- Chair of WG iMobility “Vulnerable Road Users”, Identification of ITS technologies to improve VRU safety**

The VRU Working Group targets the improvement of the safety of vulnerable road users (pedestrians, cyclists, motorcyclists), along with recommendations and guidelines to achieve this target.

VRU WG activities are implemented in four phases. Phase I focusses on the analysis of know-how, background data and current market & near-market solutions/ trends. Phase II aims at analysing the most significant studies, researches, projects and field studies involving new concepts on VRU safety. Phase III will analyse user needs and their requirements stemming from the identification of research gaps and priorities for future research initiatives. Phase IV will promote the identified solutions, and contribute to the objectives and targets related to VRU safety in the “Horizon 2020” work-programmes.

Working Group Relation with Policy Initiatives:

- Commission Regulation (EU) No 459/2011 of 12 May 2011 and of the Council on the type-approval of motor vehicles with regard to the protection of pedestrians and other vulnerable road users.
- Directive 2005/66/EC of the European Parliament and of the Council of 26 October 2005 relating to the use of frontal protection systems on motor vehicles and amending Council Directive 70/156/EEC.
- Directive 2003/102/EC of the European Parliament and of the Council of 17 November 2003 relating to the protection of
- ITS Action Plan, Final Report, “Action 3.4–Safety and comfort of the Vulnerable Road User”
- European Commission, “Road safety: Policy orientations on road safety 2011-2020”

**Dr. Annie Pauzié, Ifsttar/LESCOT (French Institute of Sciences and Technologies in Transport development and networks/Laboratory Ergonomics Cognitive Sciences in Transport), scientific coordinator of DECOMOBIL**

- **Research director at IFSTTAR-LESCOT**

The French institute of science and technology for transport, development and networks (Ifsttar) was founded on January 1st, result of the merging between INRETS Institute and the LCPC Laboratory. This new entity has the status of a public scientific and technological institution and is overseen by the French ministry of ecology, sustainable development, transport and housing on one hand and the French ministry of higher education and research on the other. Recognised as a new reference organisation in the international arena, Ifsttar conducts applied research and expert appraisals in the fields of transport, infrastructure, natural hazards and urban issues, with the aim of improving the living conditions and, more broadly, promoting the sustainable development of our societies.

The Laboratory of Ergonomics and Cognitive Sciences applied to Transport Ifsttar / LESCOT is working in the area of: design and ergonomic evaluation of transport systems, gathering knowledge on Human Factors (functional abilities, cognitive processes), development of methodological tools for task analysis and for ergonomic evaluation, knowledge database (development of database, modelisation / simulation), strategical analysis of innovative ITS and socio economical issues. Research activities of LESCOT are focused on ergonomics of Information and Communication Technology (ICT) based upon Human Centred Design approach and is running several European and national projects on this topic since 25 years (e.g. AIDE, Saferider & Safeway2school). Members of the laboratory are also involved in several international committees in this area, such as International Harmonised Research Activities-ITS working group and eSafety Working Group on HMI (European Statement of Principles), iMobility Working Groups (SafeAPP, Vulnerable Road User).

**Prof. Jose Menendez, UPM (Universidad Politécnica de Madrid)**

- **Professor at UPM**

The Universidad Politécnica de Madrid (UPM) was created in 1971 but most of its centres were founded in the 18th and 19th centuries. UPM currently encompasses 22 Faculties with approximately 47,000 students and more than 2,000 academics. Scopes of the research activities are demanding mobility improvement, research infrastructure sharing, and electronic means for networked knowledge sharing. As a result of this combination of lecturing and research activities, a number of exchange agreements exist with other Institutions, such as the Telecommunications Engineering School, with an active research group in traffic sensing, traffic behaviour analysis and management, communication architectures and cooperative systems applied to transport.

## 2. Workshop presentations

The presentations made during this workshop covered the various aspects of the issue of ICT user centred design for eco-multimodal mobility, with diversified points of views and approaches to the problem in relation to the speakers' expertise. Discussions allowed the audience to debate with the experts about their position and the perspectives of this issue in terms of research in middle and long term.

All the lecturers gave us agreement for video recording and dissemination of their presentations on internet on the web site of the DECOMOBIL project:

<http://decomobil.humanist-vce.eu/Downloads.html>.

### 2.1 Welcome and brief introduction to the DECOMOBIL workshop (Annie Pauzié, Ifsttar & Lucile Mendoza, Humanist)



The DECOMOBIL project is a Support Action funded by the DG Connect. Objectives of this project is to develop and to widely disseminate knowledge in the area of human centred design of ICT for sustainable transport by organising scientific seminars and international conferences, developing a research roadmap and participating to the Joint Research Initiative setting up. Contribution to acceptability and usability of ICT for cleaner and safer mobility is made through animation of discussion with the relevant stakeholders involved in this area and dissemination of updated data and know-how in Human Machine Interaction and Human Centred Design areas towards the ITS community at a European and international level. This workshop is dedicated to discuss issues linked to roadmap of future research priorities in the area of ICT design for clean and efficient multimodal mobility.

### 2.2 HUMANIST Virtual Centre of Excellence, a vision toward 2020 (Angelos Bekiaris, President of Humanist, CERTH/HIT, Greece)



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

The Virtual Centre of Excellence HUMANIST is a French Association under « Loi 1901 » created on 26 December 2007. The aim of the VCE is to structure and to organise the European Research in the domain of Human Machine Interaction and Human Factors applied to road Intelligent Transport Systems.

The Objectives of the VCE are: scientific researchers networking; creation of a suitable area for knowledge production, sharing and debates; structuring and favoring interactions with the European ITS community; promoting HUMANIST scientific research agenda and expertise; building up the new generation of European scientists and building up of European projects proposals on the network research thematics, favoring the participation of its members

Today, the HUMANIST network has 18 members from all over Europe.



Toward 2020, **HUMANIST** VCE aims to become **THE Center of Excellence on HMI for ITS in transport**, with emphasis on:

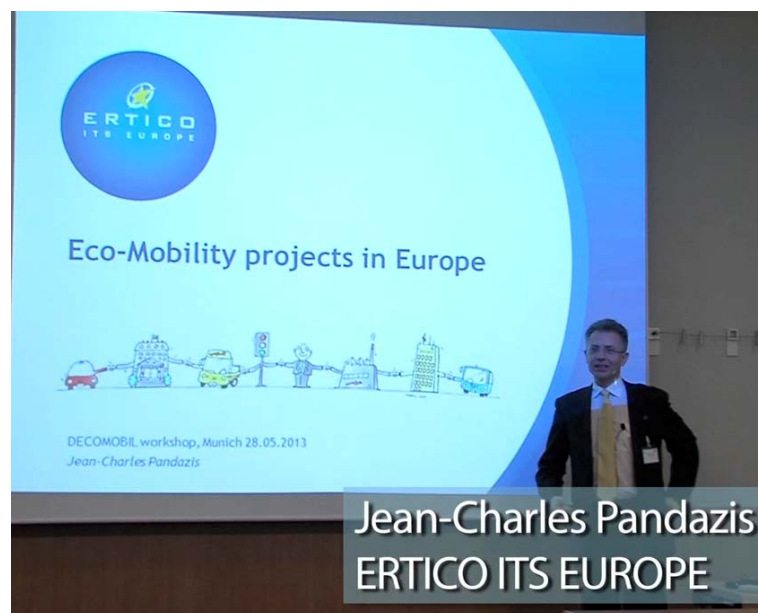
- knowledge and principles transfer from mode to mode
- specification, design and evaluation of HMI for multimodal, intermodal and integrated transport chains.

The HUMANIST 2020 focus will be on sustaining and boosting scientific excellence:

- Offer knowledge & expertise in the HMI field by covering/leading the WGs of Horizontal associations (i.e. ECTRI, FEHRL, FERSI, AVERE), Industrial Associations and EC platforms and forums (iMF, etc.)

- Edit and co-finance at least one HUMANIST scientific publication (book) per year, focused upon a specific HMI for ITS theme
- Organise (and if necessary finance) special issues in journals (i.e. ETRR, IET, ...) on HMI for ITS.
- Establish a collaborative virtual testing center on HMI for ITS.
- Provide the forum for agreeing and preparing Research Consortia to tackle key research issues related to HUMANIST with Members and non-Members. Other Member representatives included in Advisory Groups, to guarantee that all key HUMANIST experts in one topic are somehow been mobilised by the relevant project.
- Promote the issue of Guidelines and Standards in the area (starting from ESoP continuation and NHTSA guidelines adaptation), in a formal and structured way; in close collaboration to iMobility Forum and TRB; as well as relevant CEN and ISO committees.

### 2.3 European projects on ecomobility (Jean-Charles Pandazis, Head of Sector EcoMobility, ERTICO, Brussels)



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

To reduce impact on our environment, EcoMobility @ ERTICO covers the 4 main following axes:

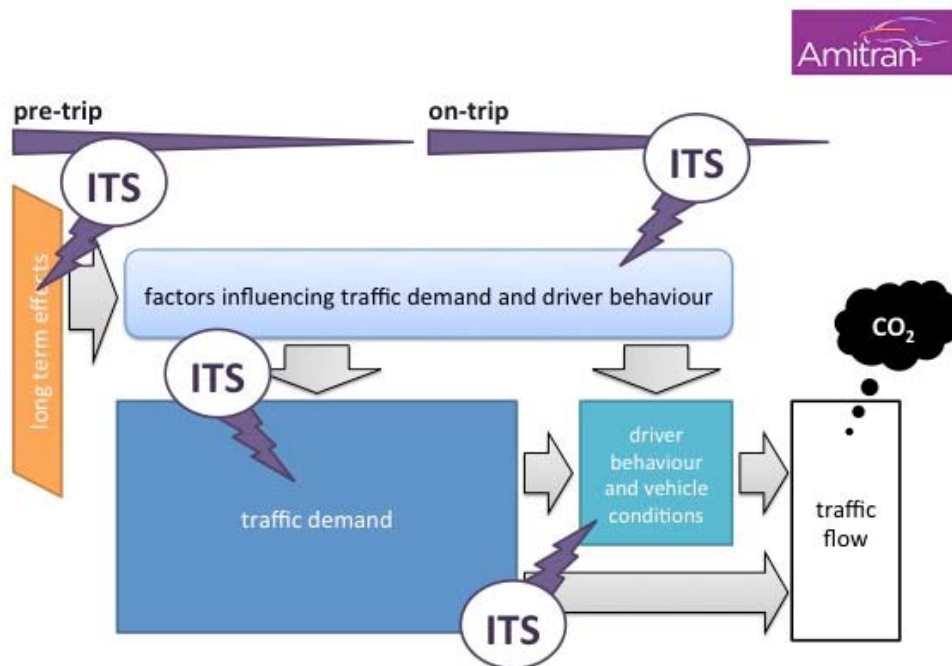
	<b>Driving behaviour support</b> <ul style="list-style-type: none"><li>• Support drivers to adopt and sustain an energy-efficient driving behaviour</li></ul>
	<b>Efficient fleet management and logistic operations</b> <ul style="list-style-type: none"><li>• Energy-efficient cooperative fleet management and logistic operations</li></ul>
	<b>Efficient traffic network management</b> <ul style="list-style-type: none"><li>• Energy-efficient traffic network management and infrastructure introducing cooperative services</li></ul>
	<b>ITS services for Electric Vehicles</b> <ul style="list-style-type: none"><li>• Integrate electric chargeable vehicles into the transport and energy networks with innovative and interoperable ITS services</li></ul>

Several projects directly related to EcoMobility are funded at the European level. They can be categorised based upon :

1. Technology
2. Type of activities
3. Applications / services
4. Assessment methodologies

eco-Navigation:

- **Pre-trip (mostly Web-based):** eCoMove, EcoNav, EcoGem, MOLECULES, FOTSis, eCOMPASS, ICT-EMISSIONS (no development), REDUCTION
- **Static Map data:** eCoMove, EcoDriver, EcoGem, REDUCTION
- **Dynamic data:** eCoMove, EcoGem, FOTSis (V2I)
- **Cooperative:** eCoMove, EcoGem, FOTSis
- **Post-trip (feedback):** EcoDriver, EcoNav
- **Multi-Modal:** EcoNav, MOLECULES (EV), eCOMPASS, REDUCTION, AMITRAN
- **Network Routing:** eCoMove, FOTSis
- **Traveller Information (real-time) and User feedback:** EcoDriver, EcoNav
- **Assessment / Validation (Energy consumption, CO<sub>2</sub> footprint):** eCoMove (Fuel consumption, Time of travel, Number of stops...), EcoGem / MOLECULES (Energy consumption EV, Asses impact, methodology and tools), EcoNav (Door2door emission model, carbon footprint), REDUCTION (EcoMark -microscopic and macroscopic-), ICT-EMISSION (Driver behaviour/pattern).





## 2.4 ICT for Clean and Efficient Mobility (Luca Pascotto, Mobility Director, FIA Region I, Chair of the WG iMobility, Brussels)



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

The iMobility Forum WG4CEM

The objective of this WG is to provide a vision on eco-friendly and sustainable mobility and a roadmap to achieve efficient transition.

Contribution to ITS deployment is made by establishing a priority list of activities related to largest saving potential, providing an overview on related activities to ecomobility distinguishing between short, medium term and long term options and identify fruitful lines of further development and research.

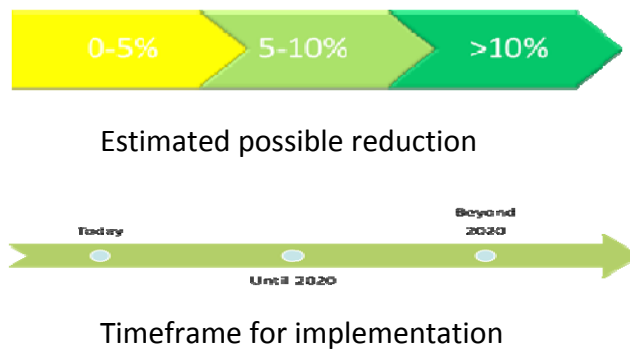
Step 1 : cluster and define

Functionalities are eco-driving, eco-information/navigation/guidance, eco-traffic/management, Ecomobility/services, eco-freight and logistic management, eco-demand and access management.

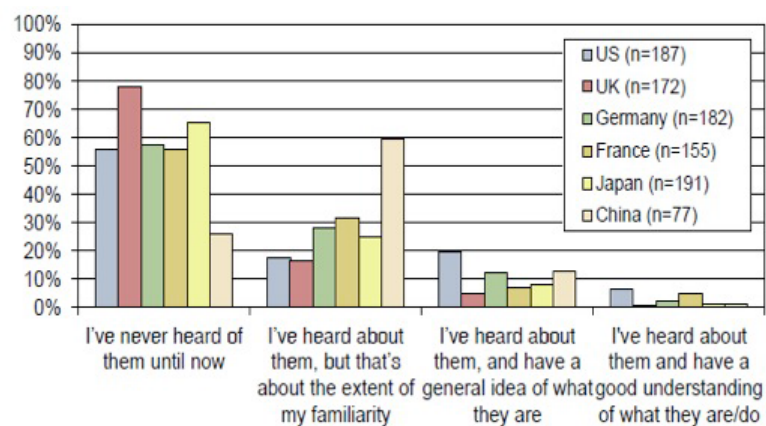
The major issues are :

- What are issues for the implementation, mass deployment on the market and user acceptance of measures?
- What indicators can be identified for user acceptance of ITS for clean and efficient mobility?
- What effect do measures have on CO2 emission caused by mobility?
- What are the costs and benefits of implementation of the 'eco' measures and systems?
- What does the 'ITS-aspect' focusing on 'eco' contributes to the existing measures?

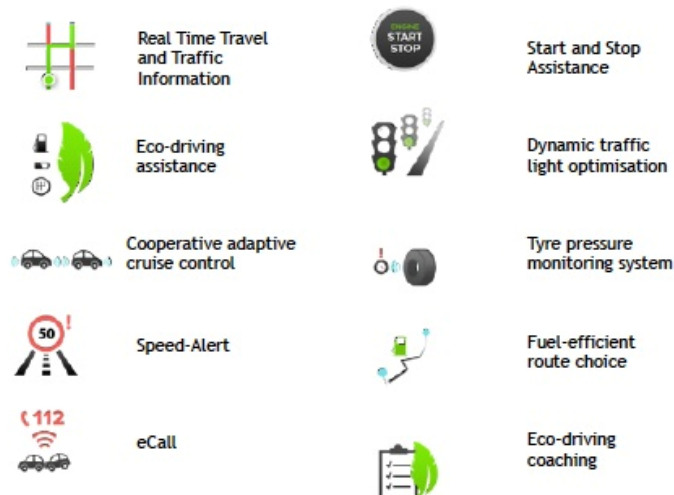
## Step 2 : estimation



One way to speed-up deployment is to promote user's awareness, information and knowledge, survey showing that a lot of people do not really know about these systems.



Type of systems so far identified as priority:



## 2.5 Priorities for Road Safety Research in Europe (Peter Urban, Coordinator of the PROS project, FKA, Germany)

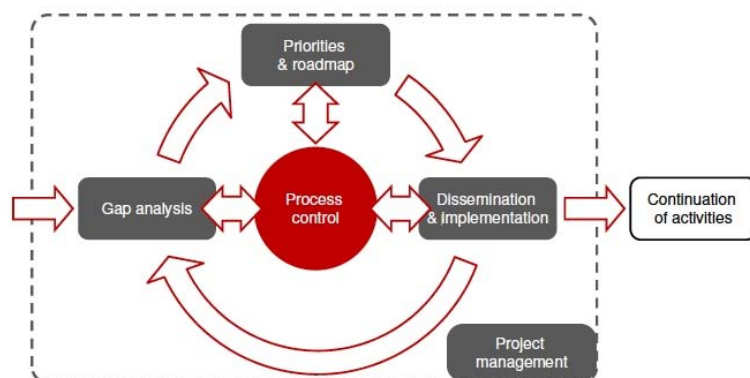


Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

The main Objective of the PROS (priorities for Road safety Research in Europe) support action is the creation of a pan-European network capable of setting commonly agreed priorities in European road safety research

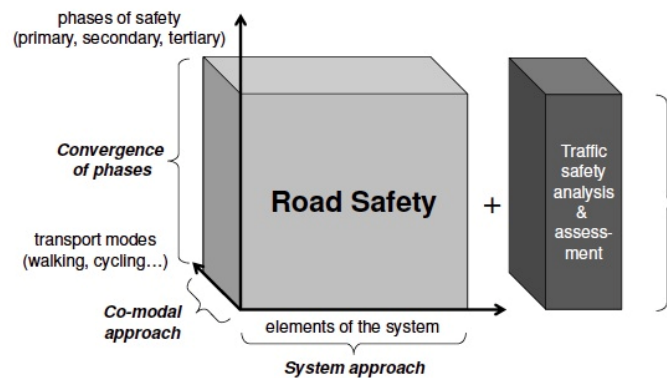
The main Deliverables are:

- Focused, well-founded safety research roadmap
- Concrete suggestions for a limited number of research topics
- Clearly-defined, transparent process
- Dissemination to all relevant groups
- Mechanism to continue the activities beyond the project duration



**Structure of the project**

Road safety research needs has been collected (n=359) and structured in 54 topics and 4 research areas.



The next step will be to define a second prioritization loop based on one-page of each topic with motivation of the topic, research needs and aspects to consider, expected impacts, recommended funding level and instrument and comments from partners.

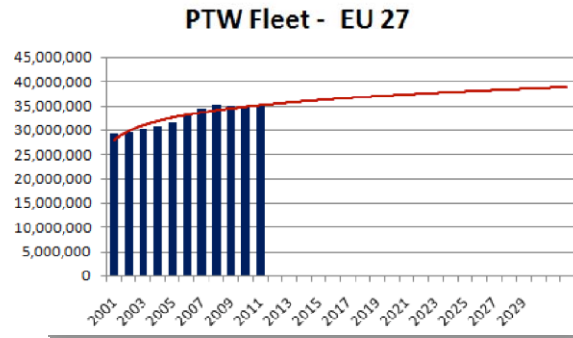
## 2.6 Perspectives on PTWs contribution to ecomobility (Dr. Veneta Vassileva, Safety Coordinator of ACEM, Brussels)



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

ACEM (Association of Motorcycle Manufacturers in Europe) was created in 1994 and gathers 14 PTW manufacturers producing 25 brands, 18 national associations, also representing smaller manufacturers & suppliers (SMEs). There are 37 millions of users in EU 27, with a diversity of vehicles, of owners and of purposes such as commuting, leisure and sport.

More and more citizens are using PTW for commuting, with a growth in urban area and an expectation of 85% of the EU population of drivers in 2030.



The question is “can motorcycling be part of the solution of mobility”. Cars can play a role in labour and social mobility but lead to congestion, and PTWs can paly a role with different perspectives and arguments. Several examples in European cities such as Madrid, Rome, Barcelona, London, Paris, Brussels showed potential benefits in using PTW in terms of carbon emission and journey times.

PTMs bring a significant contribution to urban mobility, in terms of transport of persons but also of goods, with 10 to 20 % of the daily trips according to the cities.

There are many intrinsic advantages in using PTWs for trips:

- Smaller, PTWs use land more efficiently
  - optimize existing infrastructures
  - produce less damages to roads
- Lighter, PTWs are cost efficient
  - Cheaper to produce and operate
  - Fuel efficient
  - Agile in congested areas
- More specialized, PTWs respond to mobility needs

The future developments aim to reduce environmental impact through cleaner PTWs, with for example development of hybrid propulsion, and higher proportion of ultra low and zero emission vehicles, with for example, electric powertrain.

## 2.7 Cross-modal considerations on Safety and Human Factors (Dr. Simone Pozzi & Sara Silvagni, Coordinator EXCROSS project, Italy)



## Support action to contribute to the preparation of future Community research programme in user centred Design for ECO-multimodal MOBILity - DECOMOBIL

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Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

Excross is about EXploiting safety results aCROSS transportation modes, that is to say Road, Maritime, Railway and Aviation.

The objectives are to identify possible synergies and cross-fertilization opportunities, to look for research initiatives that can bring to cross-domain, multi-domain and trans-domain solutions and to develop pools of research findings on similar subjects that can be used to stimulate certification, political or standardization initiatives that concern more than one mode.

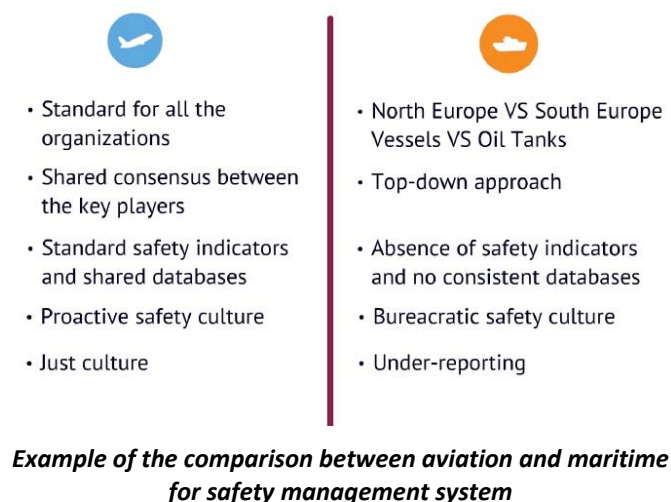
The approach consists in collecting and in-depth analyzing safety R&D projects and initiatives.

After screening 300 projects, 70 have been analysed, inventory of safety principles being conducted per each domain.

Key safety topics has been used to compare and organize the analysis:

- Certification
- Dangerous goods transportation
- Safety assessment
- Human factors fatigue
- Incident/accident reporting and analysis
- Human factors training
- Safety culture
- Decision support technologies

There are structural characteristics that may allow or dampen the cross-fertilization between domains such as the degree of centralization and standardization, the quality of availability of safety indicators and information and the safety culture maturity.



The major findings are that each transport mode has its own set of safety principles and issues; few are in common and can be compared, as the way safety is managed is very different according to the transport mode.



## 2.8 Perspectives on sustainable driving/riding training aiming at a safe and cost efficient behavior (Stella Nikolaou, CERTH/HIT, Greece)



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

Training is important in the area of safety and ICT because it increases the drivers' knowledge on the ICT functionalities and barriers, it allows to understand the situations where each system can apply, it increases the awareness and reduce the over-confidence on the reliability of ICT and It provide knowledge on ICT practical use, improving handling of effects while using.

Furthermore, training is cost-efficiency and is useful to take advantages of technology such as hybrid and electric vehicles, as well as eco-driving systems.

Training should be updated and adapted in parallel to the evolution of the ITS functions for all vehicle types. A combined use of ICT and driving simulators for training of all road driver/rider categories will allow optimal use of ICT tools. New simulation tools are expected to emerge for motorcycle riding and passenger car (both for novices and emergency drivers/riders), as well as truck driving.

Training target in terms of safety allows stimulating road users towards a more responsible or, when needed, professional behavior, potentially leading to reduction of accidents due to poor on-road training and increasing knowledge of use, benefits and of ICT in-vehicle support technologies. Furthermore, training on simulators for train drivers/riders allows to practice in dangerous scenarios (risky traffic conditions, adverse weather conditions, etc.).

Training target in terms of cost efficiency can contribute to green environment through reduction of traffic volume and pollution in cities, to reduction of fuel and vehicle maintenance costs, to create new employment opportunities and competitive advantage for the European driver training schools industry.

There are some training tools for ITS such as the Multi Media Training tool for drivers that has been developed in the framework of Humanist and simulation tools using rider or driver simulator to train riders/drivers for an optimal use of ITS in regular and emergency context.

Augmented reality in driving simulation can also constitute a relevant context for training.



Future steps and trends of training are to develop training schemes, curricula and tools for all driver cohorts ("average", novice, elderly, experienced) for optimal use of ITS technologies, with personalized and adaptive training to the driver cohort and individual driving style and needs, to set up multidisciplinary pan-European training course for ITS/ Eco-driving functions and efficient strategies for integration of training curricula and awareness campaigns in real life in Europe.

Innovative training could be recommendations/feedback to the driver on-line to permanently change his/her driving behavior and attitude, including eco-driving training and efficiency through standalone in-vehicle and/or cooperative technologies, with obviously HMI issues on workload and distraction to be overcome.

## **2.9 Design, integration and safety of mobile service for ecomobility, (Dr. Annie Pauzié, Ifsttar/LESCOT, France)**



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

There is an increase access to multi-modal transport information for citizens due to the spreading out of a diversity of informative media and devices, with availability of complex functionalities such as internet access and geolocation on these mobile devices (smartphone) and the wide ratio of equipped





to the design of these applications to be used while driving, taking into account their usefulness in terms of anticipation of road critical events, and then potential benefit for the road safety.

Real time information can be also send by travelers using social network concerning public transport problems or any relevant events of interest disseminated to the community of travelers.

Smartphone applications are not expensive and can be a way to widespread low cost access to eco driving feedback. Mobile ecodriving applications give real time feedback about the vehicle CO2 emission and fuel consumption based upon driver's behaviour.

Furthermore, smartphone technology enables dynamic ride-sharing systems on real time that bring together people with similar itineraries and time schedules to share ride on short-notice, with automatic updating of ridesharing offers all along drivers routes. Some smartphone safety application giving for example headway monitoring, collision and off road warning, are already on the market, made available to the drivers without any preliminary tests about their potential benefits for road safety or on the contrary distracting effects.

The roadmap for research in these transport mobile services should cover activities linked to **design**: creation of design guidelines for usability and legibility of information on smart phone to be defined taking into account size of the screen and mode of dialogue (tactile screen, small keyboard, vocal recognition...) and on **evaluation**: setting up of efficient methodologies for safety evaluation of mobile transport services use (balance between positive effect linked to cognitive support and negative effect linked to distraction and workload).

There is also a need of future research in understanding **requirements and functional abilities of elderly travellers/drivers** to be integrated in mobile transport applications design, knowing that there is an increase of this population and that the quality of mobility impacts on the level of good health. Furthermore, development of **technical solutions** for mobile safe use while driving still need to be further explore, with setting up of modalities of information to deliver in relation to context and drivers/riders workload and specificity (novice, senior, professional), integration of the device in the vehicle and with the other on-board functionalities coming from IVIS/OBIS and ADAS/ARAS.

## 2.10 Cooperative service concept and human Service Interface: innovative approach for a sustainable transport system, Prof. Jose Menendez, UPM, Spain



Full video and slides of the presentation is available for downloading on the DECOMOBIL website <http://decomobil.humanist-vce.eu/Downloads.html>

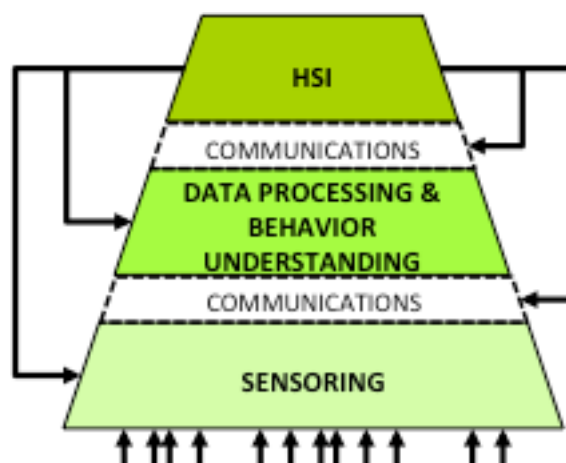
The motivation for Cooperative ITS Services is transport sustainability in terms of:

- Mobility issues: road traffic congestion, public transportation system overload and the general reduction of traffic efficiency and increased travel times and costs.
- Safety issues: increasing numbers in traffic incidents, accidents, injuries and transportation related deaths.
- Security issues: increased quantity of goods (specially hazardous goods) in the transportation network.
- Environmental issues: increased impact on transportation related pollution and energy consumption.

The Cooperative ITS Services provided in a **new information paradigm** in which all the road environment and its elements (sensors in vehicles, infrastructure, users, ...) are dynamic sources of data. The data is processed on multiple levels and made available to different users with different needs, sent to the user depending on different variables, through different channels, at the proper time and place for the circumstances, within a **complete framework of interaction towards the goals of transport sustainability**.

C-ITS Services key development areas:

- Sensoring & Communications
  - Evolution towards concepts such as Internet of Things and Smartcities.
  - Devices are permanently interconnected, requesting or providing information about their status and context
- Data processing and behaviour understanding
  - Characterisation of the overall transport scenario
  - Focus on algorithms for the automated processing of acquired data, complete situational awareness and intelligent assessment for actuations
  - Capabilities to monitor, react and predict/anticipate (→resilience)
- Evolution of HMI – HSI: Human Service Interface
  - Processing of data to be presented to the C-ITS services' users, with special attention to the accuracy and legibility of the information, and provision at the right moment, place and through the appropriate channel
  - HSIs also collect feedback from the users to improve the service responses



Future research should investigate complexity of the transport environment translates into complex Cooperative-ITS architecture and services, considering various aspects such as HSI (Human Service Interfaces) as a wider concept than classical HMI (Human Machine Interaction), being on top of the C-ITS architecture as the interacting element to the users and being both a recipient and source of data from/to the rest of the modules of the C-ITS service architecture. C-ITS Services must adapt to the specific context and environment of the user and the Human Service Interfaces must evolve to this new paradigm.

### **3. Discussion**

An animated round table with several exchanges between the speakers and the audience, and chaired by Erik Bessmann, Ifsttar, followed the presentations.



*From left to right of the roundtable: Peter Urban, Jose Luis Menendez, Jean-Charles Pandazis, Stella Nicolaou, Erik Bessmann, Veneta Vassileva, Annie Pauzié and Simone Pozzi.*

Several issues on roadmap and priorities of ICT design for ecomobility have been raised.

Some are agreements or statements, some are questions:

#### **Agreements/Statements:**

- There is a consensus on the purpose of ecomobility objective, with health, clean air, noise avoidance, energy efficiency, greenhouse gas emission reduction and individual cost savings.
- Campaigns should be deployed to promote the combination of the use of non motorized means of transport with the use of public transport to allow people to move in their local environments without utilizing privately owned motor vehicles, especially in urban areas.
- Collective taxis use is frequent in some member states and culturally not admitted in some others, which is a shame as it is an added value for ecomobility in urban areas, in addition to less costly trips for users.
- There is a need in a close future to develop knowledge and awareness through training courses on specific aspects of mobility using ITS functionalities for increase ecomobility among drivers of private cars but also, and even more importantly, among professional drivers such as taxis, express delivery, commercials... and also among truck drivers. Indeed, this professional population has a high mileages and improvement could have an important impact on the overall ecomobility.
- A long term strategy of ecodriving truck companies should be developed in order to produce effective results over a long period of time. It has to take into account human factors aspects and drivers need to understand the aim of the training to adopt it as the drivers' motivation is fundamental in the success of training and, on a long term run, to achieve fuel savings.
- Several applications for smartphones are directly impacting ecomobility: ecodriving (inform the driver about his fuel consumption on real time so he can adapt his driving style), anticipation of traffic lights timing (inform the driver how to approach the next traffic light so

he can adapt his style and speed). Roadmap for these applications design has to be set up to identify and overcome potential distracting effects on the driver and to optimize benefits in terms of ecodriving.

- The number of stops on a network has a real big impact on CO2 emissions and that is why it's important to reduce the number of decelerations and stops. The next step in research is to develop systems such as system giving advice to the driver regarding behavior before intersections, based upon the timing of the red light for example.
- Social networks and smart phone allow connecting drivers and passengers for an optimized ridesharing, in advance and instantaneous, but there is still bottlenecks and reluctance to use this way of transport, so a need to investigate what are the problems blocking acceptance and security and how to overcome them.
- Priorities to develop user friendly mobile and web applications that enable users on the move and at home to easily plan and organize their trip, no matter if they walk by foot or use public transport, a motorcycle, car or bike.
- Take into account the diversity of the population and include seniors in the design recommendations to get friendly interfaces and functionalities for all while designing ICT in transport, especially for drivers due to road safety issues.
- Devices and services capable of giving information about driving and fuel consumption are already on the market but in the near future this data will have to be combined with information coming from the surrounding infrastructure.
- Evaluating real impact of ecomobility measures and implemented systems at a European level is complex, several projects are working on this issue, developing sophisticated methodologies and raising debates. It is already a hot topic in aviation, where several key words are taken into account: safety, performance, ecology, efficiency, ending up with a business case point of view which is not fully satisfying, translating all the issue in a single matrix in terms of cost and benefit. In transport, the process is to work with business cases, comparing with and without systems to evaluate impact assessment. Nevertheless, it is not because the system is good that the overall consequences in the city will be positive for pollution. Furthermore, each system needs its own methodology, cooperative systems will not be assessed the same way than informative systems.
- Ecomobility and safety do not have exactly the same priorities nor the same constraints. Synergies between safety and ecomobility is necessary. So, ecosolutions will have to be safe and not impact negatively road safety.

#### Questions :

- How far the cross-sectoral partnership has to go for an integrated promotion of ecomobility in terms of walking, cycling, wheeling and passengers in public transport?
- What is the role of the European community and the state members in the process?
- How to get harmonization at a European level? How to coordinate effort at a global level, including other countries in the world?
- Is there any conflict for the driver's behavior to be adopted between ecodriving purpose and road safety purpose? How the roadmap for road safety integrated the future goals of ecomobility? Is there any European initiative (such as iMobility WG) studying and connecting the two roadmaps?
- Urban Mobility is a key area today for ecomobility facing chronic demands for faster commutes, safer roads, more space, and cleaner air, and local governments face increasingly

difficult decisions about mobility issues and land use policies in their communities. What is the next added value of ITS in this context in terms of functionalities to be implemented and deployed?

- What are the methodologies and the tools available to assess current EcoMobility performance and to evaluate the effectiveness of policies and actions to achieve a more sustainable transport system in terms of environment, accessibility, safety, and equity? What is the method for ecomobility improvement resulting from ITS deployment? Which ITS for which ecomobility target?
- Existing ecoNavigation application, which consists in finding the most efficient fuel/CO2 emission route. How to widespread its use and to motivate drivers to use it?

## ANNEX 1

### List of participants

Khoso	Ajmal Khan	National Highways & Motorways Police
MALLEJACQ	Patrick	Ifsttar France
MARKIEWICZ	Eric	University of Valenciennes
Médevielle	Jean-Pierre	HUMANIST VCE
Mendoza	Lucile	HUMANIST VCE
Menendez	José Manuel	UPM
Merz	Jürgen	TÜV SÜD
Moliner	Carlos	iMAUT
Moreau	Fabien	IFSTTAR
Morshed	Golam	Ing. -Büro Köll
Nikolaou	Stella	CERTH-HIT
Oguntona	Oluwaferanmi	
Pandazis	Jean-Charles	ERTICO
Pascotto	Luca	FIA
Pauzié	Annie	IFSTTAR
Pedrero	David	CIDAUT
Pendharkar	Sayalee	Technical University Munich
Pereira	Marta	Chemnitz University of Technology
Peters	Björn	VTI
Peters	Bjorn	VTI
Pfieggl	Reinhard	A3PS
Pourmeydani	Mo	
Pozzi	Simone	EXCROSS project
Risser	Ralf	FACTUM OG
Sánchez	Nuria	UPM
Sarker	Rumana Islam	TUM
Schulze	Horst	FERSI
Simoes	Anabela	CIGEST
Sucha	Matus	Palacky University in Olomouc
Urban	Peter	FKA
Vaa	Truls	Institute of Transport Economics
Valero Mora	Pedro	Universitat de Valencia
Vassileva	Vaneta	ACEM

## **ANNEX 2**

### **Presentations**



# A vision for HUMANIST Towards 2020



## HUMAN centred design for Information Society Technologies

Dr. Evangelos Bekiaris  
HUMANIST President  
CERTH/HIT Research Director

HUMANIST General Assembly  
May 27th, 2013  
Munich, Germany

# HUMANIST VCE

- **Status:** French Association under Loi 1901 created on 26 December 2007
- **Aim:** To structure and organise the European Research in the domain of Human Machine Interaction and Human Factors applied to road Intelligent Transport Systems.
- **Objectives:**
  - ❑ Scientific researchers network
  - ❑ Creation of a suitable area for knowledge production, sharing and debates
  - ❑ Structuring and favoring interactions with the European ITS community
  - ❑ Promoting HUMANIST scientific research agenda and expertise
  - ❑ Building up the new generation of European scientists
  - ❑ Building up of European projects proposals on the network research thematics, favoring the participation of its members

# Governance

- **President:** E. Bekiaris
- **Honourable President and Head of Advisory Group:**  
J.P. Medevielle
- **Secretary General:** C. Brusque
- **Head of Secretariat:** L. Mendoza
- **Quality Assurance Head:** A. Pauzie
- **Dissemination and Exploitation Head:** S. Nikolaou

# Members

## 18 members:

- **ISG -ADI-CIGEST** - Instituto Superior de Gestão (Portugal)
- **CDV** - Centrum Dopravního Vyzkumu v.v.i. (Czech Republic)
- **CERTH-HIT** - Hellenic Institute of Transport (Greece)
- **Cidaut Foundation** – Spain
- **CTAG** – Spain
- **DTU** - Danish Transport Research Institute (Denmark)
- **ESRI** - University of Loughborough (United Kingdom)
- **FACTUM** - FACTUM Chaloupka & Risser OHG (Austria)
- **IFSTTAR** (ex-INRETS)- Institut français des sciences et technologies des transports, de l'aménagement et des réseaux (France)
- **INTRAS-SINTEC** - Universitat de Valencia (Spain)
- **Palacky University** – Czech Republic
- **WIVW** - University of Wurzburg (Germany)
- **SWOV** - Institute for Road Safety Research (Netherlands)
- **TOI** - Institute of Transport Economics (Norway)
- **TUC** - Chemnitz University of Technology (Germany)
- **UPM** - Universidad Politecnica de Madrid (Spain)
- **VTI** - Swedish Transport Research Institute (Sweden)
- **VTT** - Technical Research Centre of Finland (Finland)



# Activities (1)

## ■ Task Forces

- ❑ Ecodriving methods and training – leader HIT
- ❑ Long time impact and effect of ITS – leader FACTUM
- ❑ Towards resilience within an Intelligent Road Transport System – leader ADI-CIGEST
- ❑ Intelligent Cooperative Systems for improving pedestrian and drivers' safety – leader UPM
  - Integrated in DECOMOBIL project

## ■ Horizontal Task Force:

- ❑ Task Force Road Map – leader IFSTTAR
  - Integrated in DECOMOBIL project

# Activities (2)

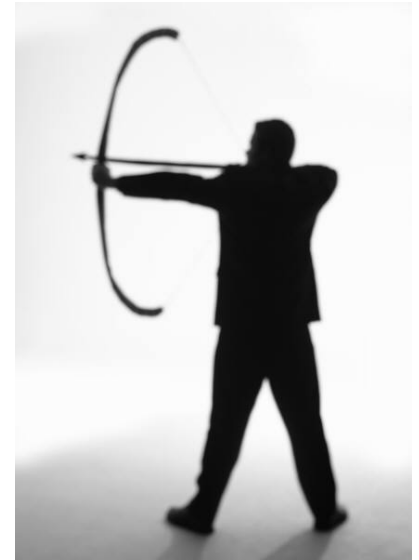
- European conference on Human Centred Design for Intelligent Transport Systems
  - Organised every 2 years in a HUMANIST member country
  - Lyon 2008: <http://www.conference.noehumanist.org/>
  - Berlin 2010: <http://conference2010.humanist-vce.eu>
  - Valencia 2012: <http://conference2012.humanist-vce.eu>
  - Wien 2014
  - From 2012, these conferences are organised in the framework of DECOMOBIL project
  
- Hot topic workshops
  - Organised on a research theme
  - Paris November 2009 on resilience: <http://resilience.humanist-vce.eu>
  - Athens February 2010 on VRUs: <http://www.humanist-vce.eu/humanist-workshops/vru-2011.html>

# Activities (3)

- Participation/ Coordination of European projects
- Summer Schools
- eLearning tool and services
- Publications: proceedings of the conferences, Special issue of IET and thematic books on years when there is no conference proceedings
- Liaison with stakeholders and lobbying (via participation to ETRA and DECOMOBIL project)
- Participation in the preparation of Guidelines in ITS and HMI domains (ESoP & participation to actualisation of NHTSA guidelines)
- Collaboration to iMobility Forum
- In coordination with DG CNECT, elaboration of first scientific proposals for 1st WP H2020

# Towards 2020: Aim

- **HUMANIST** to become **THE Center of Excellence on HMI for ITS in transport**, with emphasis on:
  - knowledge and principles transfer from mode to mode
  - the specification, design and evaluation of HMI for multimodal, intermodal and integrated transport chains.





# Towards 2020: Expansion

## ■ Full Members

- enhanced to cover with at least one member in each EC country
- aiming at expanding the VCE to 30-40 members within 3 years.
- members mainly from research organisations and universities.

## ■ Associate Members

- introduce associate members in VCE statutes with normal fee, without voting rights.
- limited to few associate members in key extra-European markets  
USA, Canada, Russia, Australia,  
Singapore, China, Malaysia, India,  
Arabic States, South American states).

PETER 1.21

4b) Expansion

$$(a+b)^n$$
$$= (a + b)^n$$
$$= (a + b)^n$$
$$= (a + b)^n$$

etc...

*Very funny, Peter.*

# Towards 2020: Scientific Focus (1)

- Sustain the scientific character of the VCE, as opposed to other associations in the area with more horizontal (and more political) approach.
- Offer knowledge & expertise in the HMI field by covering/leading the WGs of:
  - Horizontal associations (i.e. ECTRI, FEHRL, FERSI, AVERE)
  - Industrial Associations
  - EC platforms and forums (iMF, etc.)

# Towards 2020: Scientific Focus (2)

- Sustain and boost scientific excellence:
  - ❑ Edit and co-finance at least one HUMANIST scientific publication (book) per year, focused upon a specific HMI for ITS theme
  - ❑ Organise (and if necessary finance) special issues in journals (i.e. ETRR, IET, ...) on HMI for ITS.
  - ❑ Establish a collaborative virtual testing center on HMI for ITS.
  - ❑ Provide the forum for agreeing and preparing Research Consortia to tackle key research issues related to HUMANIST with Members and non-Members. Other Member representatives included in Advisory Groups, to guarantee that all key HUMANIST experts in one topic are somehow been mobilised by the relevant project.
  - ❑ Promote the issue of Guidelines and Standards in the area (starting from ESoP continuation and NHTSA guidelines adaptation), in a formal and structured way; in close collaboration to iMobility Forum and TRB; as well as relevant CEN and ISO committees.

# Towards 2020: Liaisons & Lobbying

- Further continue to build-up close relations and joint lobbying activities with other key stakeholders:
  - ❑ **Founding Member** of the DETRA-initiated **European Transport Research Alliance**; with FEHRL, FERSI, ECTRI and EURNEX (that agreed to be in it so far, maybe more later).
  - ❑ Aiming at a specific MoU of collaboration with EUCAR, CLEPA, ACEM and AVERE.
  - ❑ Establishment of a specific **User Forum** with participation of FIA, FEMA, POLIS, etc. (potentially signing MoUs with all of them).
  - ❑ Establishing specific contacts with the EC in DGs CONNECT, RESEARCH and MOVE.
  - ❑ Establish contact with **Standardisation Organisations**, (CEN, ISO, etc.), aiming at promoting standards on HMI for ITS in Transport (i.e. by a dedicated new Member, like INFOTERM from Austria).
  - ❑ Continue and strengthen the already close cooperation with the iMobility Forum and its relevant running and new Working Groups.

# Towards 2020: Dissemination

- Dissemination is the key for promotion and success, thus:
  - ❑ Reorganisation of **website** (**interactive, support eLearning**, etc.)
  - ❑ **eNewsletter** with info on open tenders, calls, opportunities, events, etc.; **mainly for the Members** and not for external use
  - ❑ **Multi-domain leaflet, handouts** and other supportive material
  - ❑ **Database of key International electronic and paper press and relevant journalists** to promote HUMANIST publications and press-conferences.



# Towards 2020: Advisory Group

- Establishment of a **3-5 wise-men Advisory Group**.
- Permanently led by the Honourable HUMANIST President J.P. Medevielle.
- Encompassing worldwide re-known figures in the Transport Research Area.
- **Aim:** to provide annually guidance and feedback to the Association, without a physical meeting (except if needed). One of its Members will be the keynote speaker in each HUMANIST bi-annual Conference.



# External Cooperation: FERSI

## ■ Strategic Activities

- Establishment of common WG on Human Factors & Safety
  - Promoting research activities on relevant topics;
  - Promoting the priorities on this topic to EC and relevant stakeholders (i.e. iMobility Forum, etc.);
  - Setting-up mutual AVERE/HUMANIST endorsed proposals on the topic, strengthening in this way the preparation of their sound content and promoting them further through the individual and common channels.

## ■ Dissemination Activities

- FERSI involvement in HUMANIST Summer Schools & Conferences
- FERSI Conference on “Ageing and Safe Mobility”: HUMANIST leading the “Human Factors” pillar.

# External Cooperation: AVERE

## ■ Strategic Activities

- Establishment of a common AVERE/ HUMANIST WG on Eco-Mobility, aiming at:
  - Promoting research activities on relevant topics;
  - Promoting the priorities on this topic to EC and relevant stakeholders (i.e. iMobility Forum, etc.);
  - Setting-up mutual AVERE/HUMANIST endorsed proposals on the topic, strengthening in this way the preparation of their sound content and promoting them further through the individual and common channels.
- Cooperation in relevant Task Forces:
  - Eco-driving methods and training – leader CERTH/HIT
  - Task Force Road Map – leader IFSTTAR

## ■ Dissemination Activities

- AVERE involvement in HUMANIST Summer Schools & Conferences



# Dissemination Activities - HSS (1)

- HUMANIST Summer School on “Intelligent Transport Systems: Human-Centred Design for Safe & Eco Mobility”.
- Originated as an activity of the HUMANIST NoE and sustained within the HUMANIST VCE.
- Aiming at HCI/ITS professionals (researchers, industrials, stakeholders, etc.).
- Organised every year (usually early July), at the premises of one of the HUMANIST Members.

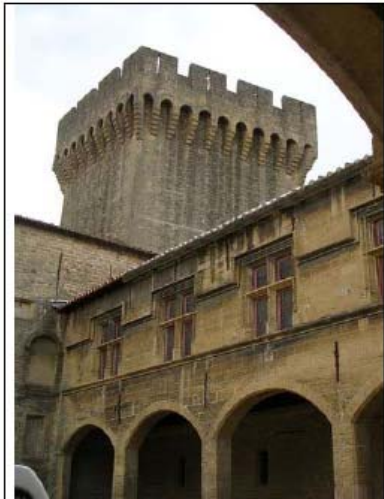
# Dissemination Activities – HSS (2)

- HSS 2013 is scheduled to be organised on July 4-5, 2013 at IFSTTAR premises in Salon de Provence.
- Special rates may apply for interested AVERE members, wishing to attend the Summer School. Normal rates: 300 € for early registration (by 20/05/13)/ 380 € after this date.



## Intelligent Transport System : Human Centred Design for Safe and Eco Mobility

4<sup>th</sup> & 5<sup>th</sup> of July 2013, Salon de Provence, France



- Find out issues covered by research on systems design for safe and sustainable mobility in road transport
- Gain knowledge on needs and requirements of population in order to design user friendly systems for vehicle, powered-two wheels and bus
- Explore tools and methods for evaluating safety of systems use while driving
- Debate on priorities between several issues such as road safety, eco mobility, design for all.

The European Virtual Centre of Excellence HUMANIST (Human Centred Design for Information Society Technologies) organises training courses, scientific workshops and summer schools for professionals and advanced students in the area of road transport and information and communication technology.

In the Humanist summer school 2013 "Intelligent Transport Systems: Human Centred Design for Safe and Eco Mobility", lecturers from European research institutions and universities will share their knowledge on safety and eco mobility to give tools and methods for a Human centred design of ITS. Discussions and practical exercises will allow participants to be involved in an active way and to learn main key aspects dealing with acceptability, usability and safety of information and communication technology uses and practices for a greener and safer road transport.

### Who can participate

The Summer School is intended for engineers, industrials, researchers and advanced students, consultants, public bodies, in the following fields: transportation and traffic, information and communication system design, automotive/truck and bus/ powered-two-wheeler industry, human factors and ergonomics, ...

### Lecturers

Prof Dr Josef Krems, Chemnitz University of Technology, Germany  
Jose Manuel Martinez Oliveira, CTAG, Spain  
Stella Nikolaou, CERTH/HIT, Hellenic Institute of Transport, Greece  
Dr Annie Pauzié, Ifsttar, French Institute of Science & Technology for Transport, Development & Networks, France  
Prof Dr Ralf Rissler, Factum, Austria

### Course content

#### Thursday 4<sup>th</sup> of July – ITS Safety & Design

- ITS functions and their potential consequences on safety (A. Pauzié, Ifsttar)
- Safety of vulnerable road users (S. Nikolaou, CERTH/HIT)
  - Practical exercises in small groups on safety and driver specificities (older, novice, professional) and on safety per vulnerable road user type (pedestrians, children, cyclists, riders)
  - Videos of research experiments on the real road, discussion about processes, constraints and knowledge gathered in research.
- Measurement methods and techniques for evaluating ITS with respect to safety-relevant criteria (J. Krems, CUT)
- Impact of ITS on safety and clean multi-modal mobility (R. Rissler, Factum)
- Driving simulator environment for ITS evaluation and testing (Jose Manuel Martinez Oliveira, CTAG, European projects DriveC2X, Ecodriving, OpEneR)
  - Demonstration and try-out of different cooperative technologies on the MA driving simulator
  - Exercises in small groups on how to evaluate different systems

#### Friday 5<sup>th</sup> of July – ITS perspectives: Eco Mobility

- Eco-driving methods and training (S. Nikolaou, CERTH/HIT)
- Nomadic systems and ecomobility (A. Pauzié, Ifsttar)
- Perspective in electric mobility systems (J. Krems, CUT)
  - Practical exercises in small groups on how to investigate acceptability and use of ecodriving functionalities (private car, truck and bus drivers) and acceptability and use of electric vehicles

### Location

Ifsttar/MA, Salon de Provence, France (Marseille-Provence Marignane airport, shuttle possibility to Salon)

### Scientific organization

Annie Pauzié & Stella Nikolaou

### Information and Registration

Lucile Murier-Mendoza, Humanist, <lucile.mendoza@humanist-vce.eu>

### Local organisation

Catherine Berthelon, <catherine.berthelon@ifsttar.fr>

### Fees and payment

The fee for the Humanist tutorial is

300,- € early registration before 20<sup>th</sup> of May 2013

380,- € registration after this date.

This includes lectures, course materials, lunches and coffee breaks, in addition to a diner the 4<sup>th</sup> of July evening.

### Registration Deadline

Application for registration must be received by the deadline of 21<sup>st</sup> of June 2013 but it is recommended to book your participation as soon as possible, as the number of participants is limited.

Detailed information about the summer school and the registration form can be ask at Lucile Murier-Mendoza, Humanist, <lucile.mendoza@humanist-vce.eu>



# Eco-Mobility projects in Europe



DECOMOBIL workshop, Munich 28.05.2013

*Jean-Charles Pandazis*

# Content

- » ERTICO and EcoMobility
- » EU project in EcoMobility overview
- » Focus on some activities:
  - » eCoMove (R&D)
  - » FREILOT, Compass4D (CIP)
  - » ADASIS (Deployment platform)
  - » Amitran (Assessment)
- » Conclusion:  
*How to reward ITS measures reducing CO<sub>2</sub> emissions?*





## *The Partnership of ITS stakeholders in Europe*

Founded in 1991

### *22 years later...*

106 Partners

750 i-Mobility Network members

27 National ITS associations

29 projects across 4 continents

40 professionals in Brussels

2 deployment platforms (TISA, ADASIS)

26 European & World ITS Congresses organised so far



# Partnership vision

## Vision for “Intelligent Mobility”



### Society perspective

- » Towards zero accidents
- » Towards zero delays and fully informed people
- » With reduced impact on the environment

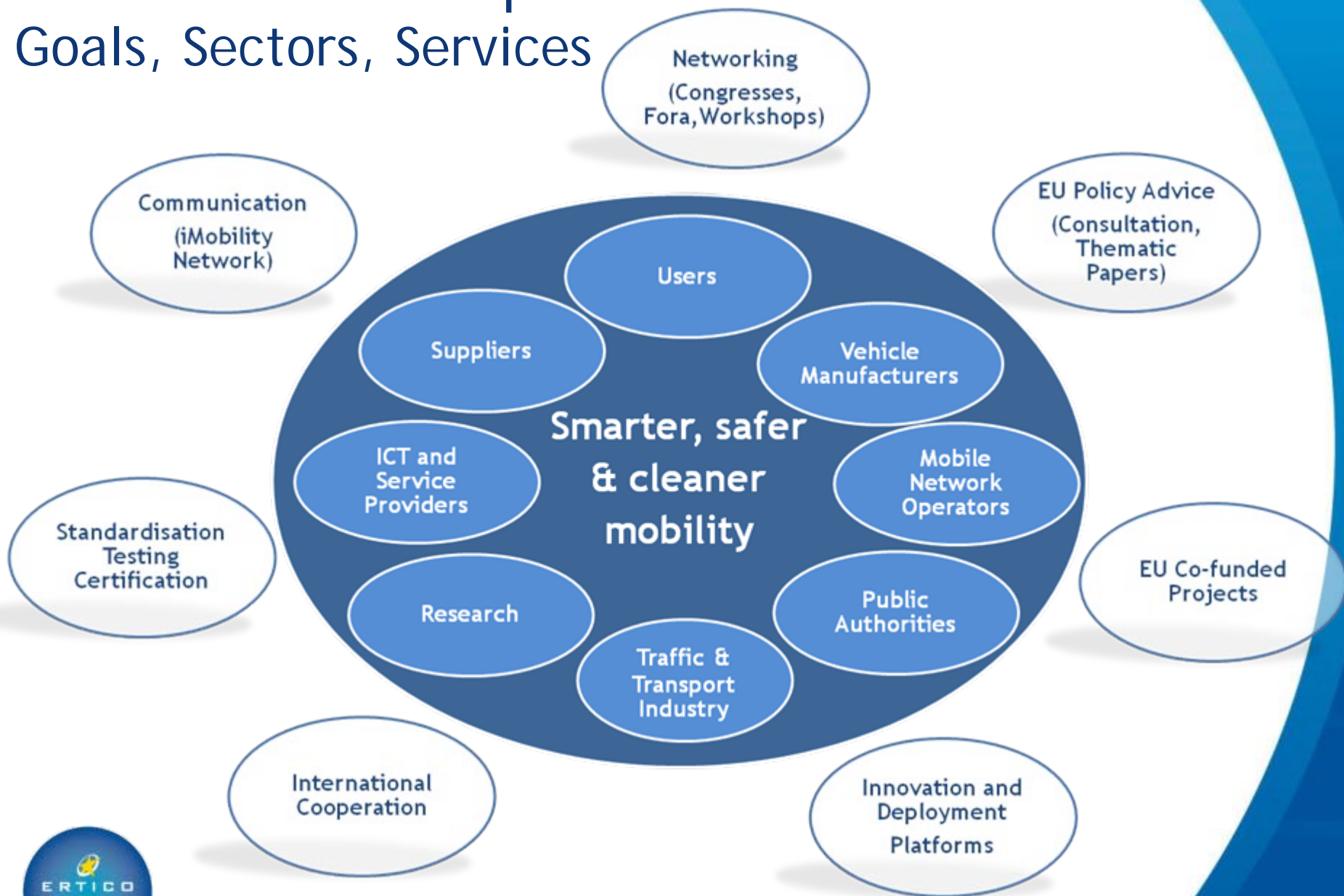
### User perspective

- » where services are affordable and seamless,
- » privacy is respected and
- » security is provided.



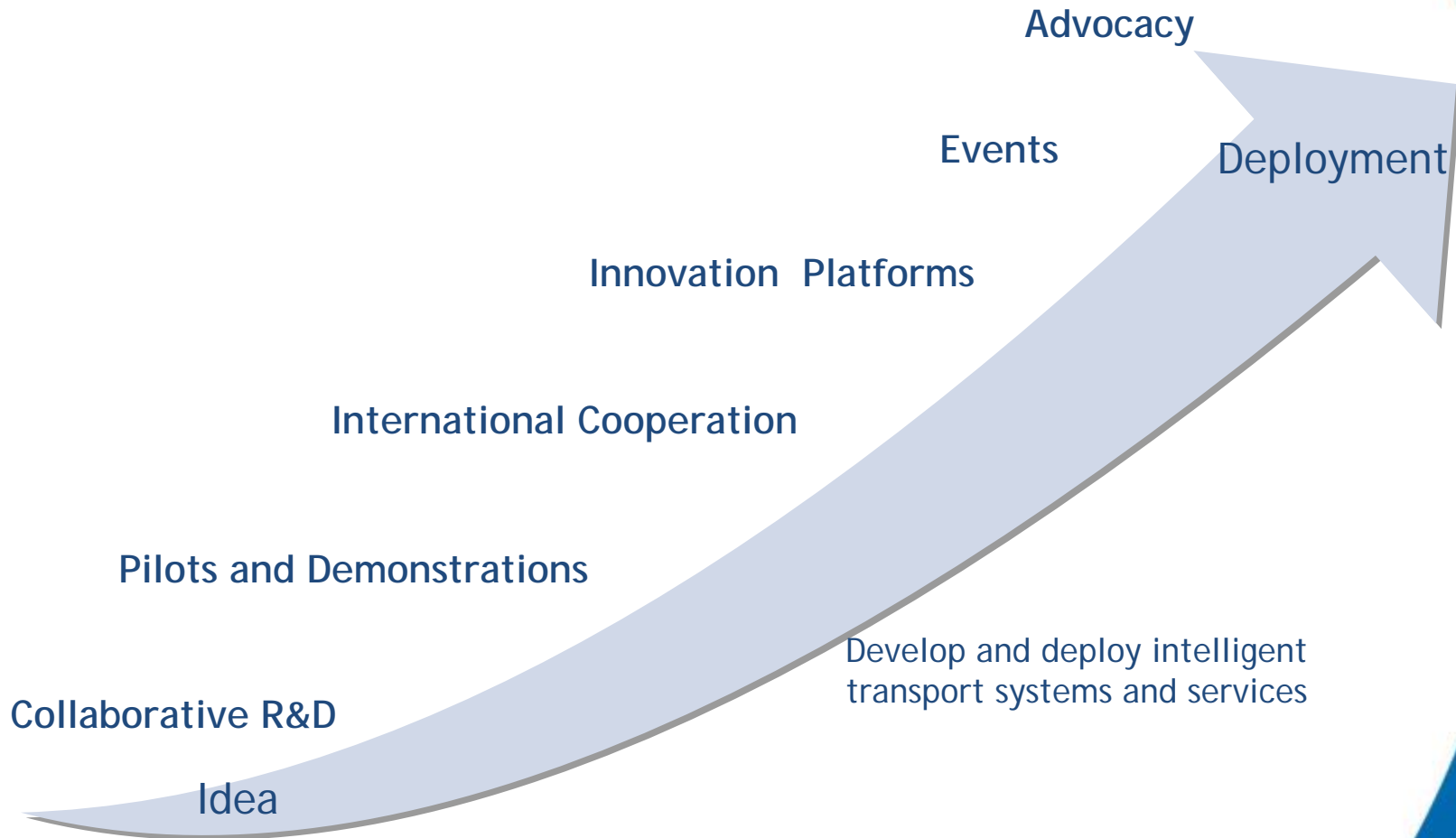
# ERTICO - ITS Europe

## Goals, Sectors, Services





# ERTICO Actions



# EcoMobility @ ERTICO

... with reduced impact on our environment



## Driving behaviour support

- Support drivers to adopt and sustain an energy-efficient driving behaviour



## Efficient fleet management and logistic operations

- Energy-efficient cooperative fleet management and logistic operations



## Efficient traffic network management

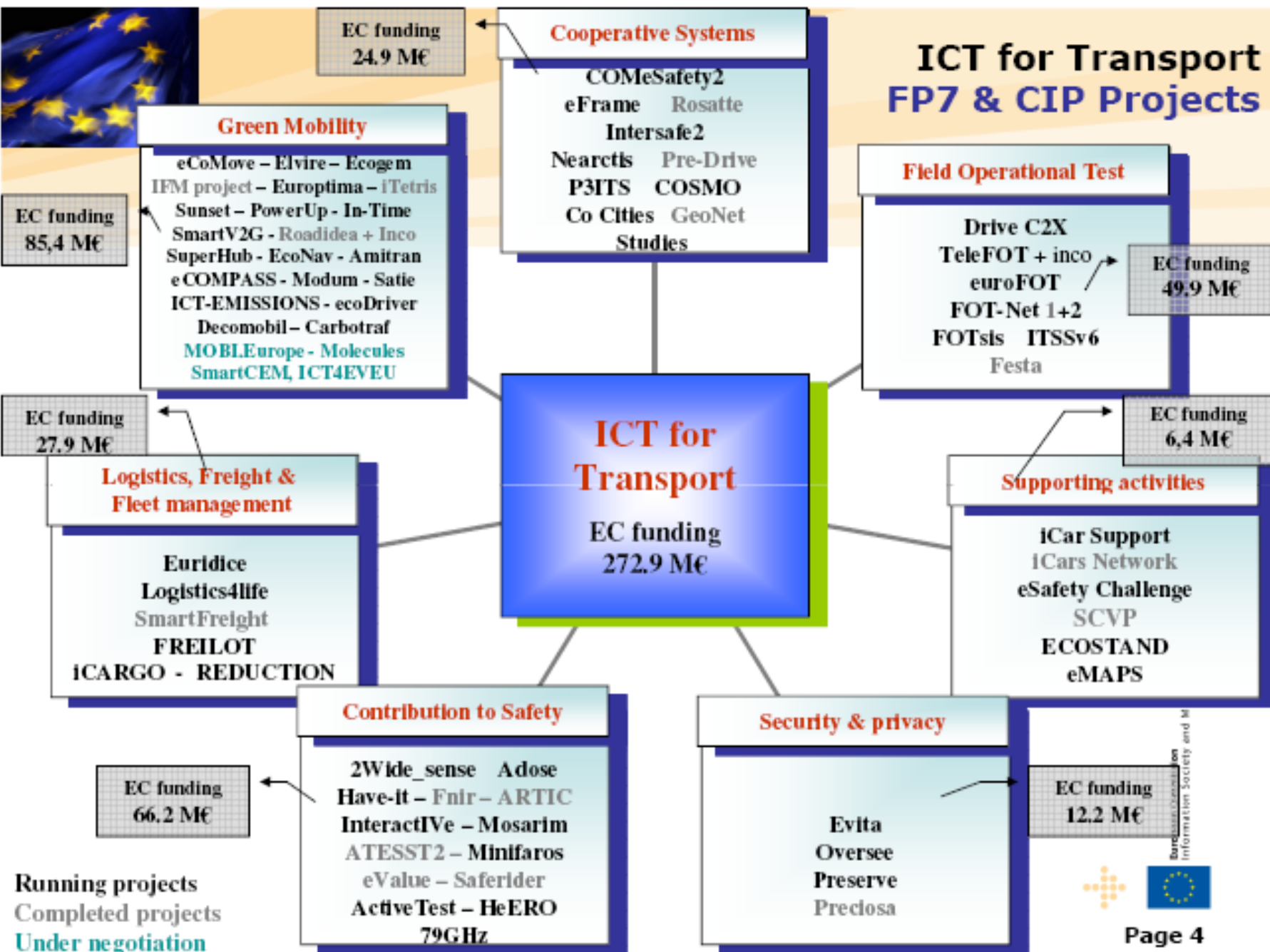
- Energy-efficient traffic network management and infrastructure introducing cooperative services



## ITS services for Electric Vehicles

- Integrate electric chargeable vehicles into the transport and energy networks with innovative and interoperable ITS services

# ICT for Transport FP7 & CIP Projects



# European projects



# How to look at all these activities?

1. Technology: e.g. Cooperative systems

2. Type of activities:

- › R&D: eCoMove, ecoDriver, etc.
- › CIP: In-Time, Co-Cities, FREILOT, Compass4D, etc.
- › Other: ADASIS (Deployment platform)

3. Applications / services (categorisation)

- › Navigation & Traffic Info
- › Behaviour change & Eco-drive
- › Logistics and fleet management
- › Traffic Mgmt & Control

4. Assessment methodologies

- › Amitran, ICT-Emission, ECOSTAND



# 1. Technology: Cooperative Systems & Applications

Contribution to energy efficiency and CO<sub>2</sub> reduction

Reduce impact on environment & increase mobility by:

- »exchanging current status data (V2V, V2I)
- »cooperative planning & routing system selecting most economical route for truck, while traffic system optimises traffic lights
- »adapting traffic signal parameters and other traffic measures so the ensemble of vehicles in the network consumes as little as possible

*R&D activities:*

CVIS, eCoMove, etc

*Pre-deployment activities (Pilots):*

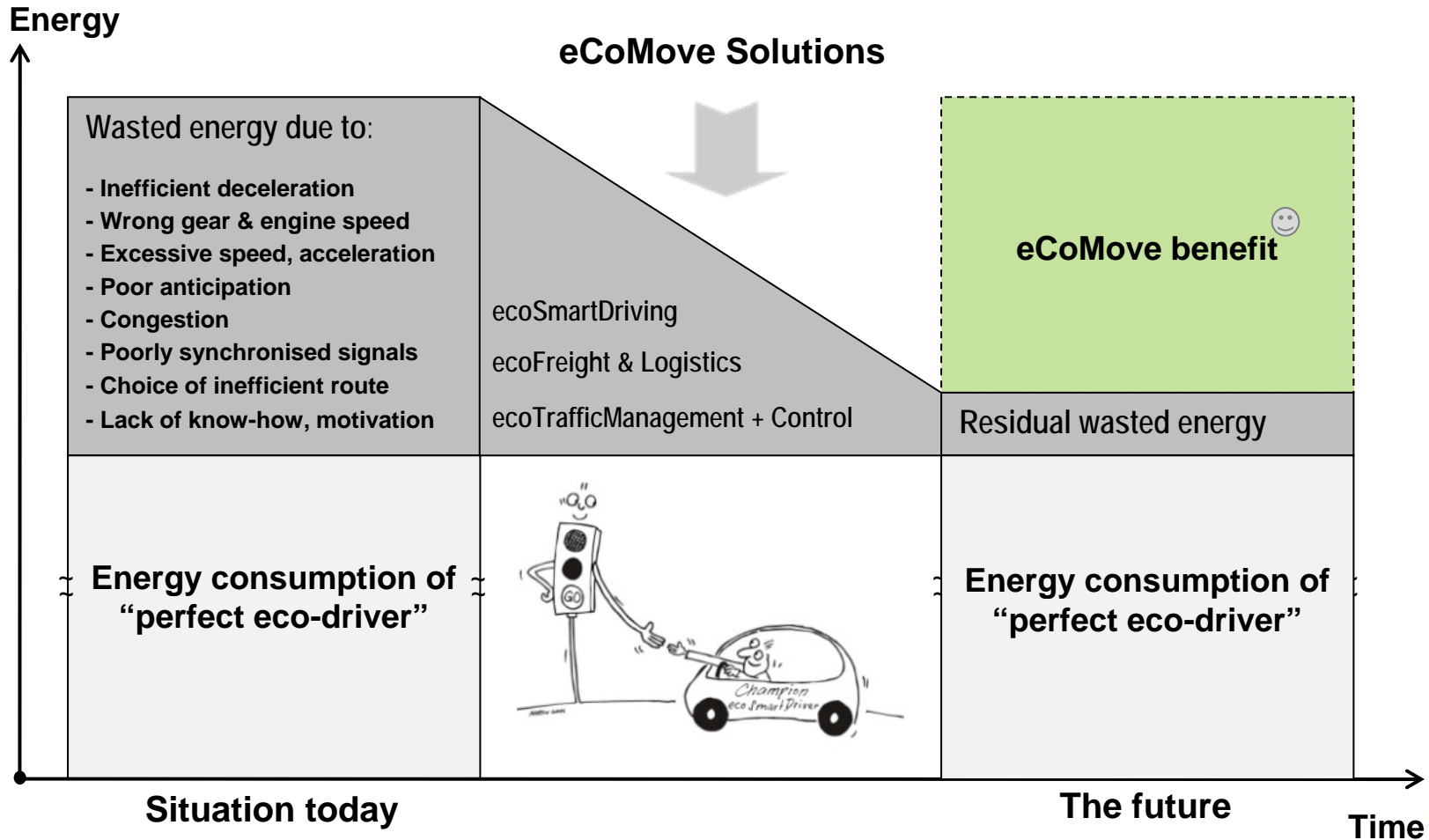
FREILOT, COSMO,

Compass4D



# 2a. R&D activities

## Vision and motivation

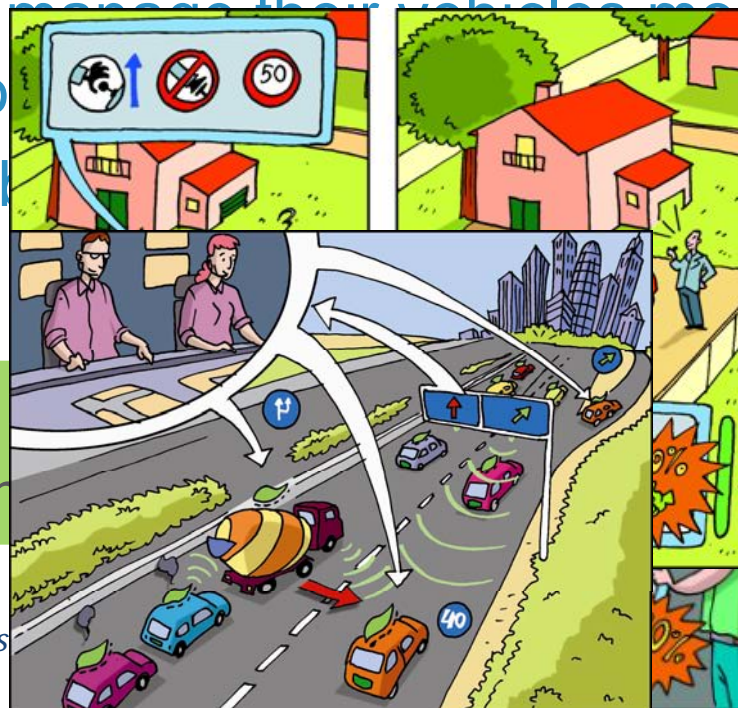




# Project objectives

To develop a **combination of cooperative systems and tools** using V2V and V2I communication to help:

- »drivers sustainably eliminate unnecessary fuel consumption;
- »fleet managers decrease their vehicles' energy consumption economically & incentives;
- »road operators manage traffic in the most energy efficient way.



Target is to  
an

sumption





# Main activities

## » Develop eCoMove core technologies (SP2)

- › V2V & V2I communication platform based on CVIS & SAFESPOT projects results
- › Standardised cooperative messages for energy efficiency-relevant information exchange
- › ecoMap (digital map database enhanced with eco-relevant attributes)
- › ecoModels to advise optimal driving and traffic control strategies (micro- and macroscopic levels)

## » Develop eCoMove applications

- › ecoSmartDriving applications for fuel-efficient driving behaviour (SP3)
- › eco Freight & Logistics applications for green freight routing and fuel consumption- optimised logistics (SP4)
- › ecoTrafficManagement & Control applications for energy-efficient traffic control & management measures (SP5)

## » Test and validate eCoMove system (SP6)

- › In 5 field trials and simulation environment
- › User acceptance and cost-benefit analysis

# eCoMove Milestones

- ✓ 11/2010: Use cases & requirements
- ✓ 02/2011: Architecture & system specification
- ✓ 09/2011: eCoMove communication platform
- ✓ 10/2012: *ITS World Congress Vienna demonstration*
- ✓ 11/2012: Applications ready for integration
- ✓ 03/2013: Applications and test vehicles ready for evaluation
- 09/2013: Evaluation results
- 20-21/11/2013: eCoMove final event*

# Beyond eCoMove

... First cooperative systems close to market

- » Transfer eCoMove solutions to ElectroMobility
- » Establish a deployment roadmap for Cooperative ITS for
  - › political/regulatory framework
  - › technology
  - › prioritisation of applications/services
- » FOT for cooperative sustainability solutions, demonstrate effectiveness and benefits of the proposed solutions (vs. safety, efficiency, etc)
- » Further research on Cooperative ITS applications & tools for deployment (e.g. new applications, business/organisational models)

## 2b. CIP Pilot: FREILOT

Energy efficient urban freight

### Objectives

1. Show that FREILOT services bring measurable benefits reducing up to 25% of fuel consumption on equipped trucks in urban areas
2. Ensure FREILOT services after-project life
3. Expand FREILOT services to more fleet operators, cities



# CIP Pilot: FREILOT

Five services, four cities

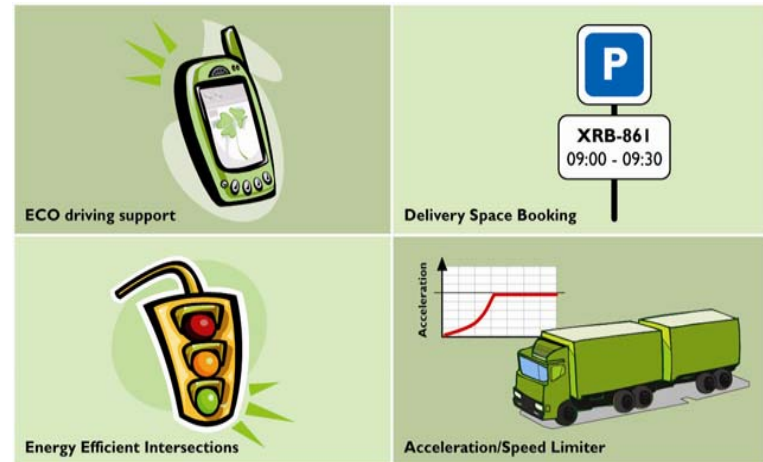


Traffic control: Energy Efficient optimised Intersections

Vehicle: Adaptive acceleration / speed limiters

Driver: Enhanced eco-driving support

Fleet operator: Real-time delivery space booking



# CIP Pilot: FREILOT

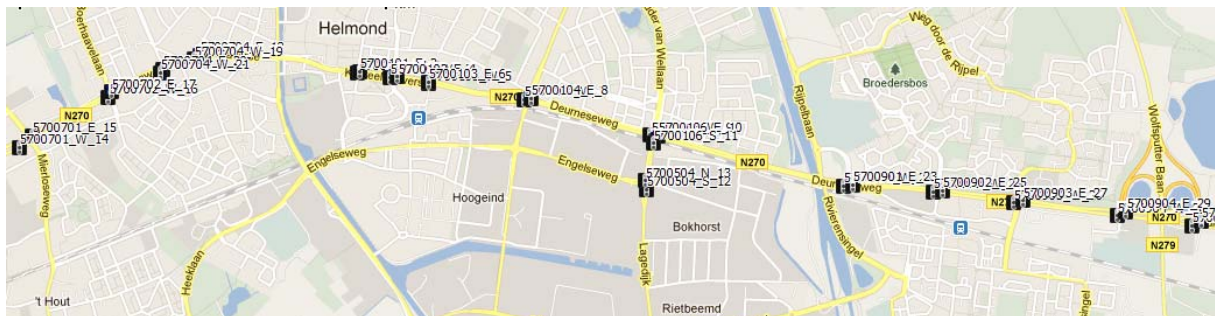
## Energy Efficient Intersection

### Helmond



- Helmond – cooperative system:  
13 intersections in urban zone

Period	Number of trips	Number of distinct vehicles
Baseline	66	13
Pilot	52	10





# CIP Pilot: FREILOT

## Energy Efficient Intersection Helmond



Period	Number of crossings	Number of stops	% of stops
Baseline	408	52	13%
Pilot	343	20	6%

### Number of crossings and stops in both periods

	Baseline	Pilot	Rate of change
CO <sub>2</sub> emissions (g/km)	644	562	-13%
NO <sub>x</sub> emissions (g/km)	3.87	3.33	-14%
Fuel consumption (l/100km)	24	21	-13%
Speed (km/h)	35	36	+2.6%

### Emissions, consumption and speed variations

# CIP Pilot: objectives 1/2



1. Ensure successful deployment and after-project life of the three piloted services, aiming at proving both safety and energy efficiency benefits and traffic flow optimisation.

**REAL**

2. Globally harmonize specifications for the three piloted services, through close cooperation with the US & Japanese counterparts, other CIP pilots and relevant standardization bodies.

**INTEROPERABLE**



3. Establish and follow an agreed harmonized testing, installation, monitoring and assessment strategy, as well as a common strategy for deployment of all three specified cooperative systems across all pilot sites

**HARMONISED**





# CIP Pilot: objectives 2/2



4. Prove safety and energy efficiency benefits to all relevant stakeholders by collecting critical mass of data in 12 months full-scale operations of selected cooperative systems at each pilot site.

**EFFECTIVE**

5. Collaborate with relevant standardisation bodies, mainly but not exclusively ETSI and CEN, in order to ensure full interoperability of the deployed cooperative solutions.

**SCALABLE**

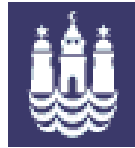
6. Create a set of best practices on the basis of the pilot site operations including guidelines, business models, manuals, and training material.

**SUSTAINABLE**



# Project consortium

compass 4D



**VOLVO**



**SIEMENS**



**TNO** innovation for life



**Applus<sup>+</sup>**  
**IDIADA**



**v·tron**



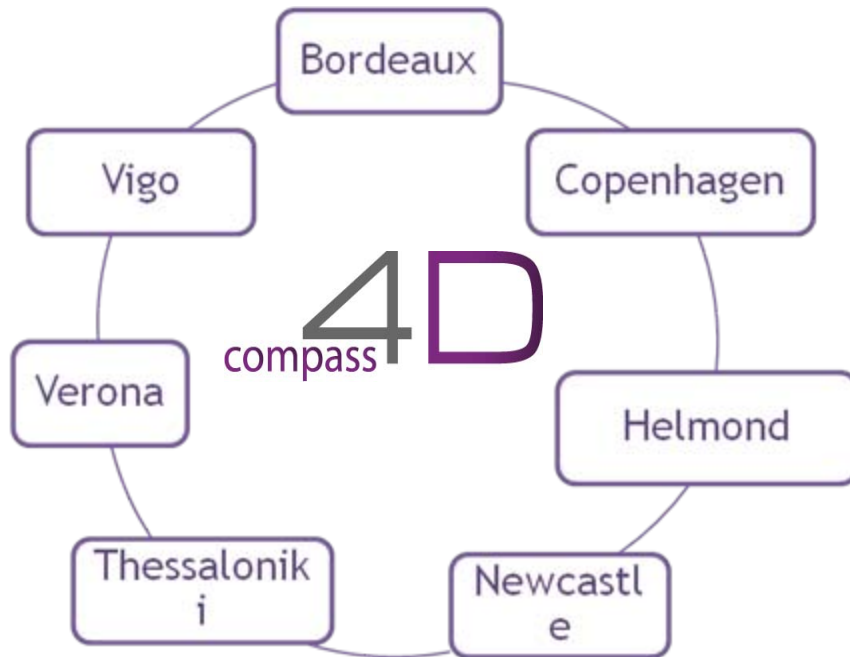
**IRU**  
Projects

Jean-Charles Pandazis

DECOMOBIL workshop, Munich 28.05.2013



# Pilot sites



Compass4D pilot sites

Geographical  
distribution of  
Compass4D  
partners



# Piloted & deployed services



- Road Hazard Warning (RHW)



- Red Light Violation Warning (RLVW)



- Energy Efficient Intersection Service (EEIS)





# Vehicles per pilot site

<i>Vehicles / pilot site</i>	Bordeaux	Copenhagen	Helmond	Newcastle	Thessaloniki	Verona	Vigo	Total
Trucks	40		7	5 vans				52
Cars	34		25 electric	5 electric	7	10	10	91
Buses		100	5			10	20	135
Emergency vehicles	6		5				2	13
Taxis					35		8	43
Total vehicles	80	100	42	10	42	20	40	334

## Estimated number of drivers: 574

- » Commercial vehicles (busses, trucks, emergency vehicles and taxis) → two users /drivers per vehicle.
- » Electric vehicles and passenger cars → one users /drivers per vehicle.

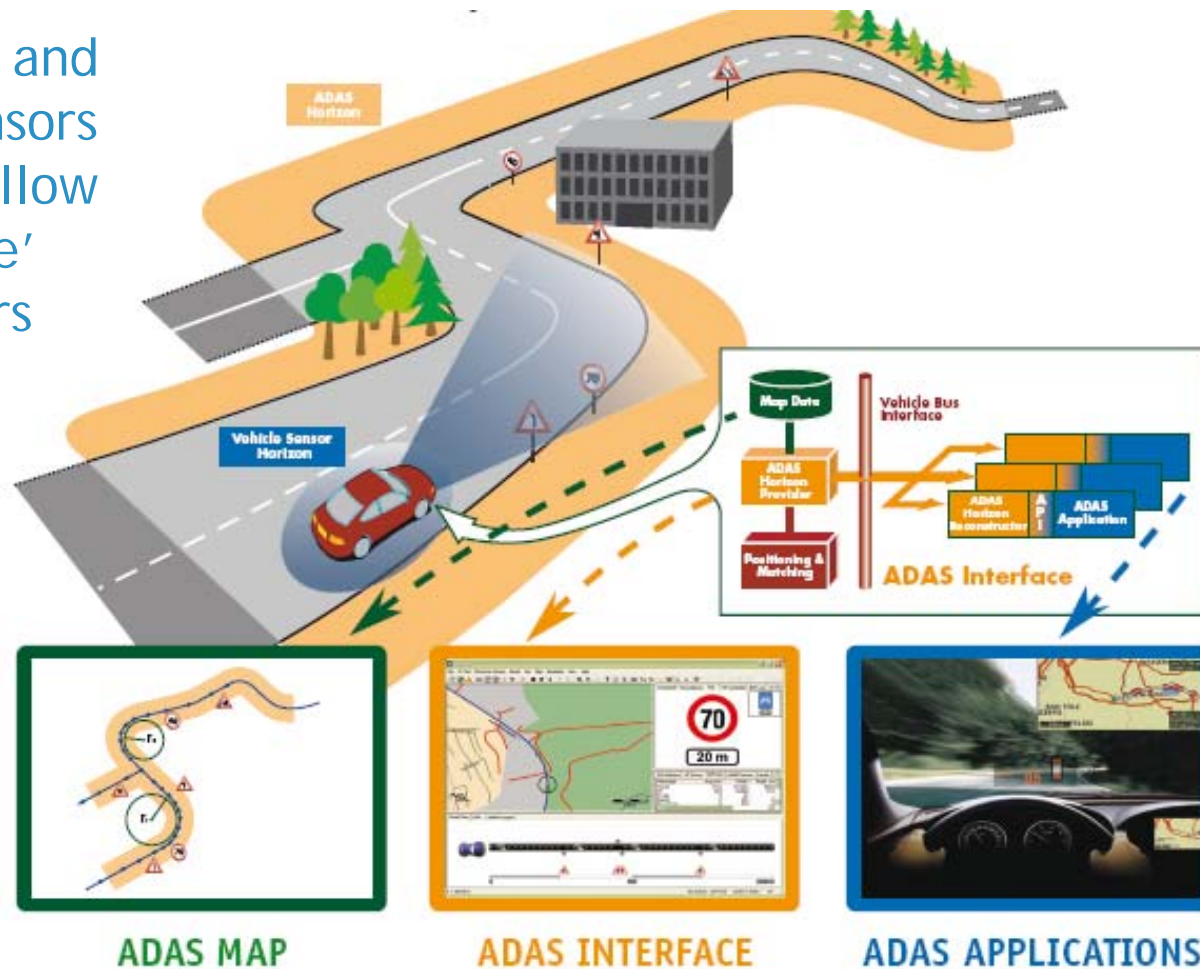
Jean-Charles Pandazis

DECOMOBIL workshop, Munich 28.05.2013

# 2c. Deployment platform

## Predictive navigation & driving: The ADAS Horizon Concept

Extend driver and in-vehicle sensors horizon and allow drivers to 'see' around corners



## Predictive navigation & driving: ADAS Horizon Applications examples

Curve Warning



Predictive Curve Light



Hybrid Powertrain Control



Predictive Cruise Control



*And many more ...*

# ADASIS on the market!

» In 2012, first applications enabled by ADASIS

› Scania Active Prediction



› Predictive Powertrain Control for the new Mercedes-Benz Actros

› Other to come!





# 3. Application / services view

## eco-Navigation

### » Pre-trip (mostly Web-based)

- › eCoMove, EcoNav, EcoGem, MOLECULES, FOTSis, eCOMPASS, ICT-EMISSIONS (no development), REDUCTION

### » Static Map data

- › eCoMove, EcoDriver, EcoGem, REDUCTION

### » Dynamic data

- › eCoMove, EcoGem, FOTSis (V2I)

### » Cooperative

- › eCoMove, EcoGem, FOTSis

### » Post-trip (feedback)

- › EcoDriver, EcoNav

### » Multi-Modal

- › EcoNav, MOLECULES (EV), eCOMPASS, REDUCTION, AMITRAN

### » Network Routing

- › eCoMove, FOTSis



# Application / services view

## eco-Navigation

- » **Traveller Information (real-time) and User feedback**
  - › EcoDriver, EcoNav
  
- » **Assessment / Validation (Energy consumption, CO2 footprint)**
  - › eCoMove:
    - › Fuel consumption
    - › Time of travel
    - › Number of stops...
  - › **EcoGem / MOLECULES:**
    - › Energy consumption (EV)
    - › Asses impact, methodology and tools
  - › **EcoNav:**
    - › Door2door emission model, carbon footprint
  - › **REDUCTION:**
    - › EcoMark (microscopic and macroscopic)
  - › **ICT-EMISSION**
    - › Driver behaviour/pattern



## 4. Assessment methodologies

### Assessment Methodologies for ICT in Multimodal Transport from User Behaviour to CO<sub>2</sub> reduction

AMITRAN will develop and deliver a standardised methodology dedicated to the evaluation of CO<sub>2</sub> impacts of ITS.

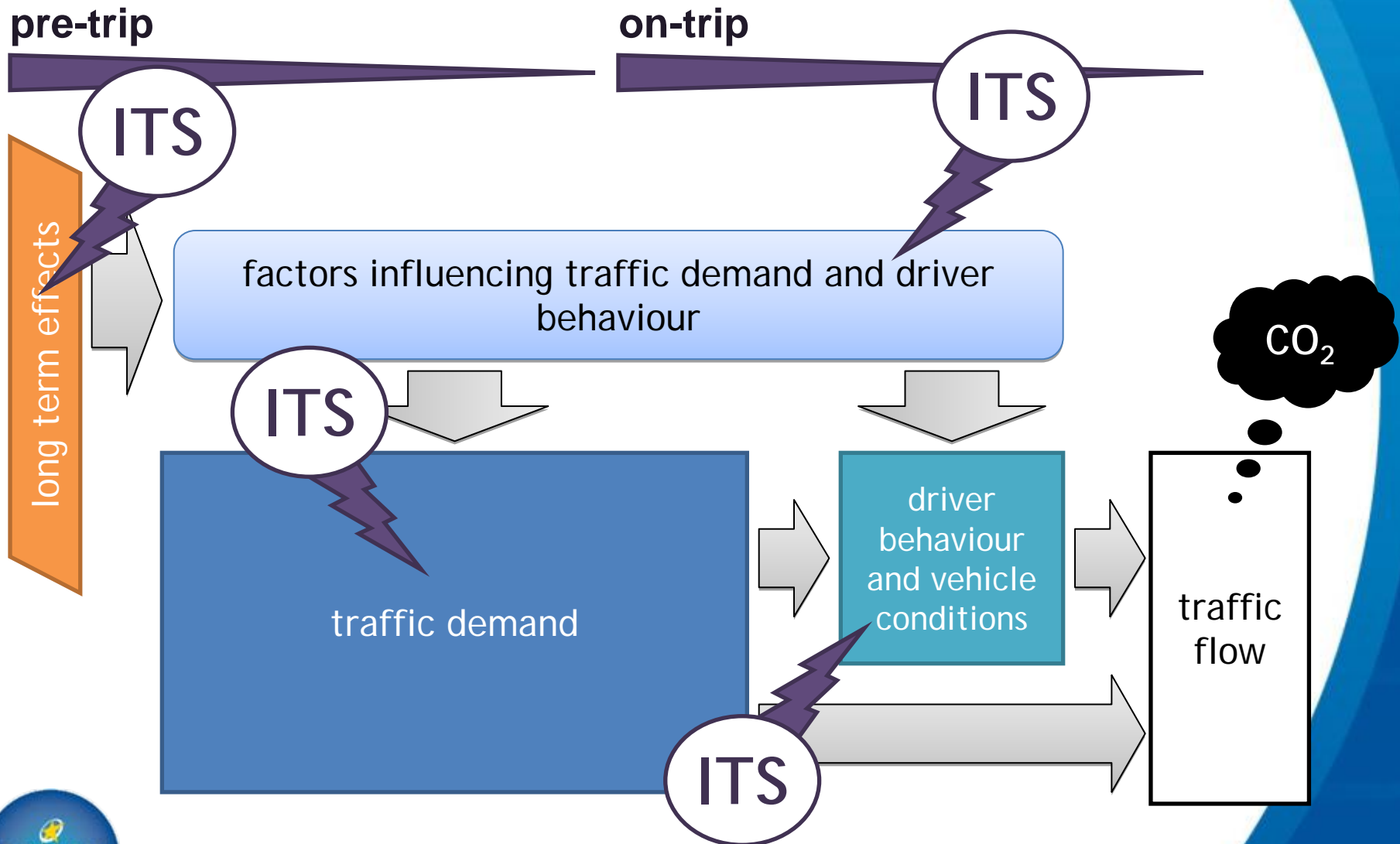


## » AMITRAN aims to:

- › Develop a **CO<sub>2</sub> assessment methodology** for ICT measures that includes **multimodal passenger and freight transport** and that takes into account the whole chain of effects from user behaviour to CO<sub>2</sub> production
- › Design **open interfaces for models and simulation tools** implementing the project's methodology
- › Establish a **generic scaling up methodology** and a publicly available database with statistics to translate local effects to the European level
- › **Validate the proposed methodology** and its implementation by using data available from other projects and studies
- › Produce an **online checklist and a handbook** that can be used as a reference for future projects

**Main result: a reference methodology to estimate *well-to-wheel* CO<sub>2</sub> emission reductions achieved by intelligent transport systems.**

# Effects of ITS on transport processes



# Relevance of parameters on CO2

Parameter	Relevance
Trip generation	high
Destination choice	high
Strategic route planning	medium
Strategic mode planning	high
Pre-trip route choice	medium
Pre-trip mode choice	high
Choice of transport means	high
Load factor and occupancy	medium
Departure time choice	medium
On-trip mode choice	high
On-trip route choice	medium

Parameter driving behaviour and vehicle conditions	Relevance
Lane	low
Speed	high
Headway	medium
Driving dynamics	high
Use of auxiliary systems and vehicle performance	medium

# ITS measures reducing CO<sub>2</sub> emission

Reward / credit to boost market uptake?

ERTICO is preparing a paper "ITS for Energy Efficiency" presenting benefit of current ITS products/measures in:

- »Predictive map-based applications for safe and clean mobility
- »Traffic and Traveler Information
- »Traffic Management and control
- »Freight and Fleet Management

*Goal is to explore with the EC a rewarding or credit mechanism for ITS measures having proven impact on CO<sub>2</sub> emission.*





## eCoMove-ecoDriver Stakeholder workshop

- » Date & Time: Tuesday 4 June 2013, 09:30 - 15:30
- » Location: Wicklow Meeting Room 1, Convention Centre Dublin

## Session: (SIS 01) ITS contribution to energy efficiency

- » Date & Time: Wednesday 05/06/2013 09:00 - 10:30
- » Location: Wicklow Hall 2B

## Session: (SIS 39) Eco-driving - How to keep performances on the long term?

- » Date & Time: Friday 07/06/2013 09:00 - 10:30
- » Location: Wicklow Meeting Room 1





Thank you for working together to  
bring Intelligence into Mobility!

[jc.pandazis@mail.ertico.com](mailto:jc.pandazis@mail.ertico.com)

[www.ertico.com](http://www.ertico.com)



*Jean-Charles Pandazis*

DECOMOBIL workshop, Munich 28.05.2013

# ICT for Clean & Efficient Mobility

experience from the iMobility Forum WG4CEM  
(and from the FIA)



Munich, 28 May 2013  
Decomobil Workshop

Luca Pascotto,  
FIA Region I



# Summary

- The iMobility Forum WG4CEM
- Measures analysed
- Preliminary Results
- The role of Awareness

# iMobility Forum WG 4CEM

**Objective:** To provide a vision on eco-friendly and sustainable mobility and a roadmap to achieve efficient transition

**Contribute to ITS deployment by:**

- Establishing a priority list of activities related to largest saving potential
- Providing an overview on related activities to eco-mobility distinguishing between short, medium term and long term options
- Identify fruitful lines of further development and research





# Mapping services



More than 30 measures      More than 60 EU projects

# Step 1: cluster & define

Eco-driving

Eco-Information,  
Navigation and  
Guidance

Eco-Traffic  
Management

Eco-Mobility  
Services

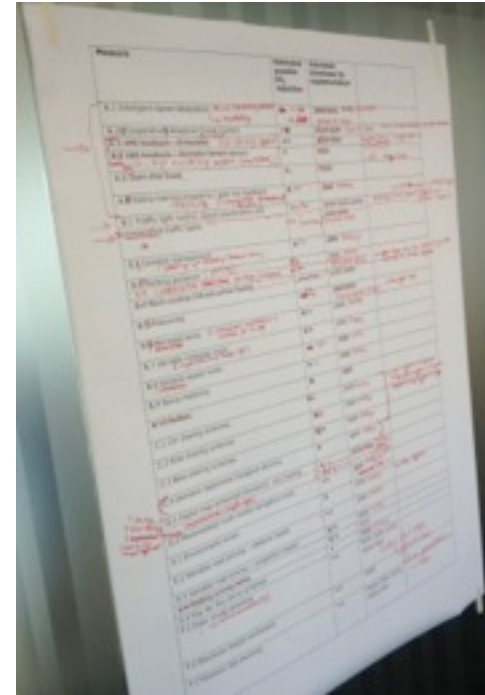
Eco-freight and  
Logistic  
management

Eco-Demand and  
Access  
Management



# Measures Analysed

Scope theme	Measure
Eco-Driving	A.1 Intelligent Speed Adaptation
	A.2 (Cooperative) Adaptive Cruise Control
	A.3 HMI feedback – Embedded
	A.4 HMI feedback – Nomadic (smart phone)
	A.5 Start stop assist
	A.6 Online training programs / post trip feedback
Eco-Traffic Management	B.1 Traffic light control, signal coordination and cooperative traffic lights
	B.2 Incident management
	B.3 Parking guidance
	B.4 Micro routing (infrastructure based)
	B.5 Platooning
	B.6 Managed lanes
	B.7 Variable message signs
	B.8 Variable speed limits
	B.9 Ramp metering
	B.10 Buffers
Eco-Mobility Services	C.1 Car sharing schemes
	C.2 Ride sharing schemes
	C.3 Bike sharing schemes
	C.4 Demand responsive transport services
Eco-Information, Navigation and Guidance	D.1 Digital map enhanced (dynamic) eco-routing
	D.2 Personalized multi-modal navigation tools
Eco-Demand and Access Management	E.1 Environment zones
	E.2 Variable road pricing – distance based
	E.3 Variable road pricing – congestion based
	E.4 Parking pricing
	E.5 Pay-As-You-Drive schemes
Eco-Freight and Logistics Management	F.1 Inter-modal solutions
	F.2 Electronic freight exchanges
	F.3 Dynamic trip planning



# Major Issues at Hand

- What are issues for the implementation, mass deployment on the market and user acceptance of measures?
- What indicators can be identified for user acceptance of ITS for clean and efficient mobility?
- What effect do measures have on CO<sub>2</sub> emission caused by mobility?
- What are the costs and benefits of implementation of the 'eco' measures and systems?
- What does the 'ITS-aspect' focusing on 'eco' contributes to the existing measures?





# Step 2: estimation

Estimated possible reduction



Timeframe for implementation



Actions needed



# Step 3: output (preliminary)

MEASURES	TIME
(on trip) Eco-driving support	beyond 2020
Traffic light control and signal coordination	Today
Cooperative Traffic light	beyond 2020
Personalised multi-modal navigation tool	Today
Variable road pricing – distance based	Today
Inter-modal solutions	Today
Electronic freight exchanges	Today
Dynamic trip planning	Today



# Step 3: output (preliminary)

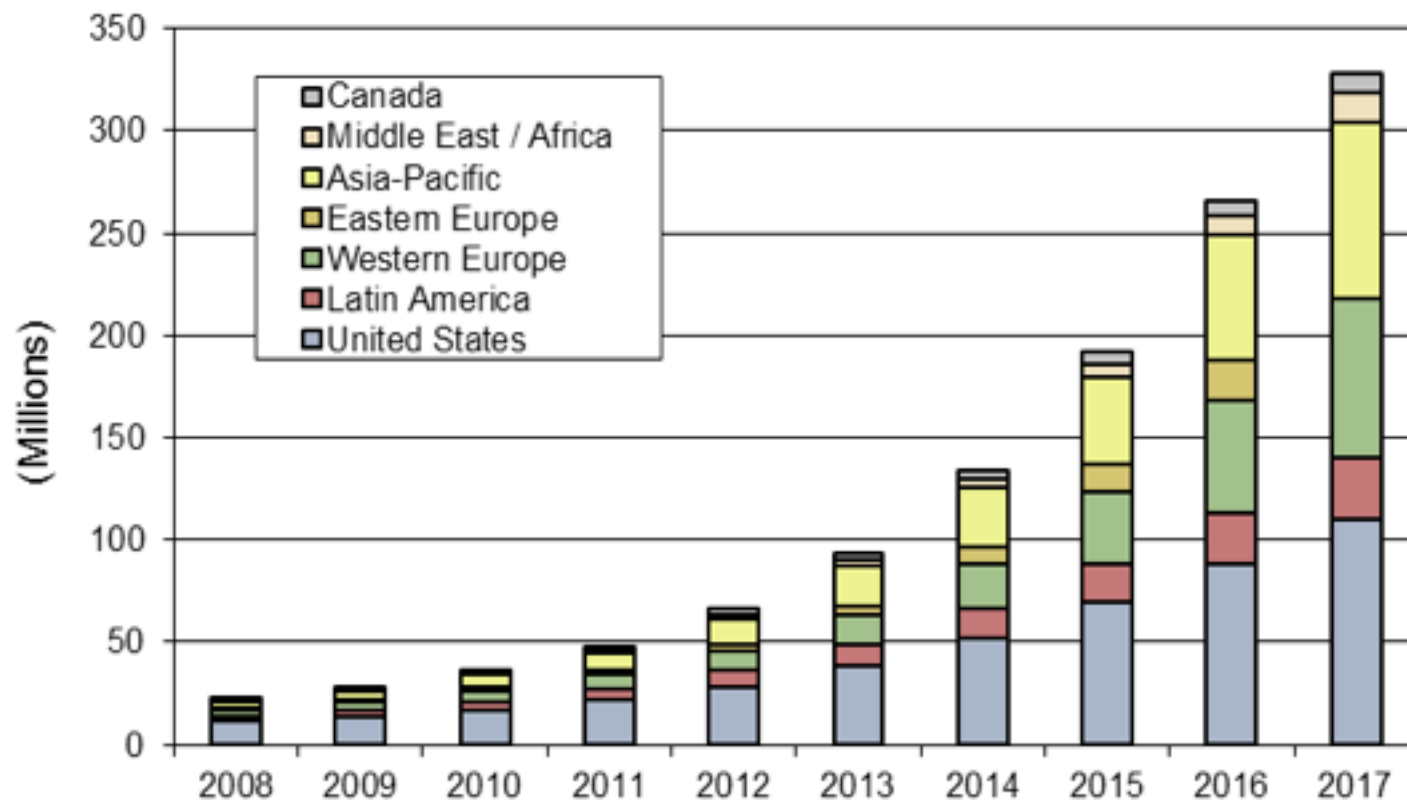
MEASURES	TIME
Intelligent Speed Adaptation	beyond 2020
Cooperative Adaptive Cruise Control	beyond 2020
on trip eco-driving support (smartphone)	until 2020
Coaching on eco-driving	Today
Pay-as-you-drive schemes	Today
Car-sharing schemes	Today
Routing navigation	Today
Eco-routing	Today

5-10%

# How to speed-up deployment?



# Opportunities



**Connected Car Subscribers by Region**  
**World Market, Forecast: 2008 to 2017**  
*Source: ABI Research 2012*

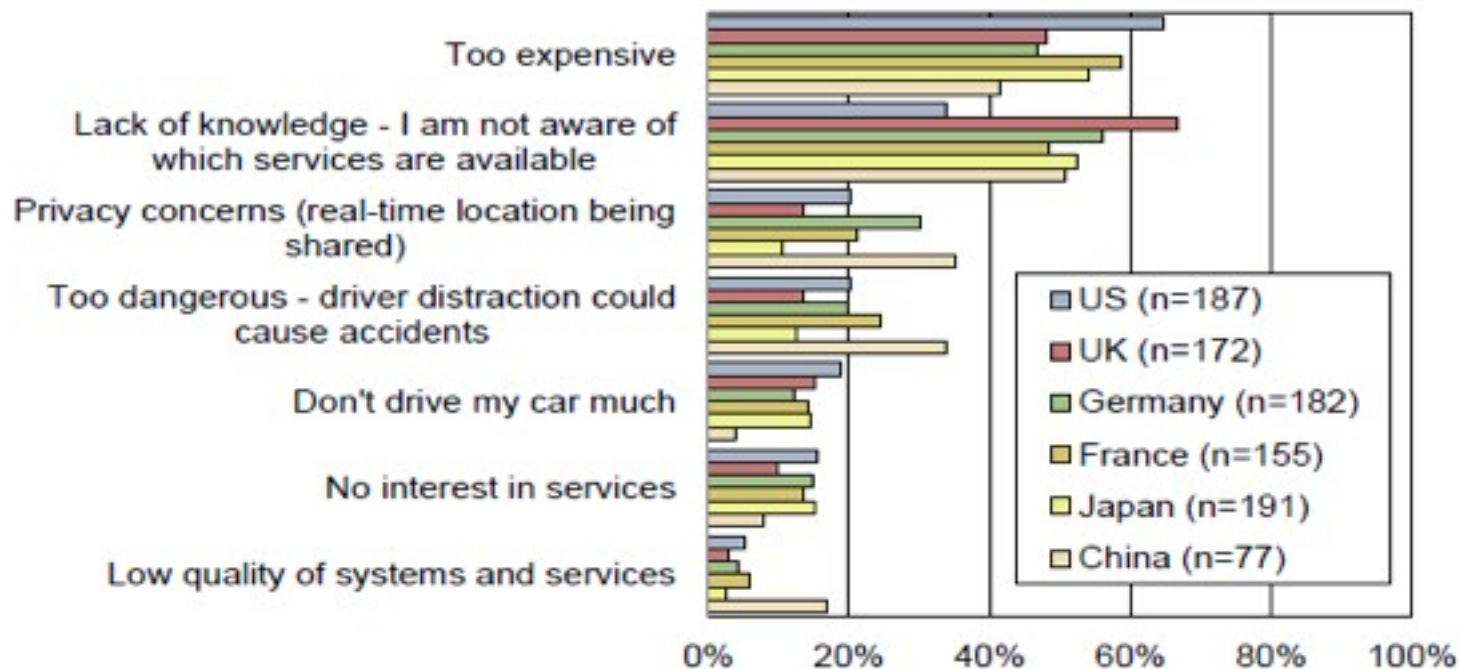
...but...

# Key factor: user awareness

## Main Reasons for Not Using Telematics Services

World Market, 2011

Source: ABI Research 2011

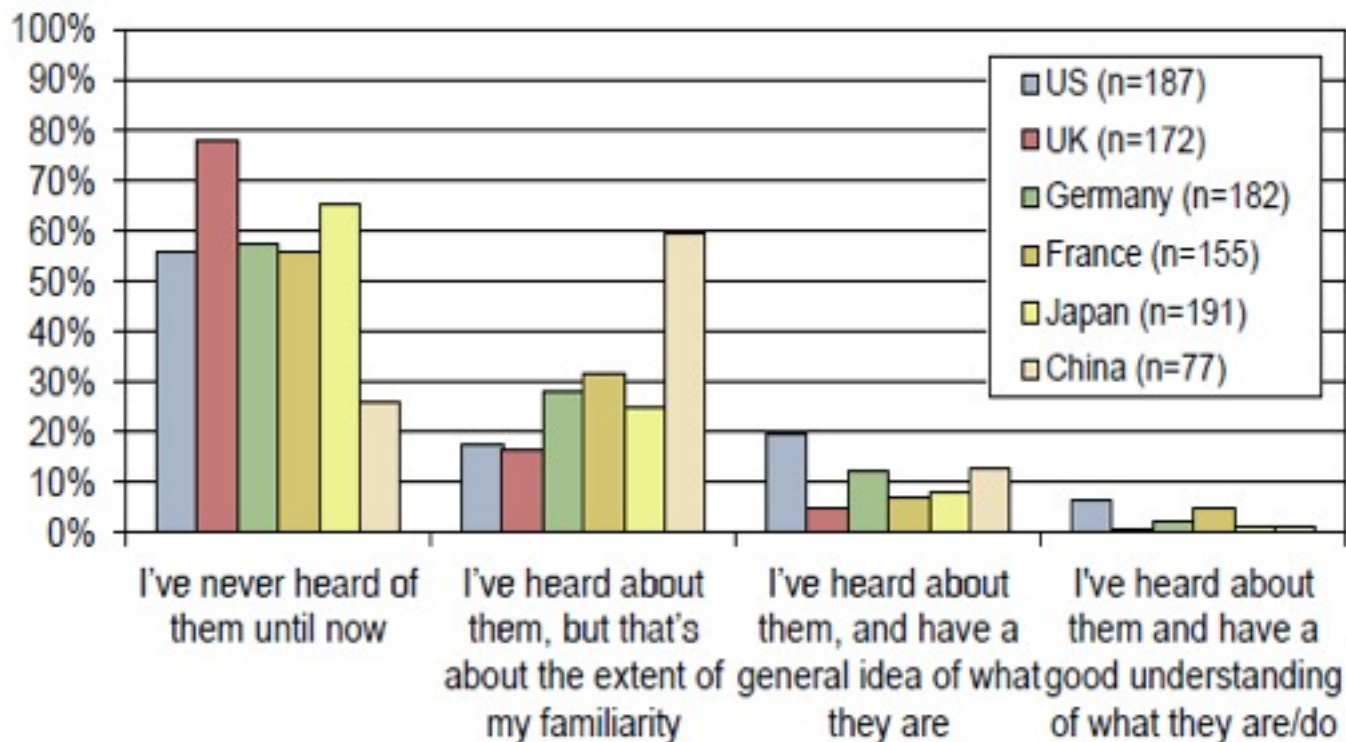


# Key factor: user awareness

## Familiarity with Telematics Systems for Cars

World Market, 2011

Source: ABI Research 2011





# Promoting awareness

Create a market for safety & efficiency by increasing awareness, information, knowledge



# iMobilityChallenge



Secretary-General of the International Transport Forum, José Viegas, testing cooperative systems, ITF Forum, 23 May



Racing driver Timo Glock, showcasing the benefits of the latest cooperative systems for intelligent mobility at ITF Forum, 22 May 2013

# Priority systems



Real Time Travel  
and Traffic  
Information



Start and Stop  
Assistance



Eco-driving  
assistance



Dynamic traffic  
light optimisation



Cooperative adaptive  
cruise control



Tyre pressure  
monitoring system



Speed-Alert



Fuel-efficient  
route choice



eCall

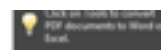


Eco-driving  
coaching



Netherlands 2013

VALKENBURG AIRPORT (NEAR THE HAGUE),  
11 SEPTEMBER



Intelligent Mobility for Smart Cities



## Preliminary programme

WEDNESDAY 11 SEPTEMBER 2013



DRIVING EXPERIENCE

11.00 - 12.30

Parallel iMobility demonstrations in hangar and airstrip  
(opportunity for test rides)

11.30 - 12.00

Plenary demonstration of eCall

12.00

Arrival of delegates attending FIA Conference Week

12.00 - 13.00

Networking lunch

13.00 - 13.30

Opening speeches

13.30 - 13.45

iMobility Awards

13.45 - 14.15

Plenary demonstration of Autonomous Driving

14.00 - 17.00

Parallel iMobility demonstrations in hangar and airstrip  
(opportunity for test rides)

14.30 - 15.00

Plenary demonstration of Cooperative Systems for Urban Mobility

15.30 - 16.00

Plenary demonstration with celebrity drivers  
(alternative fuel vehicles)

16.30 - 17.30

Networking cocktail



CELEBRITY DRIVERS



AWARDS



EXHIBITION



*ICT can also help safety!*

# THE LONG SHORT WALK

Brussels, 6 May 2013,  
UN Road Safety Week

Thank you for the  
attention

[lpascotto@fia.com](mailto:lpascotto@fia.com)





# Priorities for Road Safety Research in Europe - the PROS Support Action

DECOMOBIL Workshop

“Roadmap of ICT Design for Clean and Efficient Multimodal Mobility”

Munich, 28 May 2013

Peter Urban

Forschungsgesellschaft Kraftfahrwesen mbH Aachen

# Agenda



Giving an overview of...

- ... what PROS is doing and why,
- ... who is involved,
- ... what are the main outcomes so far.



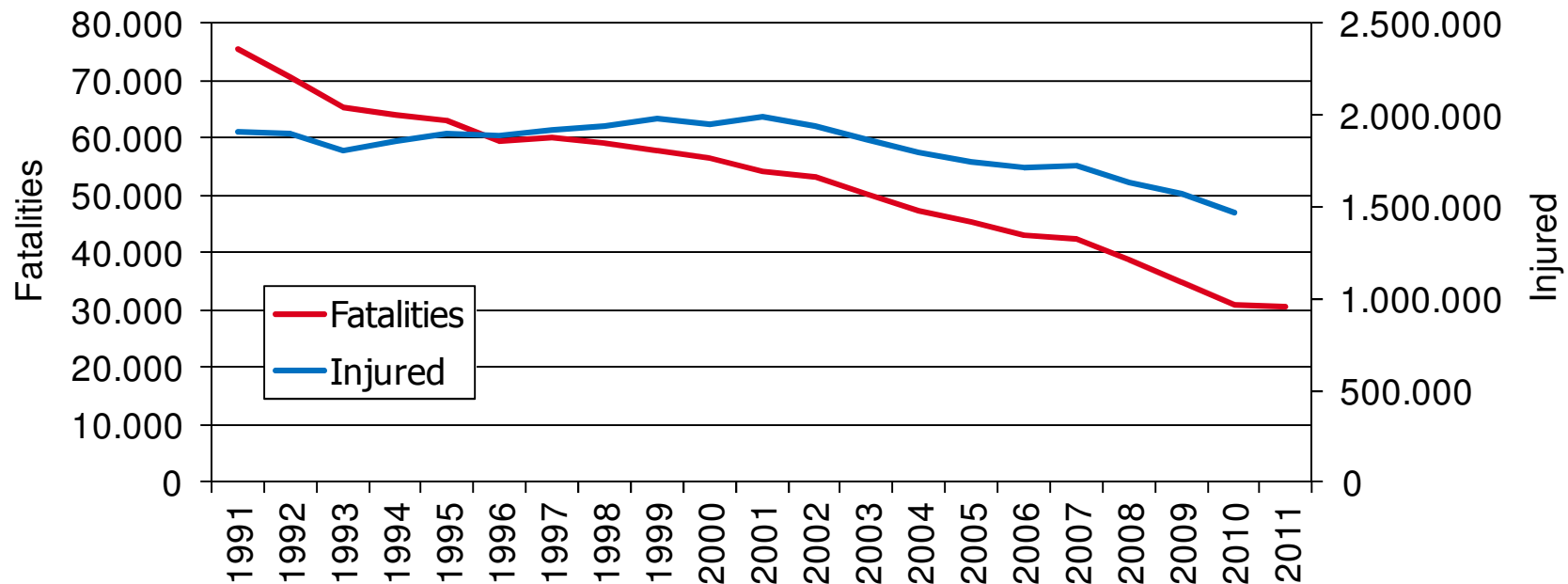
# Agenda



Giving an overview of...

- ... what PROS is doing and why,
- ... who is involved,
- ... what are the main outcomes so far.

# Road Safety: Facts and Figures European Perspective



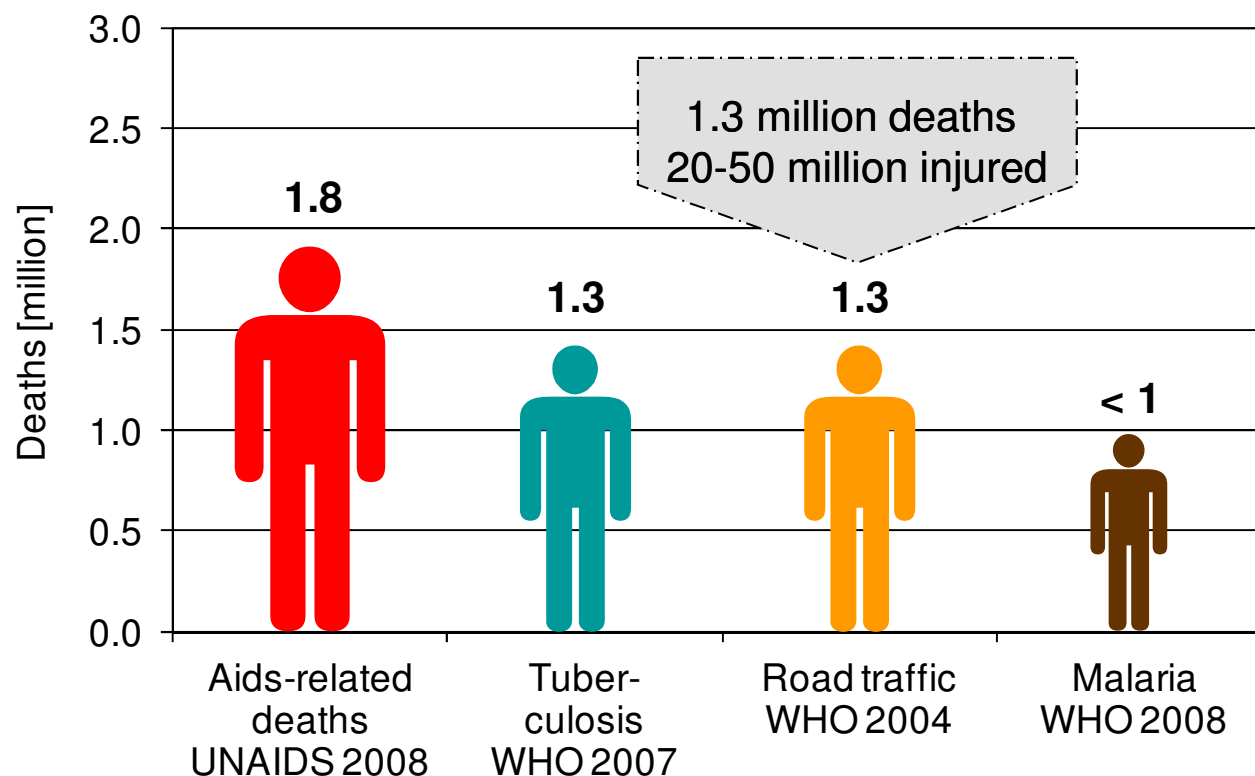
[Source: CARE database or national publications, EC / DG MOVE (data for 2011 provisional)]

## Key figures:

- In 2011, more than **30,000** people died on the roads of the European Union.
- For every death on Europe's roads there are an estimated **4** permanently disabling injuries, **8** serious injuries and **50** minor injuries.

[Source: [http://ec.europa.eu/transport/road\\_safety](http://ec.europa.eu/transport/road_safety)]

# Road Safety: Facts and Figures Global Perspective



## UN Decade of Action for Road Safety 2011-2020:

- Launched in more than 100 countries, with one goal: to prevent five million road traffic deaths globally by 2020

[Source: [http://www.who.int/roadsafety/decade\\_of\\_action](http://www.who.int/roadsafety/decade_of_action)]



# Objectives in Road Safety



## Vision Zero

- ▶ No-one killed or severely injured anymore in road transport
- ▶ Safety cannot be traded for other benefits

## ERTRAC Guiding Objectives for 2030

Safety	Fatalities <u>and</u> severe injuries	-60% *
	Cargo lost to theft and damage	-70% *

\* versus 2010 baseline

## EC's Road Safety Programme 2011 - 2020

- ▶ -50% of road fatalities until 2020

## European Transport Safety Council (ETSC)

- ▶ -40% of both fatalities and serious injuries until 2020

# Main Project Objectives and Deliverables



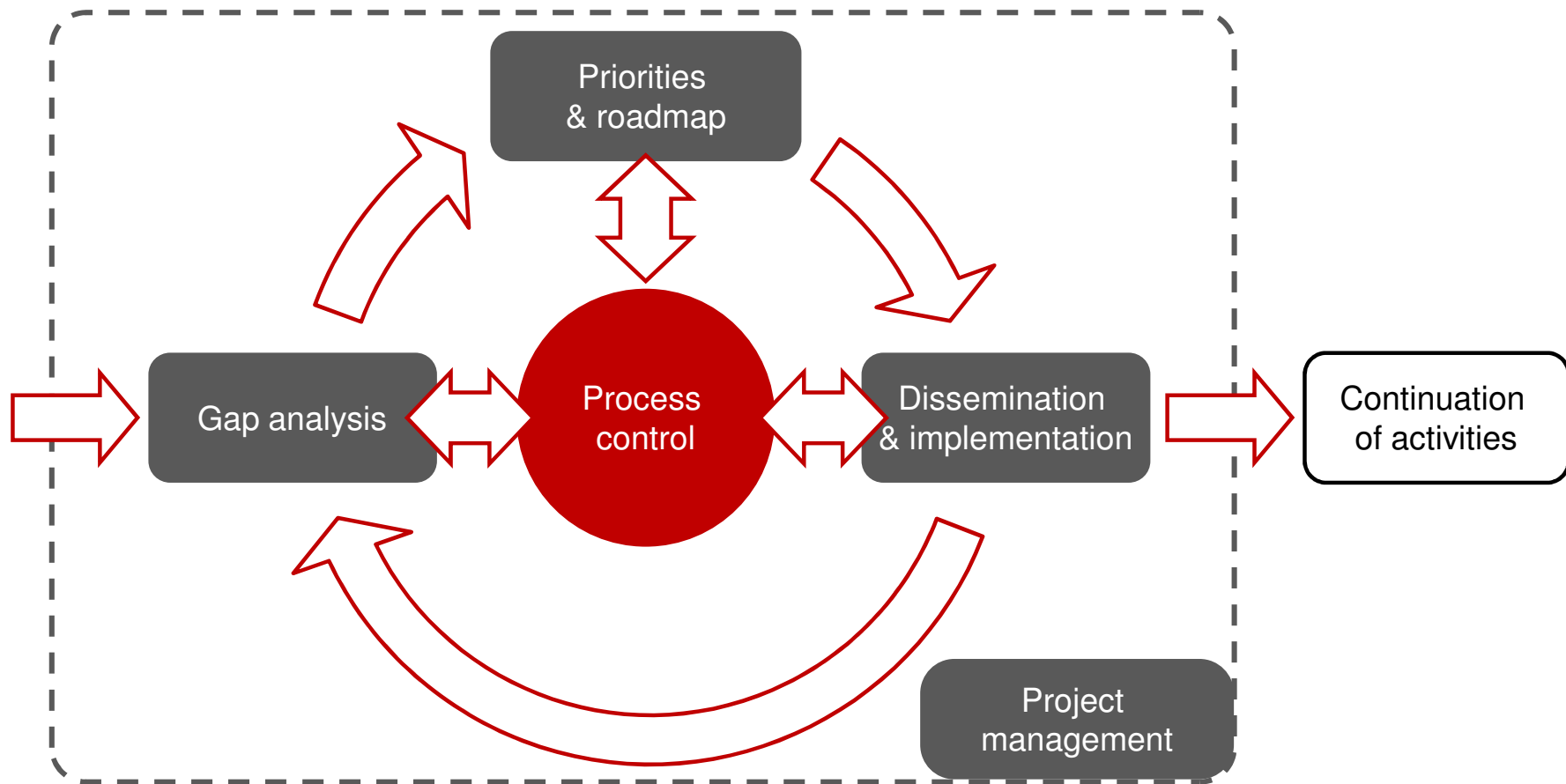
## **Main Objective:**

Creation of a pan-European network capable of setting commonly agreed priorities in European road safety research

## **Main Deliverables:**

- Focused, well-founded safety research roadmap
- Concrete suggestions for a limited number of research topics
- Clearly-defined, transparent process
- Dissemination to all relevant groups
- Mechanism to continue the activities beyond the project duration

# Project Structure



# Gantt Chart

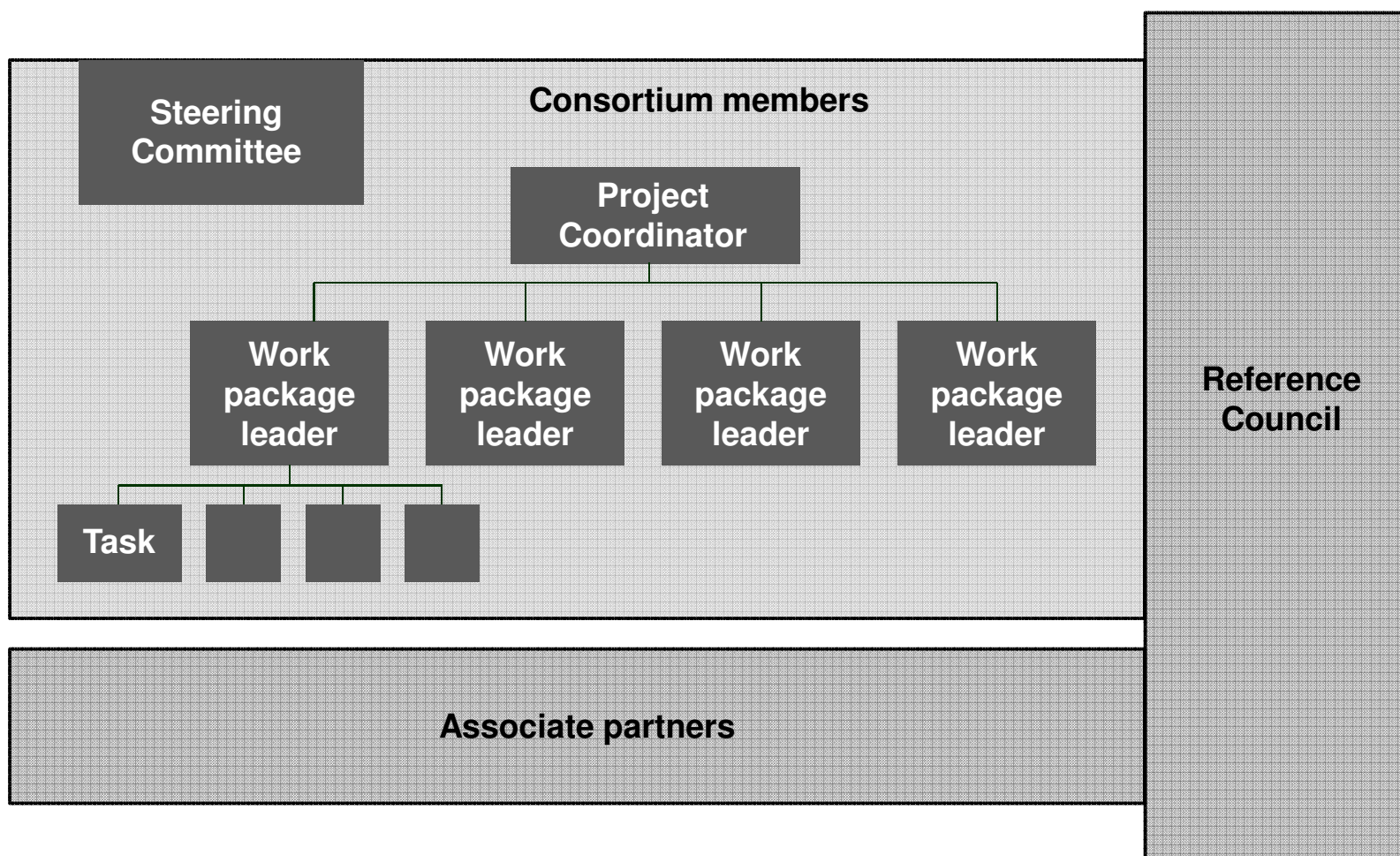


	Tasks/Activities	Month																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>WP1</b>	<b>Gap analysis</b>																								
1.1	Review of societal trends and scenarios																								
1.2	Collection of existing strategic research agendas and similar documents																								
1.3	Overview of current road safety research activities																								
1.4	Analysis, integration and structuring of the material from task 1.1 - 1.3																								
<b>WP2</b>	<b>Development of priorities and roadmap</b>																								
2.1	Working group management																								
2.2	Priorities setting																								
2.3	Roadmap																								
<b>WP3</b>	<b>Dissemination &amp; implementation</b>																								
3.1	Dissemination plan and activities																								
3.2	Events organisation																								
3.3	Electronic User Forum and website																								
<b>WP4</b>	<b>Process control &amp; continuation</b>																								
4.1	Process control / safety impact																								
4.2	Mechanism for continuation of activities																								
<b>WP5</b>	<b>Project management</b>																								
5.1	Daily project supervision by Coordinator																								
5.2	Project portal and infrastructure																								
5.3	Financial administration and progress management																								

today →



# Management and Governance Structure



# Agenda



Giving an overview of...

- ... what PROS is doing and why,
- ... who is involved,
- ... what are the main outcomes so far.

# Consortium Members



No.	Organisation Name	Represented Stakeholder Association
1	fka Forschungsgesellschaft Kraftfahrwesen mbH Aachen	CLEPA / EARPA
2	SAFER - Vehicle and Traffic Safety Centre at Chalmers	EARPA
3	Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek TNO	
4	Centro Ricerche FIAT S.C.p.A.	ERTRAC / EUCAR
5	Daimler AG	EUCAR
6	Ford Werke GmbH	
7	Autoliv Development AB	CLEPA
8	Robert Bosch GmbH	
9	European Road Transport Telematics Implementation Coordination Organisation S.C.R.L.	iMobility Forum
10	Loughborough University	ERSO
11	European Union Road Federation	ERF
12	Integrated Safety Network	ISN

# Stakeholder Involvement



## Representation in Consortium



## Associate Partners

- FERSI
- FEHRL
- European Cyclists' Federation
- European Blind Union
- Authorities
- Automotive industry
- Research organisations
- Academia
- ...

## External Stakeholders

- ACEM
- FEMA
- ETSC
- Euro NCAP
- ACEA
- FIA
- IRF
- IRAP
- Dutch Ministry of Transport
- UK Department for Transport
- German Transport Safety Council
- ...

# Agenda

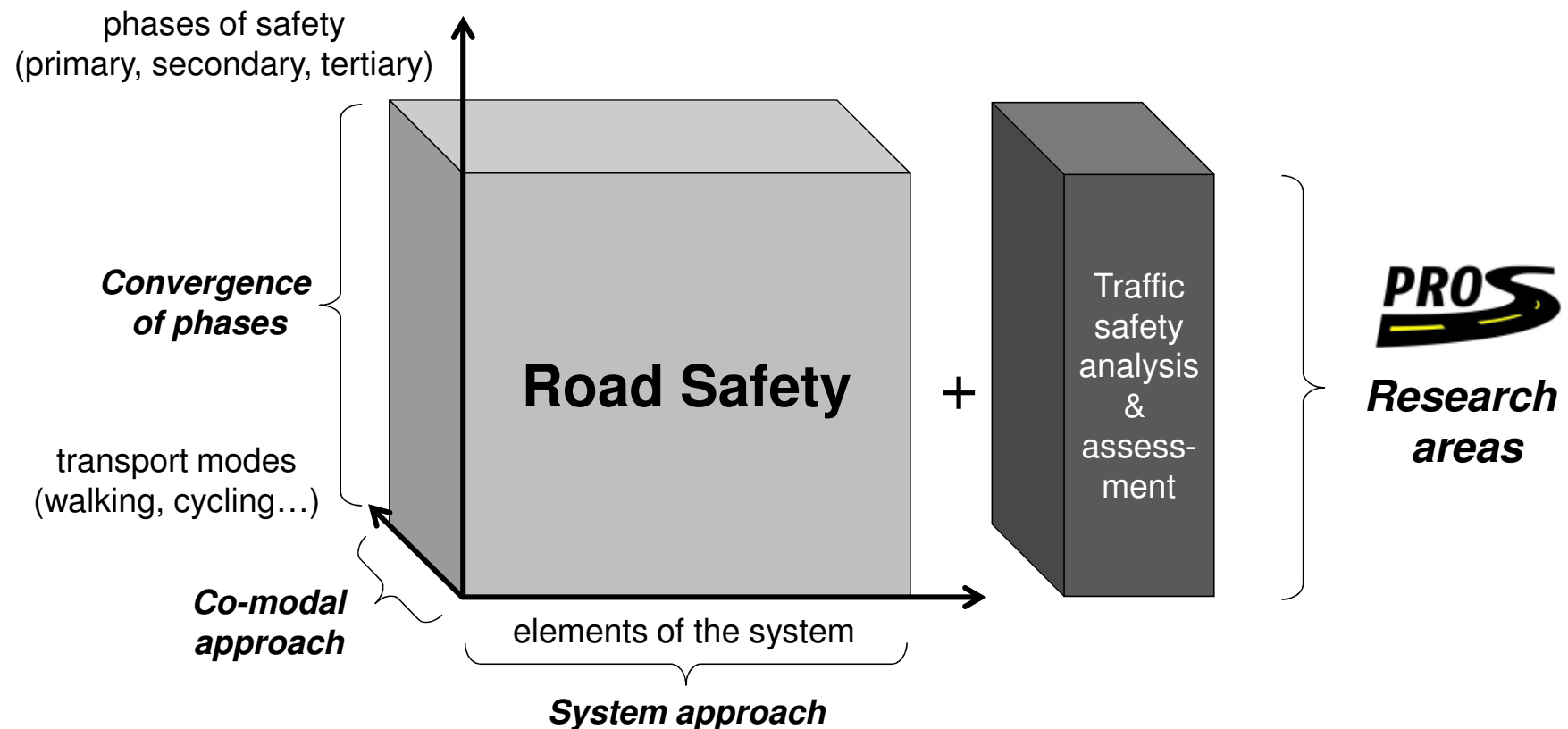


Giving an overview of...

- ... what PROS is doing and why,
- ... who is involved,
- ... what are the main outcomes so far.

# Collecting and Structuring Research Topics

- 359 road safety research needs collected
- Structured in 54 topics and 4 research areas



# Research Topics Gross List (Research Area “Human”)



Research Area	Topic	Research Needs
Human	<b>Biomechanics + injury modeling</b>	Injury criteria for neurological deficits incl. injury criteria for elderly, children and VRUs
		Passive and active (i.e. active muscles) human body models for safety assessment with biofidelic kinematics and realistic injury, incl. child models
		Testing tools for integrated safety. On the long term (+10 years) models should be suitable for multiple events and harmonized worldwide.
		Integrated assessment methodology for primary and secondary safety in global regulations and consumer testing
		New techniques for measuring properties of biomechanical material, injury criteria on tissue level, brain and whiplash injuries, child and elderly injuries, tolerances for organs and model based lower leg injury criteria, long term injuries. Link with crash dummy and human body model developments
		Better link between injury criteria in pedestrian component tests and real life/full-body
	<b>Next generation crash dummies</b>	Worldwide harmonized more biofidelic crash dummies for frontal and side impacts, incl. need for far side dummy in interaction with near-side
		One single new world-wide harmonized dummy family for adults and children addressing the most important impact modes (VRU accidents, front, side, rear, rollover ...) considering also future accident conditions and protection systems; THOR dummy; pedestrian/bicyclist/rider dummies
		Promoting further research of designing a crash test dummy suitable for the EN 1317 impact test (road restraint systems) in order to have a direct correlation between real-life-injury and severity level
	<b>Personal safety equipment for VRUs</b>	Ergonomic solutions to improve visual attention and conspicuity / perceptibility of VRU
		Design new personal safety system for VRU protection, in particular for the protection of cyclists incl. riders of electrically driven bikes, and specific systems for the protection of motorcyclists
		Protective garments for VRUs that become active when an imminent collision is detected (easy to handle and fitting comfortably under all weather conditions)
		Enhanced concept for motorcycling helmets to protect the rider from neck torsion while avoiding negative effects in terms of service operability performance
	<b>Analysis of road user behaviour</b>	Improving understanding of driver/rider behaviour (e.g. to anticipate driver/rider reactions and possible errors)
		Behavioural research on alcohol addiction, mobile phone use, driving under the influence of drugs / medicine / poli-drug use etc and road safety
		Analysis of the characteristics of users refusing seatbelts and child restraint systems
		Analysis of perceptual factors contributing to accident risk
		Long-term use of new technologies and driver adaptation / system effectiveness, incl. long-term adaptation to ADAS
		Long-term use of new technologies and rider adaptation / system effectiveness, incl. long-term adaptation to ARAS (following the path drawn by SAFERIDER and 2BeSAFE)
		Analysis of the degree of acceptance of new safety technologies to have a real impact on road safety, tackle the trade-offs between fun to drive and safety
		Analysis of the degree of acceptance of new safety technologies for motorcycles to have a real impact on road safety, tackle the trade-offs between fun to ride and safety taking into account the differences in HMI and dynamics between motor vehicles and motorcycles
		Analysis of driver interaction with advanced safety systems avoiding driver overload while simultaneously ensuring the driver remains engaged with the primary task
		Analysis of rider interaction with advanced safety systems avoiding rider overload while simultaneously ensuring the rider remains engaged with the primary task; consider the specific characteristics of motorcycling as opposed to car driving
		Improving understanding of prevalence of behaviours through surveys
		Analysis of potential safety implications of range anxiousness with EVs (possible conflicts between safe and energy-efficient driving)
		Analysis of the safety aspects of non-traditional transport means, e.g. skateboarders, skaters,....
	<b>Methodologies to analyse road user behaviour</b>	Methodologies for the assessment of Intelligent Transport Systems' impact on VRU safety

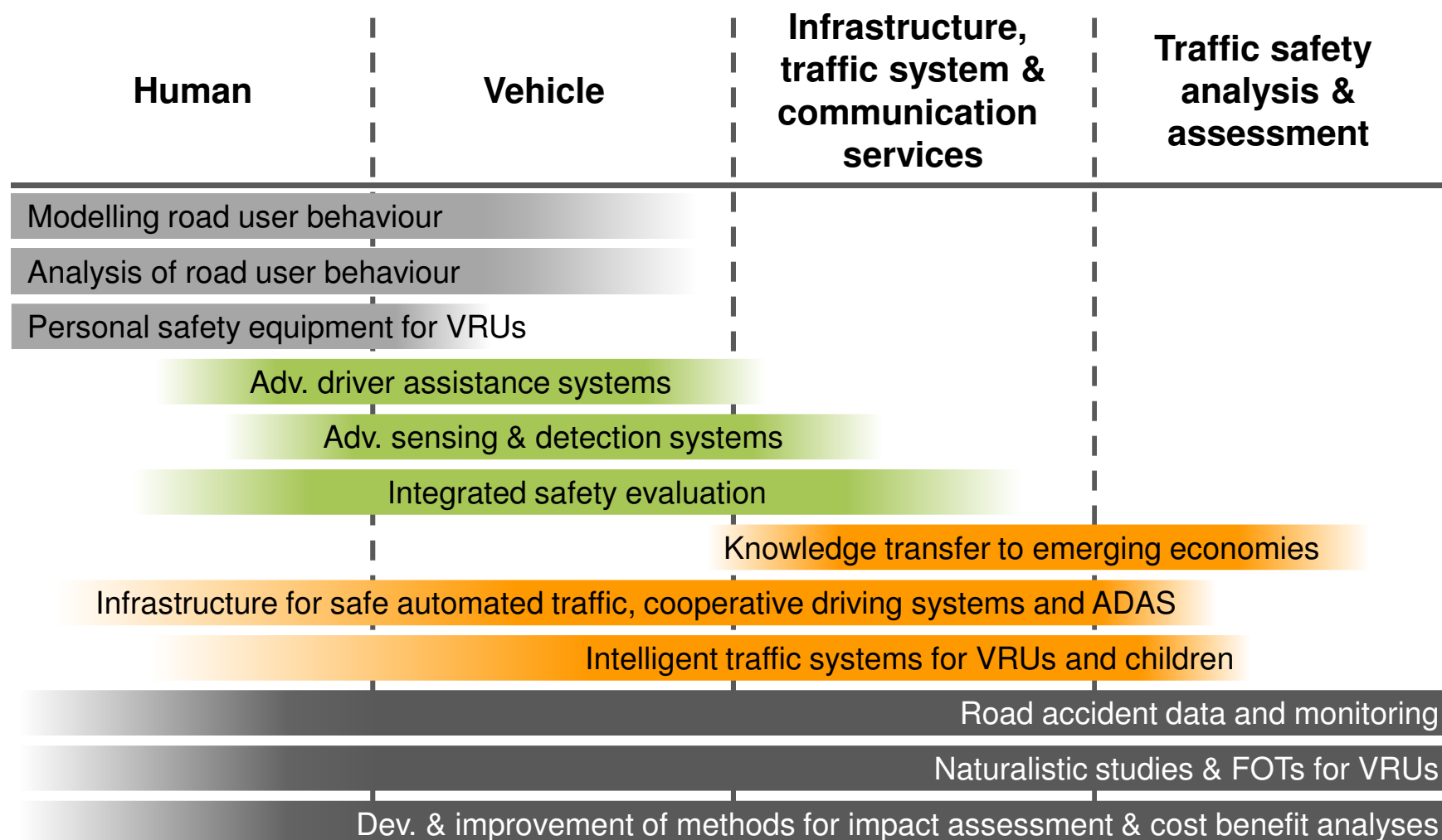


# Prioritisation Matrix (Research Area “Vehicle”)

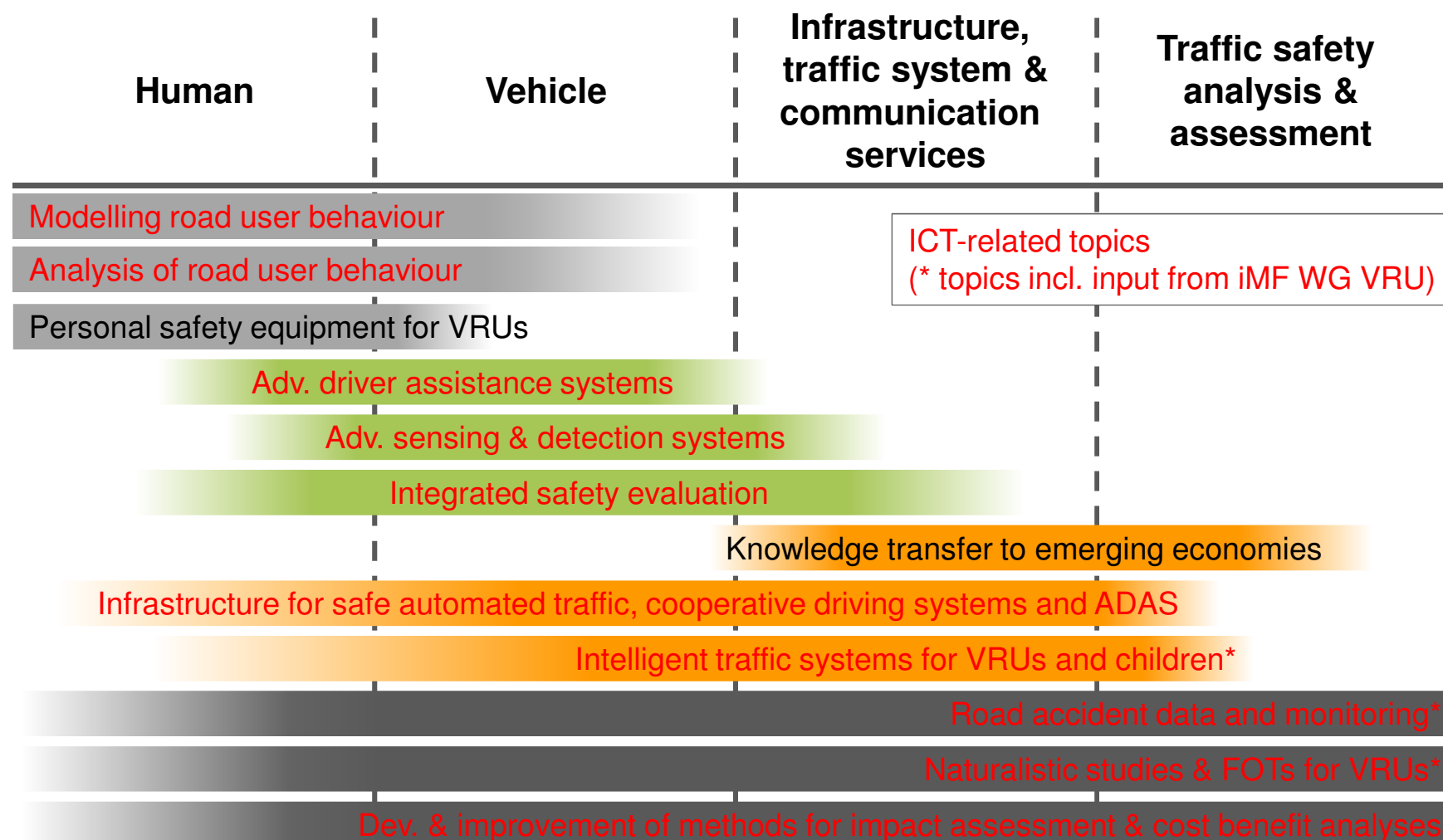


		4: Very high 3: High 2: Low 1: Very low						4: Very low 3: Low 2: High 1: Very high						4: Very short 3: Short 2: Long 1: Very long						4: Very high 3: High 2: Low 1: Very low						
		0	1	2	3	4	S	0	1	2	3	4	S	0	1	2	3	4	S	0	1	2	3	4	S	
Weighting factor:		3						2						1						1						
Research area:	Research topic:	Safety benefit (volume x effectivity)						Total costs (development, implementation, maintenance)						Time for measure to have effect						Level of innovation						Average total score
Vehicle	17 Advanced driver assistance systems	5	0	2	6	13	3,52	5	2	9	10	0	2,38	5	0	10	10	1	2,57	5	0	3	13	5	3,10	67%
	14 Advanced sensing and detection systems	4	0	1	9	12	3,50	5	0	15	6	0	2,29	5	1	10	10	0	2,43	5	0	1	11	9	3,38	66%
	11 Integrated safety evaluation	5	0	5	7	9	3,19	6	0	7	10	3	2,80	6	1	9	9	1	2,50	6	0	8	10	2	2,70	64%
	16 Driver monitoring and status-adaptive support systems	5	0	3	10	8	3,24	5	0	14	7	0	2,33	5	2	12	6	1	2,29	5	0	2	9	10	3,38	62%
	15 Safe HMI / HVI (Human Machine/Vehicle Interface) design	4	0	6	8	8	3,09	5	1	7	13	0	2,57	5	0	9	12	0	2,57	5	0	6	9	6	3,00	62%
	1 Vehicle-based systems for VRU safety	3	0	0	12	11	3,48	4	2	17	3	0	2,05	4	0	14	8	0	2,36	4	1	2	14	5	3,05	62%
	10 From primary, secondary and tertiary to integrated safety	7	0	3	10	6	3,16	7	0	13	4	2	2,42	7	1	13	5	0	2,21	7	0	2	13	4	3,11	60%
	18 Safe automated driving	5	1	3	6	11	3,29	5	9	6	3	3	2,00	5	9	9	3	0	1,71	5	0	0	5	16	3,76	59%
	9 Virtual testing for crashworthiness incl. validation methods/protocols	7	3	4	10	2	2,58	7	1	3	12	3	2,89	7	0	8	10	1	2,63	7	1	4	11	3	2,84	57%
	12 Intelligent vehicle dynamics	6	1	6	9	4	2,80	6	0	14	6	0	2,30	6	2	8	9	1	2,45	6	0	1	11	8	3,35	56%
	2 Safe PTWs	5	1	7	6	7	2,90	5	2	12	7	0	2,24	5	0	16	4	1	2,29	6	0	2	10	8	3,30	56%
	3 Safe bicycles incl. electric bicycles	5	2	5	10	4	2,76	5	0	10	9	2	2,62	5	1	14	5	1	2,29	6	0	5	12	3	2,90	56%
	13 Safe interaction with the road	8	1	3	10	4	2,94	8	1	13	3	1	2,22	8	2	10	5	1	2,28	8	0	6	6	6	3,00	55%
	19 Effects of automated vehicles and cooperative systems on other road users	4	0	6	10	6	3,00	6	6	6	7	1	2,15	5	10	9	2	0	1,62	6	0	0	9	11	3,55	55%
	20 Safety of goods transport	5	1	9	8	3	2,62	5	1	7	11	2	2,67	5	1	9	11	0	2,48	5	0	10	8	3	2,67	54%
	5 Crash compatibility and crashworthiness of light and/or new vehicle concepts	7	0	3	9	7	3,21	7	7	8	4	0	1,84	7	3	11	5	0	2,11	7	0	6	11	2	2,79	53%
	8 Specific safety issues of alternatively powered vehicles	3	2	10	9	2	2,48	4	1	12	9	0	2,36	4	2	14	6	0	2,18	5	0	3	10	8	3,24	50%
	4 Advanced occupant protection systems	7	2	3	10	4	2,84	7	7	9	3	0	1,79	7	0	11	8	0	2,42	7	1	3	10	5	3,00	50%
	7 Vehicle lighting	8	3	6	9	0	2,33	8	0	7	9	2	2,72	9	1	9	7	0	2,35	7	2	8	8	1	2,42	49%
	6 Safety of mobility scooters	8	8	6	3	1	1,83	8	0	8	8	2	2,67	8	1	10	7	0	2,33	8	1	8	8	1	2,50	41%

# Preliminary High Priority Topics



# Preliminary High Priority Topics



# Next Step: 2<sup>nd</sup> Prioritisation Loop based on One-pager of each Topic



One-pagers provide details on:

- Motivation of the respective topic
- Research needs / aspects to consider
- Expected impacts
- Recommended funding level and instrument
- Comments by partners

Research Topic Description	
<b>Topic:</b> Analysis of road user behaviour	
<b>Motivation:</b>	
<p>A NHTSA study released in 2006 already indicated that nearly 90% of crashes and 85% of near-crashes involved some form of driver inattention within three seconds before the event. Inattention and distraction of road users (not only drivers) are apparently a major cause of critical situations and erroneous decisions in such situations. Most accidents are related to road user behaviour and in order to be capable to influence behaviour of road users (e.g. by regulations, advanced driver assistance systems, training, etc.) detailed insight and understanding in this behaviour is required.</p> <p>A prerequisite to make road traffic safer is an increased understanding of the behaviour of all different kinds of road users incl. drivers, riders (motorbike and moped), pedestrians, bicyclists and users of non-traditional means of transport (mobility scooters, skateboard, ...) in interaction with the traffic environment. If behaviour is better understood, lives can be saved and severe injuries can be prevented. Typical questions to be answered to increase the understanding of road user behaviour are:</p> <ul style="list-style-type: none"> <li>- What is the most typical behaviour in normal and critical situations?</li> <li>- Which parameters influence behaviour most?</li> <li>- How should the environment and vehicle systems be designed to provoke the desirable behaviour?</li> </ul> <p>Knowledge on the (interacting) parameters that define road user behaviour and the effects of environmental, vehicle and policy characteristics on road user behaviour, is essential to generate measures that ensure safe road user performance, to anticipate road user responses and to eventually reduce the number of errors and conflicts on the road.</p> <p>Not only behaviour in critical or near critical situations needs to be considered. Other factors which should be studied with regard to their influence on behaviour are the use of medicines, drowsiness, prevalent behaviour that causes unsafe situations (e.g. the refusal to use seatbelts, or switching off on-board safety features). Also the adaptation of road users to new safety technologies incl. the change in effectiveness as a result of adaptation should be analysed.</p>	
<b>Research needs / aspects to consider:</b>	
<ul style="list-style-type: none"> <li>• Study the parameters that influence driver/ride state, i.e. investigate intra-individual variation in terms of the following factors: fatigue, drowsiness, and the use of medicines, and how these factors influence driver/ride state, and what the resulting impact on road safety is.</li> <li>• Based on such knowledge, policy measures as well as design-guidelines (e.g. the design of systems that detect undesirable driver states and correct that behaviour) can be developed. Policy measures include measures which influence opinions, attitudes and behaviour accordingly concerning driver state and driving. Design guidelines relate to technical systems that can detect undesirable driver states.</li> <li>• As a result of the increase of in-car applications, a specific undesirable (side) effect that needs to be investigated is the influence on driver/ride performance due to an over-load or under-load of information and driving tasks.</li> <li>• Research into the acceptance of, the interaction (also misuse) with, and the adaptation to advanced safety systems for drivers and riders. Key aspect is how the driver/ride's use of the advanced safety system influences the effectiveness and performance of the system over time.</li> <li>• Issues such as motivation and conscious choices based on the road user's experience, expertise, attitude and risk awareness in conjunction with the standards and norms that exist in society and in the immediate social group should be studied.</li> <li>• Non-traditional transport modes, such as skateboards, skates, and Segways (personal mobility devices) become more and more popular. This changes the composition of the traffic environment and the interaction between road users. Moreover, these new traffic modes often involve a higher vulnerability in traffic. In order to establish a safe, comfortable and comprehensible traffic environment for all, knowledge should be developed on the (future) penetration rates and behavioural effects of these new transport means on the traffic system. Based on these insights, recommendations can be developed concerning road design, vehicle design and regulations.</li> </ul>	
PROS SC52-GA-2012-314427-PROS	

Research Topic Description	
<b>Expected impacts:</b>	
<ul style="list-style-type: none"> <li>• Insight in the diverse behavioural patterns of road users and traffic participants is the necessary first step in the development of measures and methods to influence behaviour in all possible ways, whether it is regulations, training, information, in car support systems, warning systems, etc. all with the purpose to increase road safety in a cost effective way without compromising mobility.</li> <li>• The analysis of road user behaviour leads to a welcome side effect, as these analyses enable the implementation of technologies that result in an increased feeling of comfort which stimulates the acceptance of safety systems as they are becoming capable to adapt to each specific user with his or her specific needs and wishes.</li> <li>• Furthermore, technology development that includes the role of road user behaviour is highly innovative and knowledge on road user behaviour is of vital importance to make automated driving a true success.</li> </ul>	
<b>Funding level and instrument:</b>	
IP, STREP	
<b>Comments by PROS partners:</b>	
Autoliv:	Important topic that can drive the definition and development of various safety technologies. Assumes that there are related topics in some parallel research topics, e.g., "Cultural aspects of road safety", "Enforcement, incentives and corresponding communication to influence road user behaviour", "The older person/ disabled person", "Training of road users", etc. Coordination and cross-fertilisation between these research areas may be beneficial.
ECTH Safety:	This topic would gain from adapting a broader cross model perspective. The issue of behavioural adaptation also needs to be considered, i.e. research about the user of the transport system as an active participant.
CDV: SAFER:	Need for update research based data in this very important field. Driver behaviour is not a new topic – what is the specific knowledge gap that needs to be filled? A focus on "normal" driving would be positive. Opposite against the claim that the main cause of accidents is behaviour. It is an interplay between factors. A better understanding of this interplay is required.
Velvo:	The topic is too general. SHRP2's focus is driver behaviour and it did a break-down of driver behaviour research needs. I think that the current proposal may be motivated had it not been for UDRIVE (the EU version of SHRP2 which SAFER is a major partner) which I think the EU will view as the strongest project in EU on driver behavior in general. Research topics must be complementary to e.g. UDRIVE or SHRP2.
<b>Comments by PROS partners (based on topic descriptions list):</b>	
ACEM:	Better understanding of human factor is important.
Daimler:	Analysis of road user behaviour is an enabling technology.
ECF:	Behaviour (inattention/distraction/tiredness etc.) is one of the main causes of motor-vehicle accidents.
FEMA:	It is a prerequisite for any other road safety measures.
ISV:	Very important, long term impact on fatalities and injuries.
SWOV:	Far too diverse to score, behaviour is no 1 reason for crashes.
PROS SC52-GA-2012-314427-PROS	

## Contact



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Internet [www.pros-project.org](http://www.pros-project.org)

# Powered Two-Wheelers

## Clean and efficient multimodal mobility

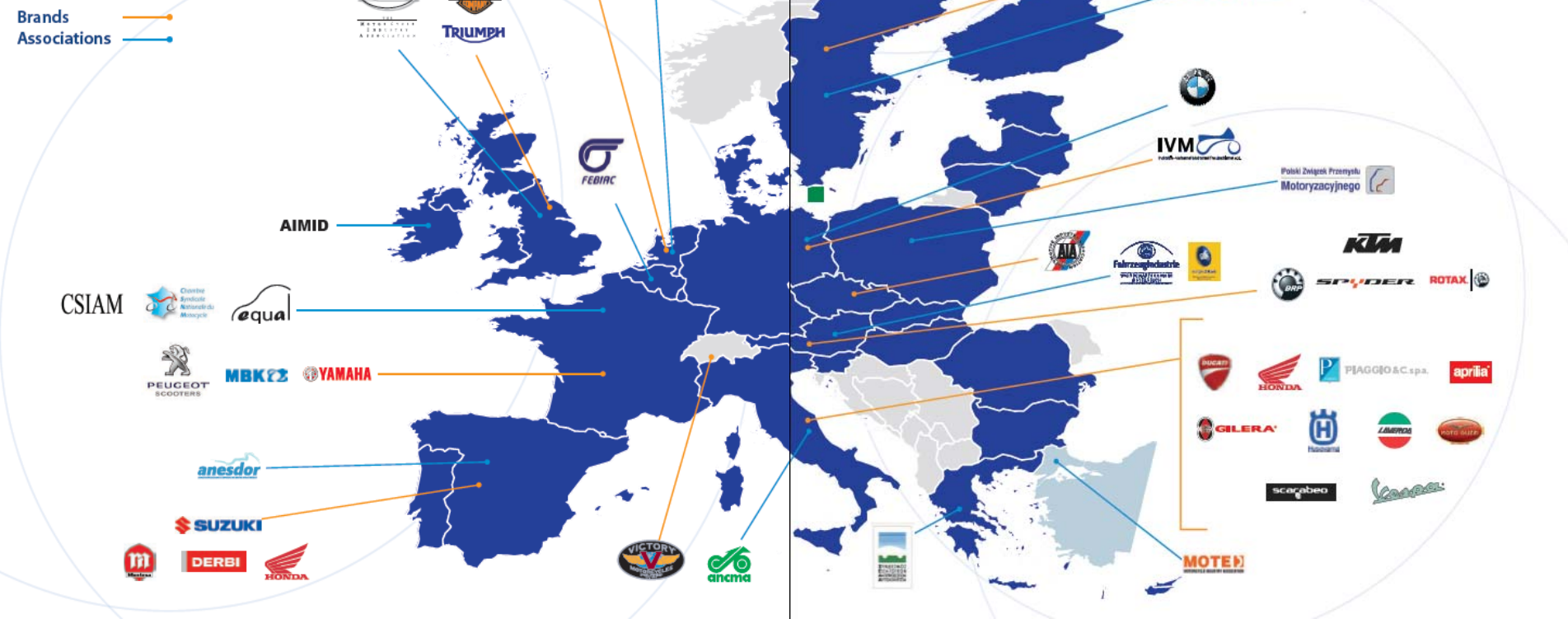
Workshop “ICT design for clean and efficient multimodal mobility”, Decomobil  
28<sup>th</sup> May 2013, Munich





## The Motorcycle Industry in Europe

### ACEM Members





# L-category vehicles

2-Ws



L1



L3



3-Ws



L2



L4



L5



4-Ws



L6 / L7



# 37 million users in EU 27

**VULNERABLE  
ROAD USERS**

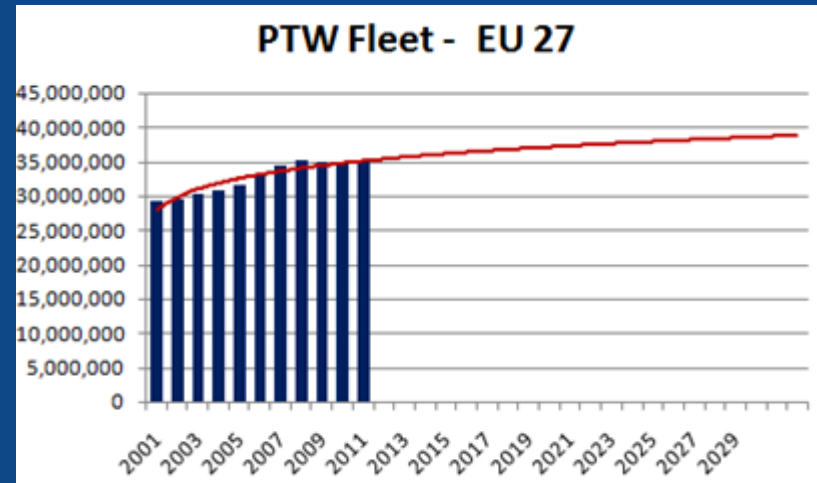
**More and more EU  
citizens using PTW  
for commuting**



**Diversity of vehicles, owners and purposes  
Commuting, Leisure, Sport**

# Powered Two-Wheeler (PTW) Fleet

- 37 million units in 2011, up to more 40 million units in 2030
- Three main drivers:
  - Growth of urban areas (85% of the EU population in 2030)
  - Growth of individual mobility needs
  - Current mobility offer limited (public transport/ infrastructure/public budget)



# Mobility = Quality of Life

Mobility cannot  
be given up

## ► Evolution of mobility needs lead to congestion



(Ambrosetti , 2005)

# Can Motorcycling be part of the solution?



# Mobility is Complex

LABOUR and SOCIAL  
MOBILITY

Cars can play a role but lead to congestion

PTWs can play a role with different perspective and arguments

**EFFECTIVENESS and EMOTION**

# Sustainable Mobility

► Smaller



► Lighter

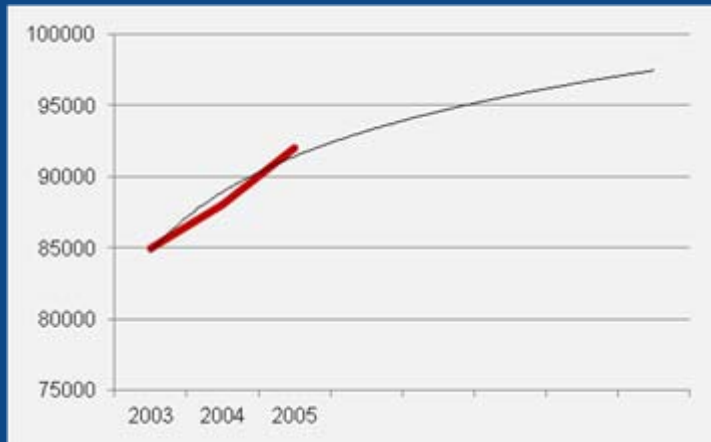


► More specialized



# Madrid

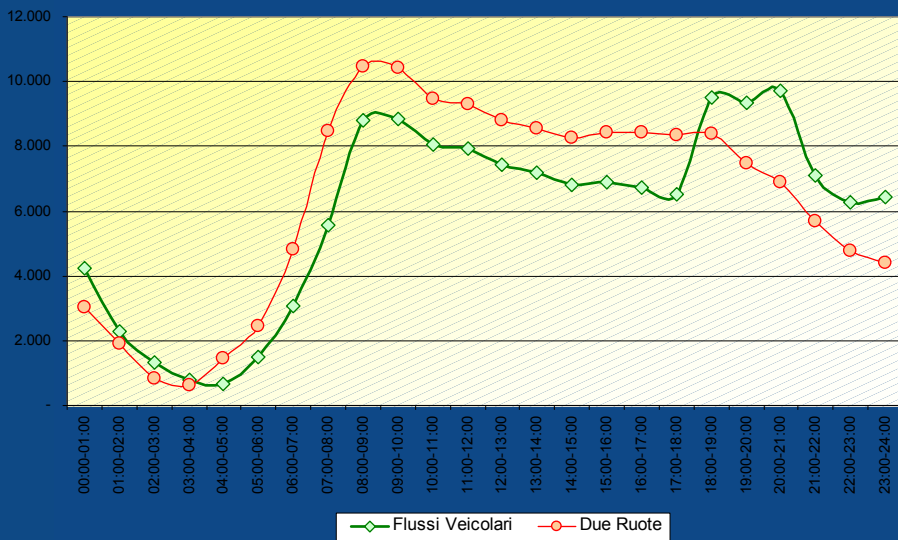
- ▶ Supporting the PTW traffic growth
- ▶ +20% over the decade



(Atutamiento de Madrid, 2007)

# Rome

## Predominance of PTWs in certain areas



(ATAC, 2007)

# Barcelona

- ▶ PTWs' role in the transport system of the City acknowledged by the City Council
  - 28% of the private motorized transport is carried out by PTWs
  - 248,000 trips a day
  - 40,000 parking places dedicated to PTWs



(Barcelona City Council, 2006)

# London

- ▶ Estimated 50,000 journeys a day now being made by motorcyclists in the Transport for London Road Network bus lanes
- ▶ Benefits include
  - Reduced journey times,
  - Less carbon dioxide emissions.
- ▶ The safety of motorcyclists and other vulnerable road users is unaffected.



(Transport for London, 2012)



# Paris



- ▶ In “Parisian” traffic conditions : average speed for PTW is twice a car : 42 km/h vs 21km/h  
(additional average car parking time of about~ 16 mn)
- ▶ PTW have potential for best fuel consumption and GHG emissions

(ADEME, 2005)



# New Approach Individual Mobility

- Paris: +27% of trips ensured by PTWs between 1996 and 2000 resulting in a positive c/b ratio (Prof. Kopp, La Sorbonne)
- Brussels area: no more traffic jams with 25% modal shift to PTWs, with overall positive c/b ratio (Prof. Yperman T&M Leuven)



# Paris



## Positive Cost/Benefit of the shift to PTWs 1996/2006

Time gains	24 millions
Cost of accidents	-8 millions
Public Finance	-4 millions
Pollution	-7 millions
Balance	+5 millions

(Kopp & alii, 2008)



# Impact on traffic congestion

## Case study Leuven-Brussels



- Impact modal shift (10%) on traffic congestion:
  - Queues are shorter and disappear more quickly
  - Total time losses reduced by 40%
  - Time benefits on Belgian highway network: 50 M€/year
  - Total emission costs 20% lower for recent motorcycles

(Transport & Mobility Leuven, 2012)

# Conclusion

- ▶ PTWs bring a significant contribution to Urban Mobility reaching 10 up to 20% of the daily trips according to cities
- ▶ The contribution includes transport of persons and goods



# PTWs: SMART Choice For Urban Mobility



## Many Intrinsic Advantages

- Smaller, PTWs use land more efficiently
  - optimize existing infrastructures
  - produce less damages to roads
- Lighter, PTWs are cost efficient
  - Cheaper to produce and operate
  - Fuel efficient
  - Agile in congested areas
- More specialized, PTWs respond to mobility needs  
(EU 27, over 60% of journeys - commuting, average occ rate -1.1 per vehicle)



# Future Developments will Boost Modal Shift

**Main trends will contribute to:**

- Reducing environmental impact through cleaner PTWs and a higher proportion of ultra low and zero emission vehicles



- Improving Road Safety



- Offering more convenience



# Powertrain: from Cleaner Engines...

## Optimization of ICEs

- Sophisticated engine management
- Deployment of low friction techniques
- Downsizing



Honda 125cc scooter engine:  
A 25% more fuel efficient



Piaggio 350cc scooter engine  
Power output similar to the 460cc engine



# Powertrain: from Cleaner Engines...

- Development of hybrid propulsion

## Key figures

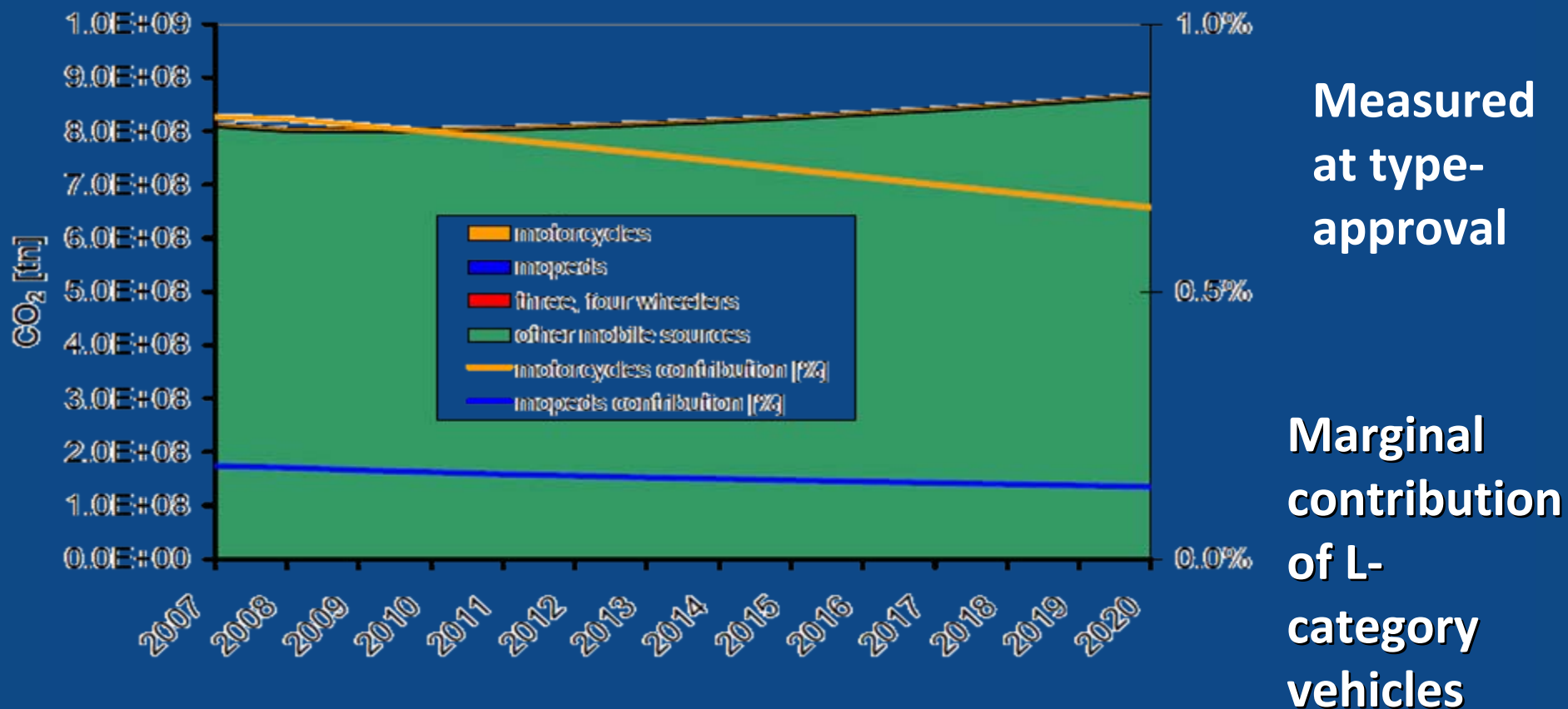
PTW contribution to CO<sub>2</sub> emissions of transport <2% (LAT 2008)

PTWs emit 50% less CO<sub>2</sub> than passenger cars (ADEME 2008)



Piaggio hybrid electric scooter  
Fuel consumption 60km/l CO<sub>2</sub> emissions 40g/km

# PTW CO<sub>2</sub> Contribution to all Transport Modes





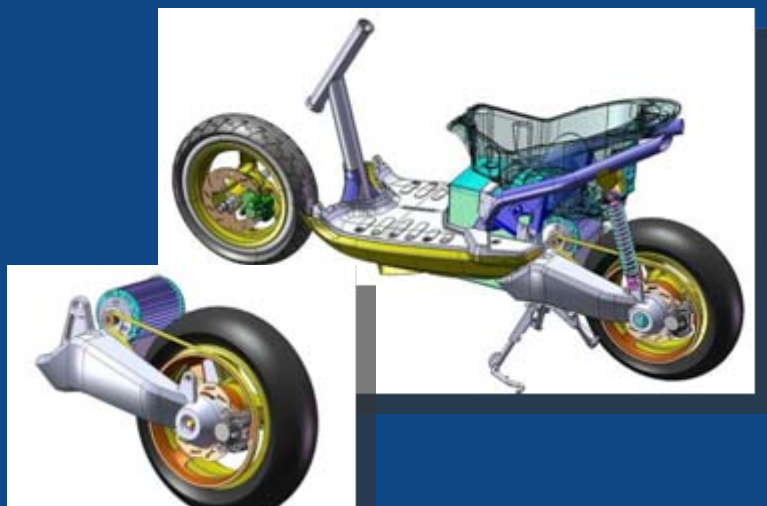
# Powertrain: to Zero Emission Engines...

## Deployment of electric propulsion

- From moped electric powertrain
- To maxi scooter electric powertrain

### Key figures

- ePTW Market near 15,000 units in 2011
- 50,000 in 2020
- Over 100,000 in 2030



Peugeot electric scooter powertrain  
4kW 100 km range 0.4 EUR per 100 km

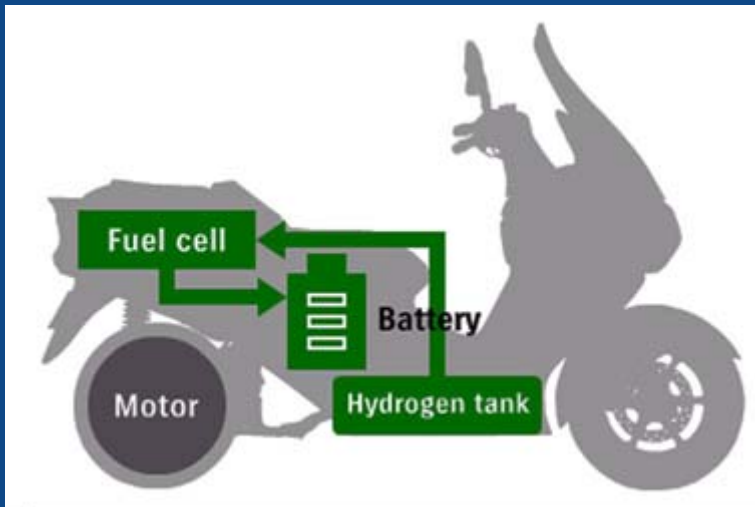


BMW eScooter project  
Dynamic behaviour of ICE maxi scooter

# Power train: to zero emission engines...

- Application of fuel cell

Yamaha concept of Direct Methanol Fuel Cell (DMFC) System eliminates the need for a converter and a pressurized (fuel) tank

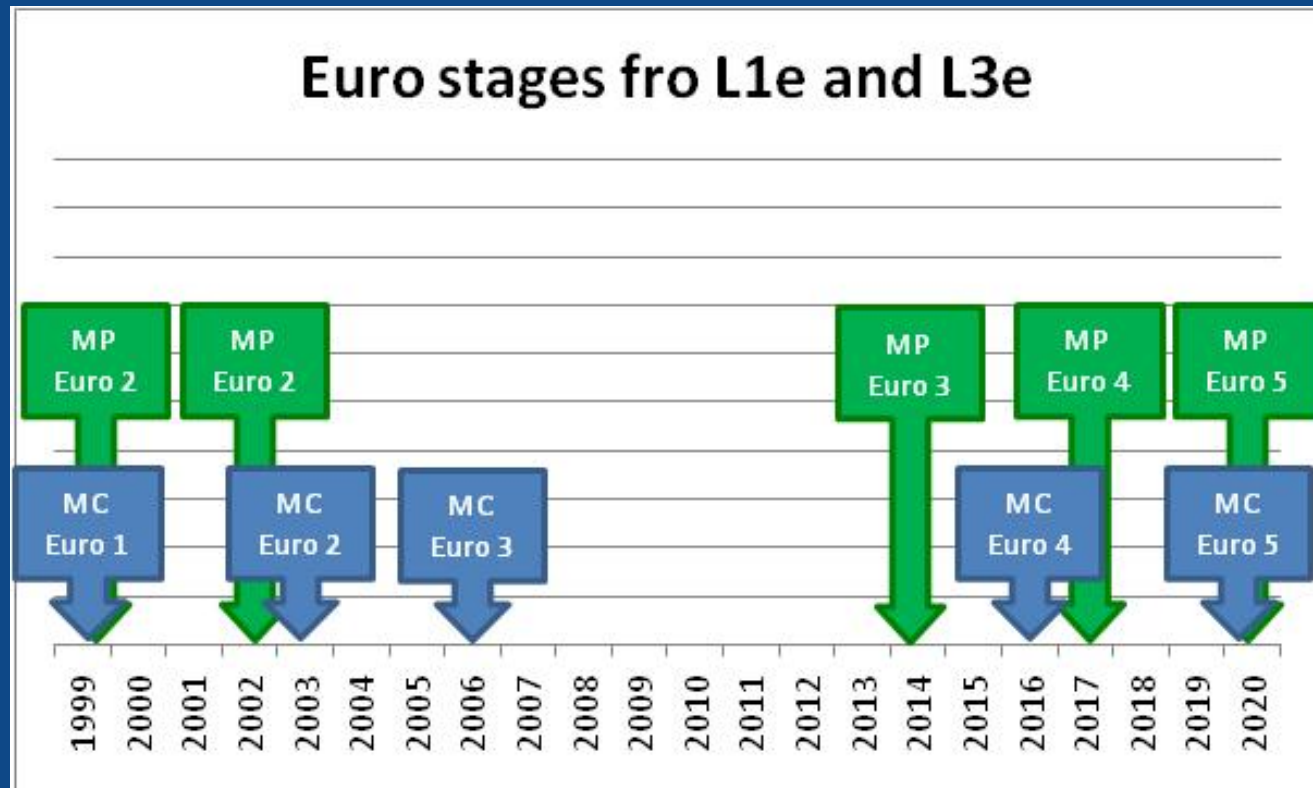


Suzuki scooter fuel cell technology concept  
Range of 350km comparable to a  
conventional Burgman scooter

# Emission limits

Calendar - recently adopted FW regulation

- MP = Mopeds - MC = Motorcycles
- 2020 parity with cars





# Lighter, smaller, cleaner specialized

2030 –  
PTWs will keep  
their  
fundamental  
intrinsic  
advantages!





REDUCING CONGESTION AND TRAVEL TIMES

**Thank you for your attention!**

**Dr. Veneta Vassileva, Safety Coordinator, ACEM**

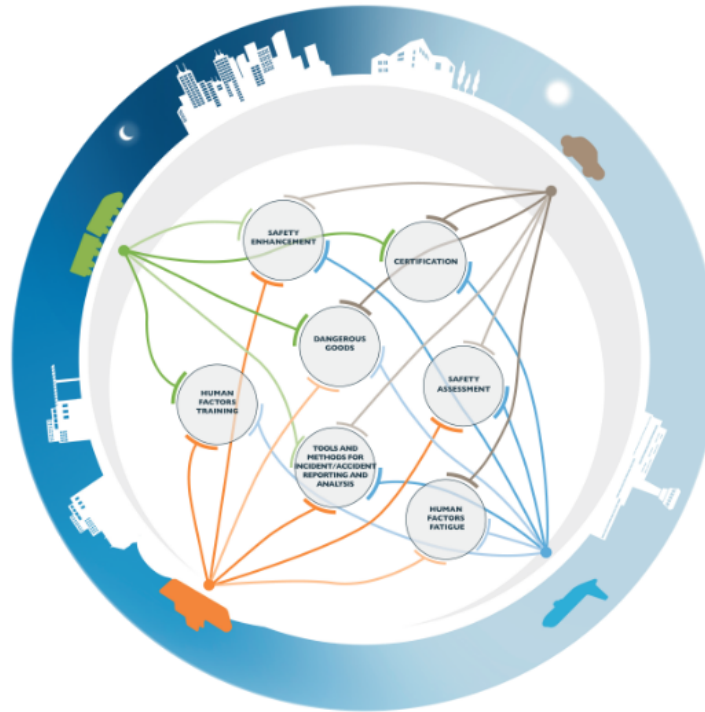
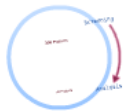
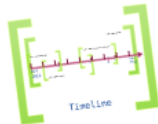
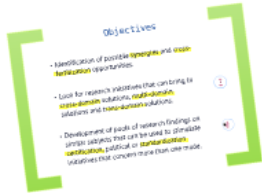
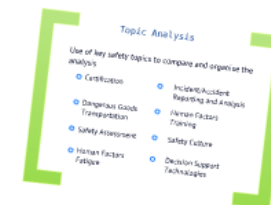
[v.vassileva@acem.eu](mailto:v.vassileva@acem.eu)



# EXCROSS

Exploiting safety results across transportation modes

Simone Pozzi - Sara Silvagni  
Deep Blue srl



## Objectives

- Identification of possible synergies and exploitation opportunities
- Look for research initiatives that can bring to stakeholders valuable, reliable, and actionable solutions and recommendations
- Development of pools of research findings on specific subjects that can be used to generate valuable, reliable, and actionable solutions and recommendations

## Approach

- Collection of safety R&D projects and initiatives (EU and national):
  - Pre-screening and ranking
  - Shortlist based on relevance and availability of data
  - In-depth analysis and comparison

## Topic Analysis

- Use of key safety topics to compare and organise the analysis
  - Certification
  - Dangerous Goods Transportation
  - Safety Assessment
  - Human Factors Fatigue
  - Incident/Accident Reporting and Analysis
  - Human Factors Training
  - Safety Culture
  - Decision Support Technologies

# EXCROSS

EXploiting safety results aCROSS  
transportation modes

Simone Pozzi - Sara Silvagni  
Deep Blue srl









The Idea

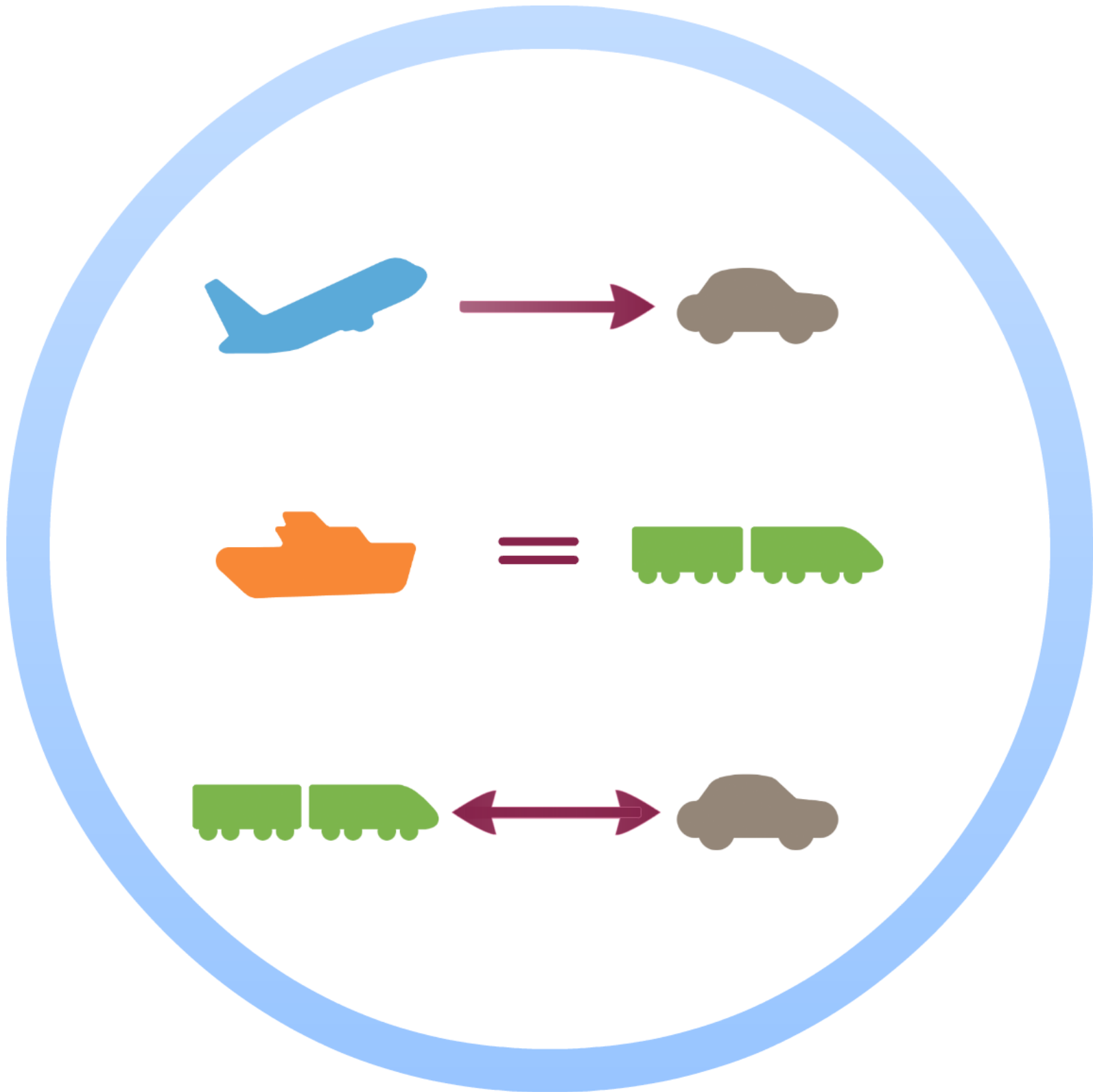
# Objectives

- Identification of possible synergies and cross-fertilization opportunities.
- Look for research initiatives that can bring to cross-domain solutions, multi-domain solutions and trans-domain solutions.
- Development of pools of research findings on similar subjects that can be used to stimulate certification, political or standardization initiatives that concern more than one mode.



# Objectives

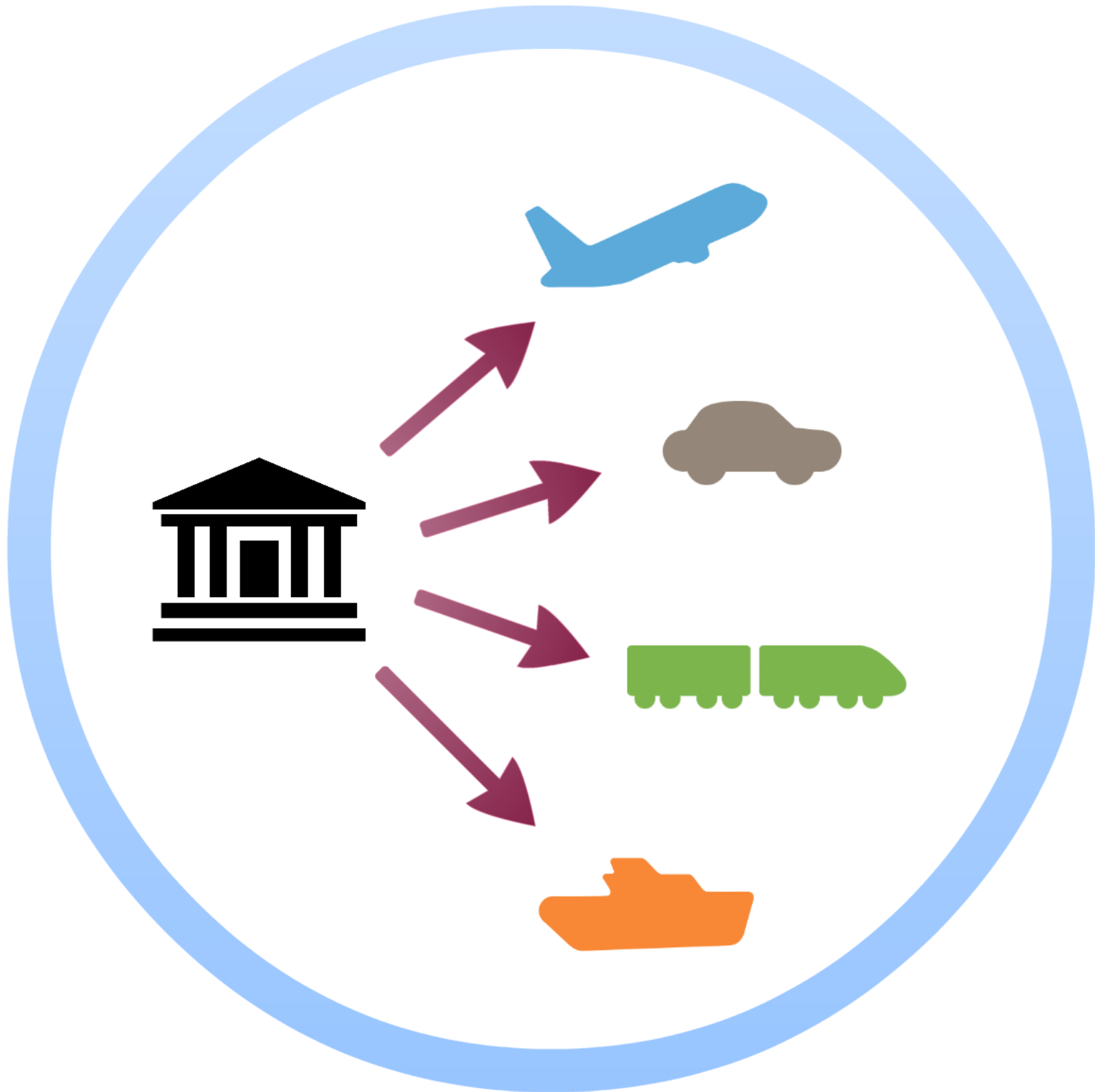
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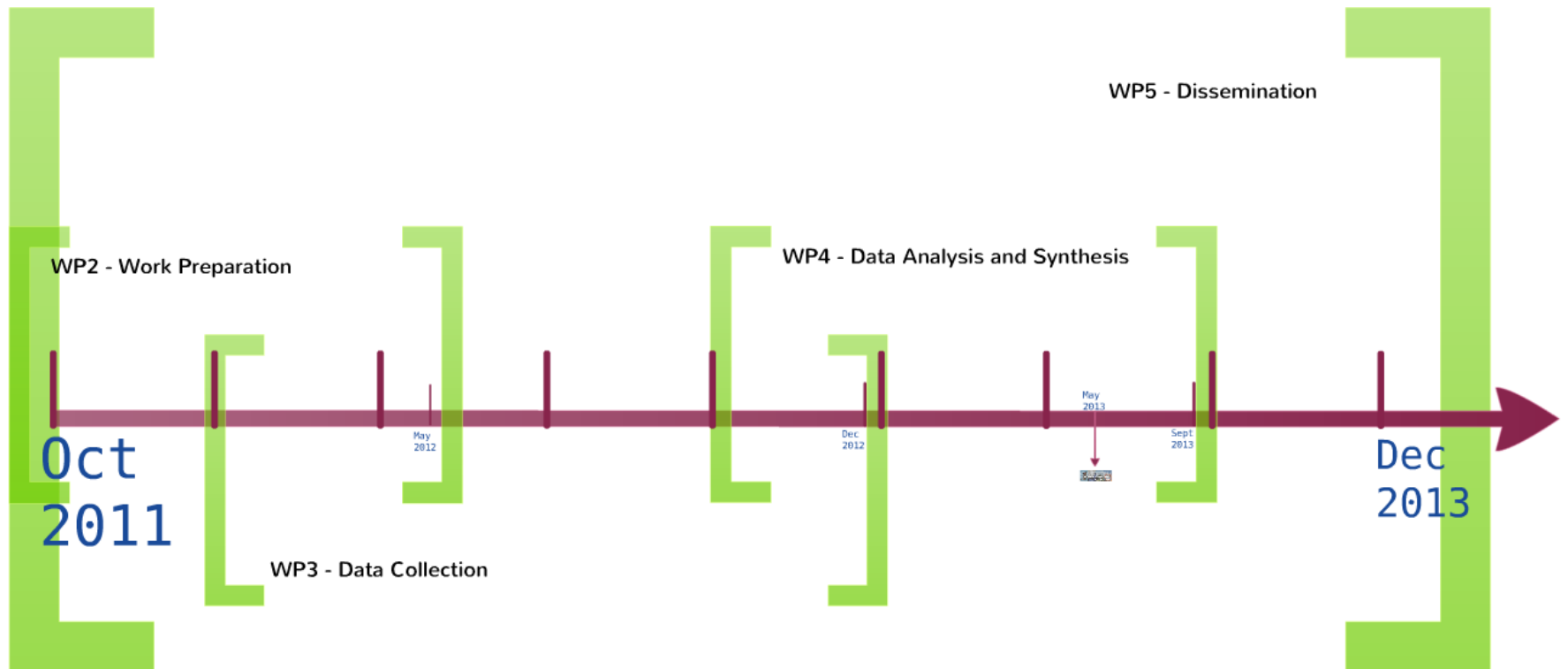




- Look for research initiatives that can bring to cross-domain solutions, multi-domain solutions and trans-domain solutions.
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# Timeline

# Approach

Collection of safety R&D projects and initiatives (EU and national):

- Pre-screening and ranking
- Shortlist based on relevance and availability of data
- In-depth analysis and comparison

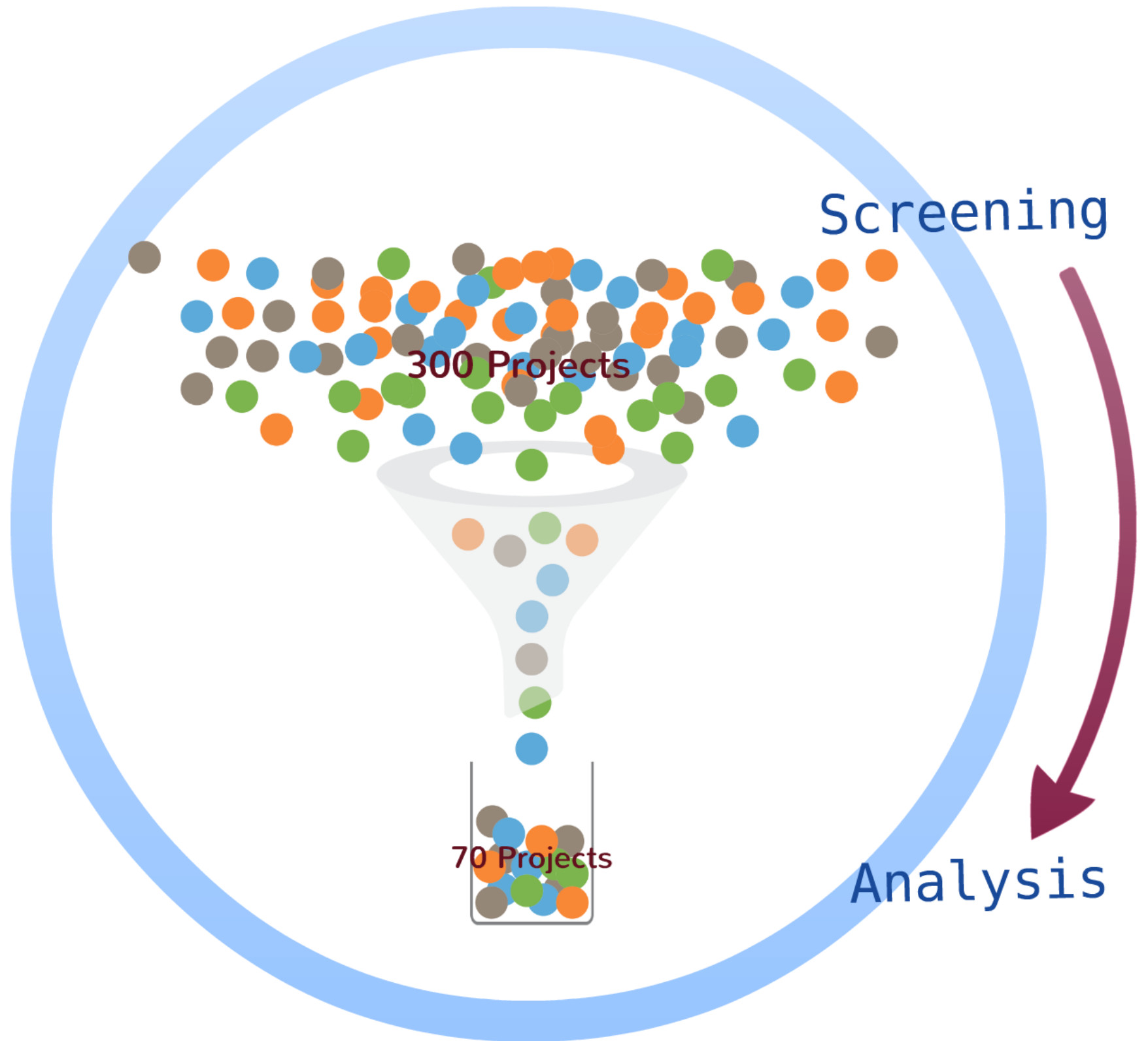
300 Projects

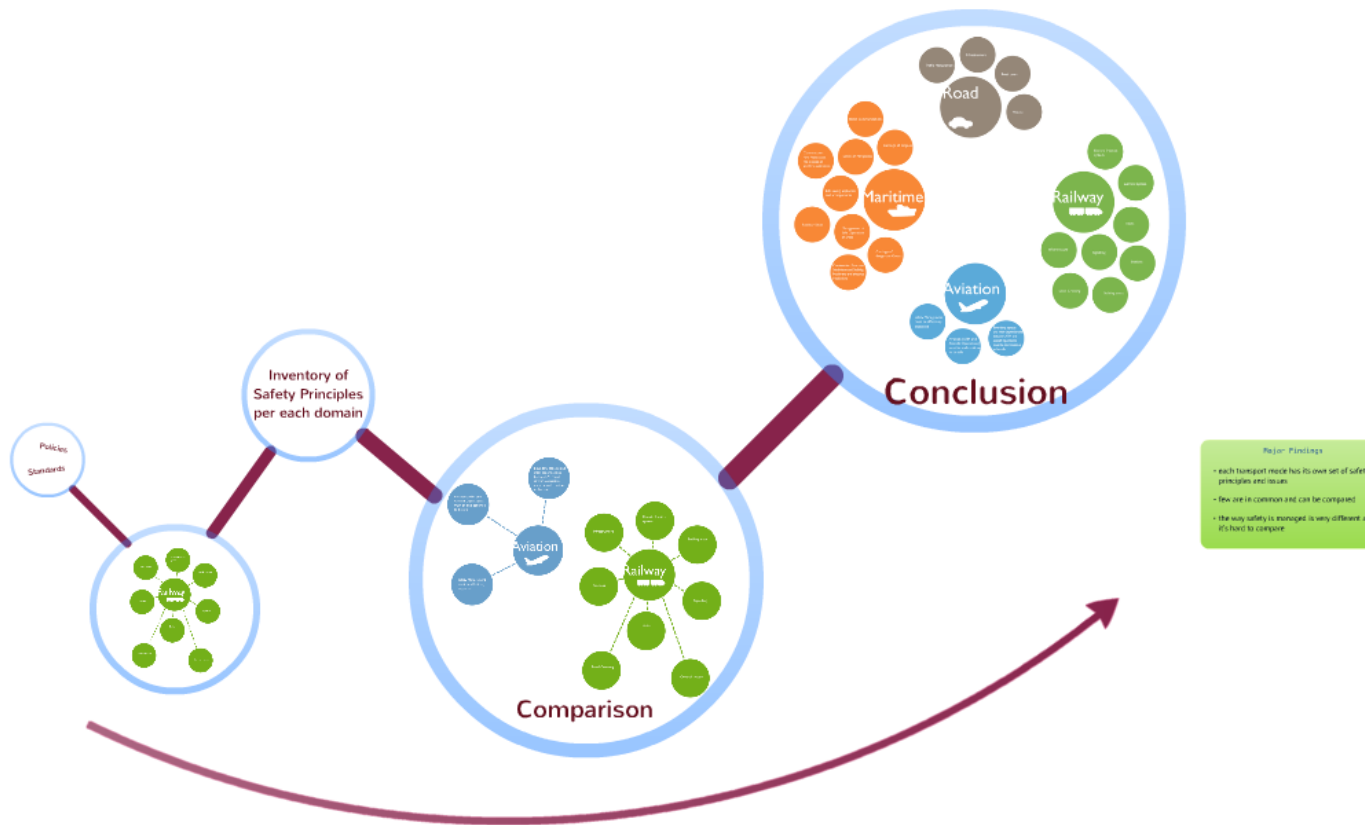


70 Projects







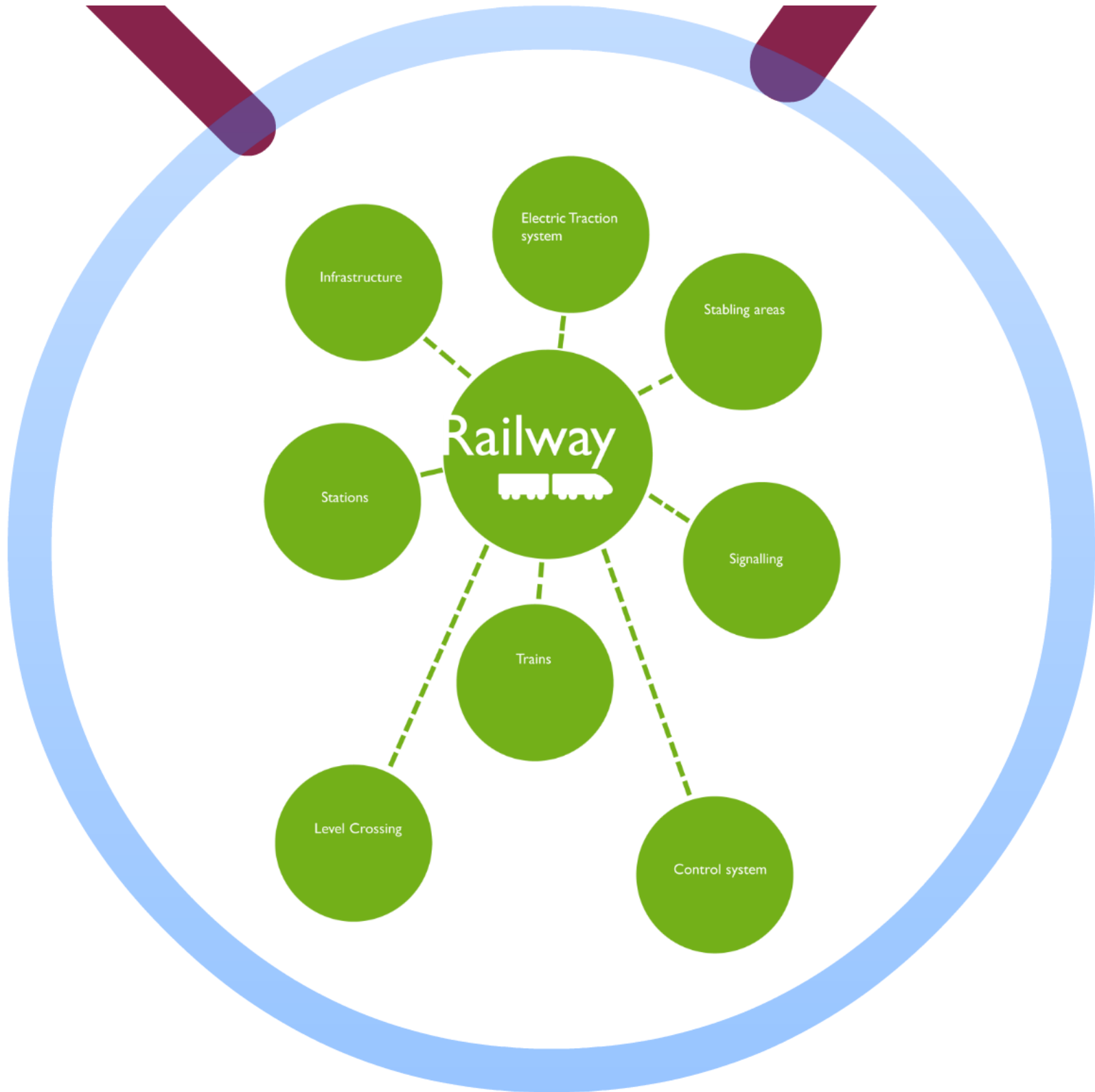


# Safety Principles



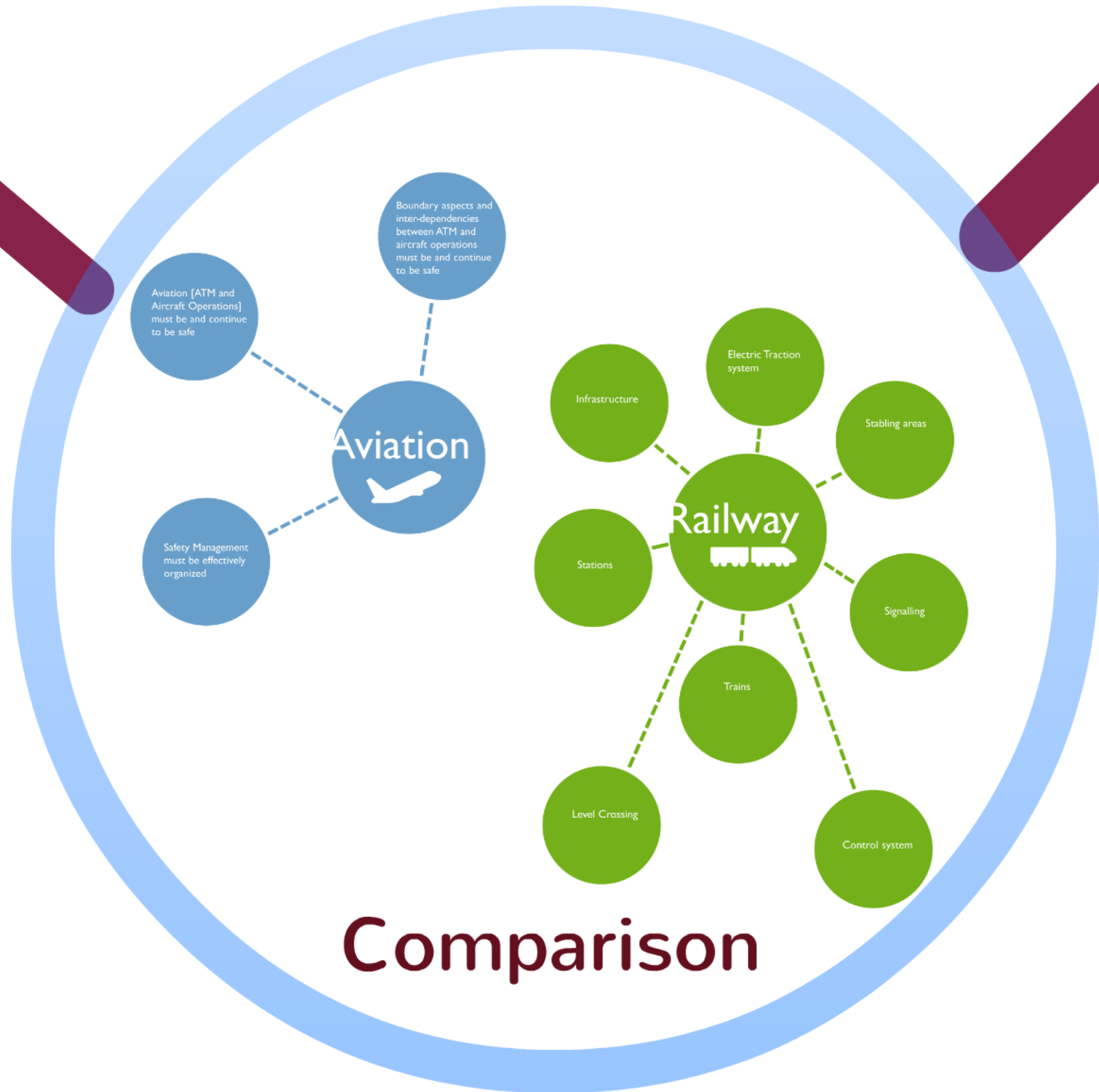
*Policies*

**Standards**



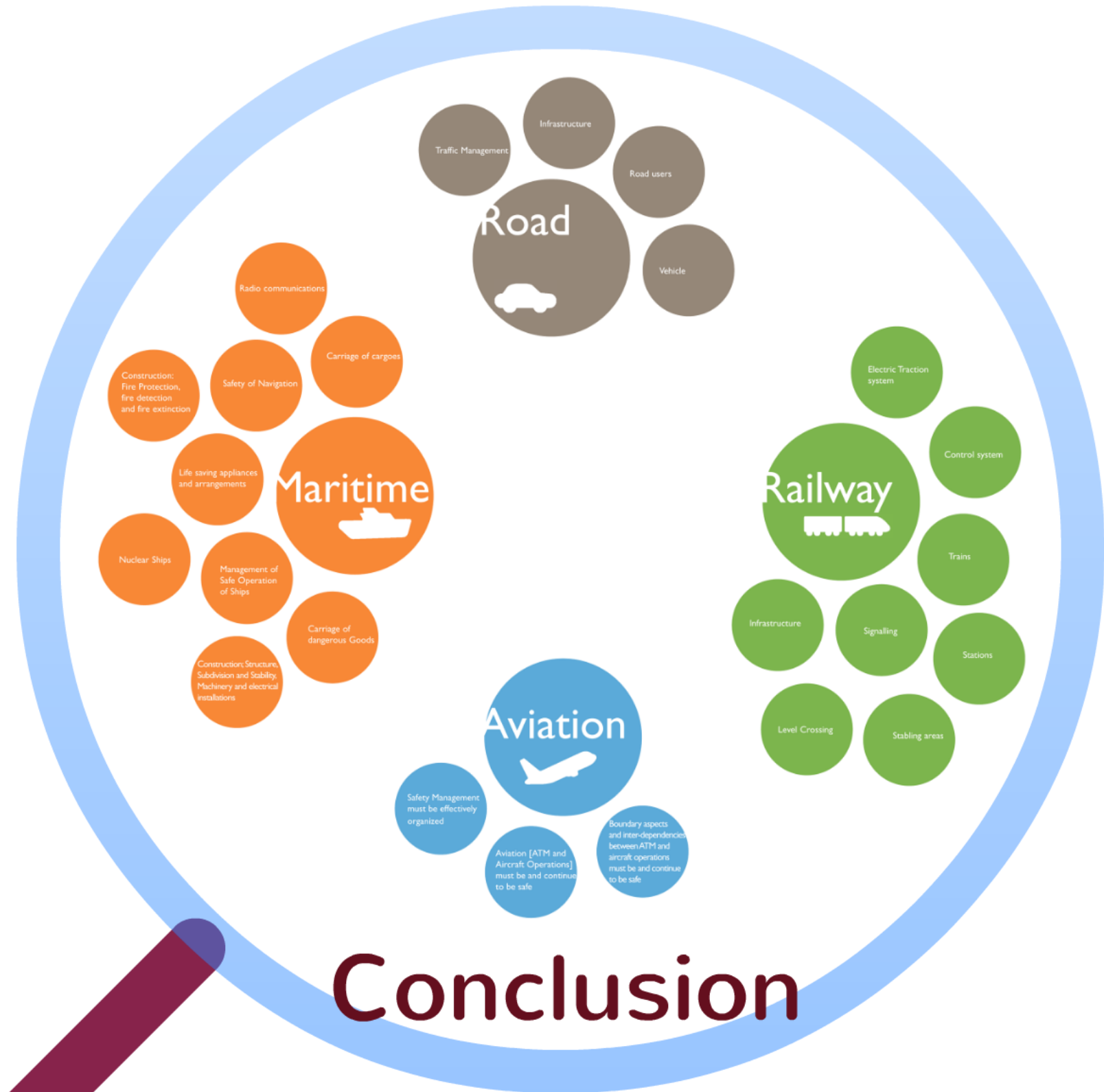


# Inventory of Safety Principles per each domain



# Comparison





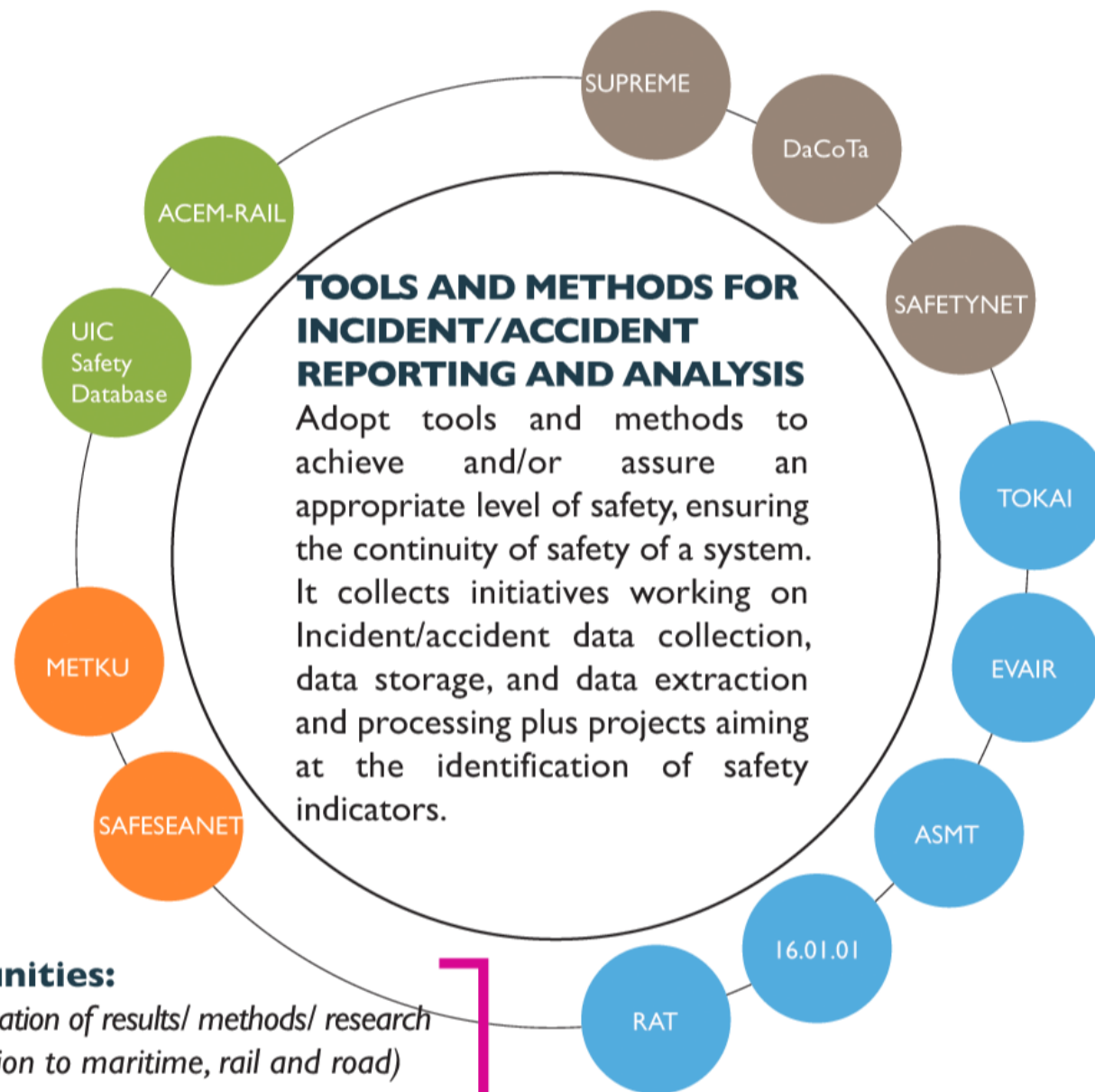
## Major Findings

- each transport mode has its own set of safety principles and issues
- few are in common and can be compared
- the way safety is managed is very different and it's hard to compare

# Topic Analysis

Use of key safety topics to compare and organise the analysis

- Certification
- Dangerous Goods Transportation
- Safety Assessment
- Human Factors Fatigue
- Incident/Accident Reporting and Analysis
- Human Factors Training
- Safety Culture
- Decision Support Technologies



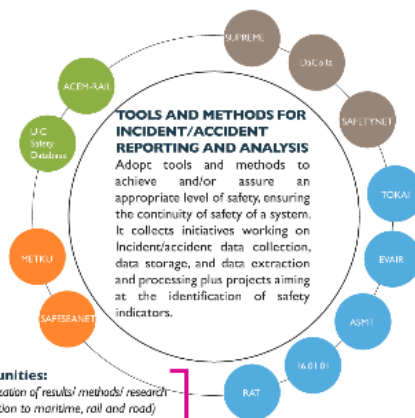
### **Opportunities:**

*Cross-fertilization of results/ methods/ research  
(from aviation to maritime, rail and road)*

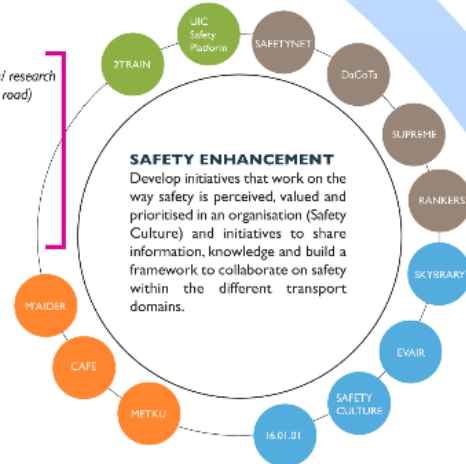
*Multi-domain initiatives  
(aviation, maritime, rail and road)*

*Multi-domain policies  
(aviation, maritime, rail and road)*

*Joint Initiatives  
(aviation, maritime, rail and road)*



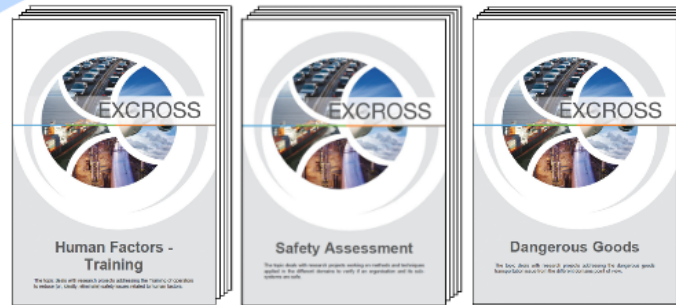
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 Joint Initiatives (aviation, maritime, rail and road)



- Opportunities:**  
 Cross-fertilization of results/ methods/ research (from aviation to maritime, rail and road)  
 Multi-domain initiatives (aviation, maritime, rail and road)  
 Multi-domain policies (aviation, maritime, rail and road)  
 Joint Initiatives (aviation, maritime, rail and road)



- Opportunities:**  
 Multi-domain initiatives (road and rail)  
 Cross-fertilization of results (road and rail)  
 Joint Initiatives (road and rail)



# Safety Management System



Considered the leading domain for safety in complex systems. The international ICAO standards recommend structured approaches to safety, by implementing SMS. One of the SMS goal is to promote safety culture.



The IMO adopted the International Management Code for the Safe Operation of Ships and for Pollution Prevention. The ISM Code promotes safety culture for the maritime industry.



# Safety Management System



- Standard for all the organizations
- Shared consensus between the key players
- Standard safety indicators and shared databases
- Proactive safety culture
- Just culture



- North Europe VS South Europe  
Vessels VS Oil Tanks
- Top-down approach
- Absence of safety indicators and no consistent databases
- Bureaucratic safety culture
- Under-reporting

# Incident Reporting System



## Aviation Safety Reporting System (ASRS)

- Established in 1975 by the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA)



## UK National Reporting and Learning System (NRLS)

- Established in 2001 by the National Patient Safety Agency following the input of the Department of Health

# Incident Reporting System



- High degree of standardisation of operations
- Clear distinction between accidents, incidents, minor events, non significant events
- Homogeneous domain culture: the community can speak with one “non-controversial” voice



- More variability of operations: craftsmen not equivalent actors
- Not clear sometimes whether an event actually constitutes an avoidable adverse event
- Several micro-cultures differentiated by role, specialisation, competence, age, geography

Structural characteristics that may allow or dampen the cross-fertilization between domains:

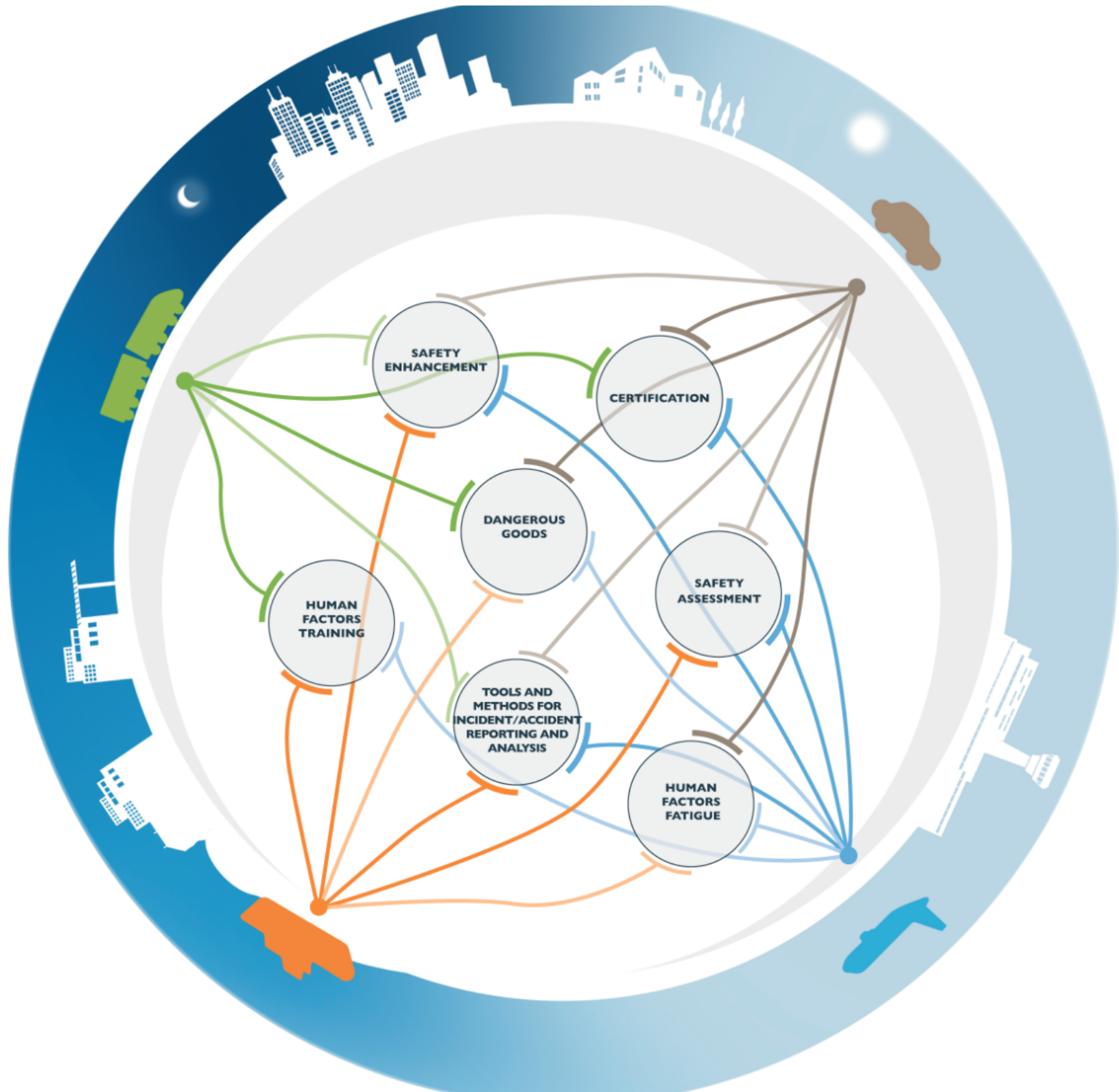
Degree of Centralization

Degree of Standardization

Quality and availability of Safety Indicators and Information

Safety Culture maturity

Lesson Learnt





# EXCROSS

EXploiting safety results aCROSS transportation modes

[www.excross.eu](http://www.excross.eu)  
[info@excross.eu](mailto:info@excross.eu)





# DECOMOBIL Roadmap Workshop

## ICT design for Clean and Efficient Multimodal Mobility



# Perspectives on sustainable driving/riding training aiming at a safe and cost-efficient behaviour

**Munich, 28/05/2013**

**Stella Nikolaou**

Researcher at CERTH/HIT

Email: [snikol@certh.gr](mailto:snikol@certh.gr)

Web: [www.hit.certh.gr](http://www.hit.certh.gr)





# Why training? – Safety & ICT

- Increase the drivers' knowledge on the ICT functionalities and barriers.
- Understand the situations where each system can apply.
- Increase the awareness and reduce the over-confidence on the reliability of ICT.
- Provide knowledge on ICT practical use, improving handling of effects while using.

## **THUS:**

- Increase safety by exploiting the potentials of ICT-based support systems in the safest way through users' knowledge on their functionalities and limitations.  
Over-reliance issues should be a priority.



# Why training

- Economic crisis leads to financial re-organisation and efforts for cost savings in all European countries.
- Hybrid vehicles already spread in the automotive market. However to benefit the advantages of such technology a thorough training is a pre-requisite.
- Electric vehicle technologies emerge and are expected to be introduced in the market at a medium-term period.
- Eco-driving systems through cooperative applications are currently in development at research level by the automotive industry.



# How to create

- Training should be updated and adapted in parallel to the evolution of the ITS functions for all vehicle types,.
- Combined use of ICT and driving simulators for training of all road driver/rider categories on optimal use of ICT tools.
- New simulation tools are expected to emerge for motorcycle riding and passenger car (both for novices and emergency drivers/riders), as well as truck driving.



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Novice drivers/riders

- Vehicle control and basic traffic participation skills
- New ICT-based technologies, such as ADAS/ARAS, IVIS/OBIS, cooperative systems (V2V, V2I, I2V).

Professionals

- Emergency drivers/riders
- Truck/ Bus drivers
- ADR drivers

Experienced

- Lifelong training of experienced drivers/riders that can benefit from training to new vehicle technologies and ICT.

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- Stimulate road users towards a more responsible or, when needed, professional behaviour.

- Reduction of accidents due to poor on-road training.

- Training on the use, benefits and of ICT in-vehicle support technologies.

- Train drivers/riders in dangerous scenarios (risky traffic conditions, adverse weather conditions, etc.) that is not often possible not safe to be anticipated in real traffic.

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- Contribution to green environment through reduction of traffic volume and pollution in cities.
- Reduction of fuel and vehicle maintenance costs.
- New employment opportunities and competitive advantage for the European driver training schools industry.
- Reduction in training time and cost.





# Humanist

Multimedia Training Tool for driver's training

ADAS IVIS DSS

Description Functionality Benefits Limitations Indicative HMI Applications

## Emergency-related Information

### eCall, European Emergency Number 112, E112

In the event of an emergency, the single European emergency number **112** can be used across the European Union ("One number for all Europeans"). Calls can be made free of charge from fixed line or mobile phones. 112 calls must be given the same service level as calls to alternative national emergency numbers. It is desirable that several languages be spoken in the emergency centre.

**E112** is a location-enhanced version of 112. It is crucial for mobile calls. The telecom operator provides location information to the emergency centre which in return must be adequately equipped to process the logical development of 112: Abroad, you often do not know exactly where you are. So the emergency centre should have the capacity to know it for you.

**eCall** is an emergency call either generated manually by vehicle occupants or automatically by in-vehicle sensors when an accident occurs. When activated, the in-vehicle eCall system establishes a connection directly with the relevant PSAP (Public Safety Answering Point), which is a public or private eCall centre that operates under the regulation and/or authorisation of a public body. A minimum set of data (MSD) – including key information about the accident such as time, location, vehicle description – is sent to the PSAP operator receiving the voice call. eCall builds on E112. It requires emergency centres and emergency service chains that are capable of dealing with calls coming from an in-vehicle eCall device and of processing the minimum set of data.

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# Humanist

Multimedia Training Tool for driver's training

ADAS IVIS DSS

Description Functionality Benefits Limitations Indicative HMI Applications

## Emergency-related Information

### eCall, European Emergency Number 112, E112

In the event of an emergency, the single European emergency number **112** can be used across the European Union ("One number for all Europeans"). Calls can be made free of charge from fixed line or mobile phones. 112 calls must be given the same service level as calls to alternative national emergency numbers. It is desirable that several languages be spoken in the emergency centre.

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Video 1: In this video the eCall service is presented (Source: European Union).



close video

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New frontiers are simulator-based training:

- for ARAS/OBIS for PTWs,
- for combinations of ADAS/IVIS cooperative systems and eco-driving systems,
- for training drivers in optimal use of emerging ITS



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Where virtual world meets the physical one. AR (Augmented Reality) in driving simulation. On-line/off-line exchange of data between physical and virtual world

- Real geographic traffic and driving data integrated in the simulation
- Real-time ray-tracking
- Integration of real vehicles interiors into the simulation



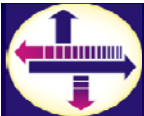
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- Training schemes, curricula and tools for all driver cohorts (“average”, novice, elderly, experienced) for optimal use of ITS technologies.
- Towards a multidisciplinary pan-European training course for ITS/ Eco-driving functions.
- Personalised and adaptive training to the driver cohort and individual driving style and needs.
- Efficient strategies for integration of training curricula and awareness campaigns in real life in Europe.



# F u t u r e s t e p

- Recommendations/feedback to the driver on-line to permanently change his/her driving behavior and attitude (HMI issues on workload and distraction evident).
- Adaptation and personalisation of the system and its thresholds as result of use (“training” the system as well as the driver/ rider).
- Eco-driving training and efficiency through standalone in-vehicle and/or cooperative technologies.
- Introduction of new training tools and methods (use of ICT for training, new simulation tools, ...).



ΙΝΣΤΙΤΟΥΤΟ  
ΜΕΤΑΦΟΡΩΝ

Thank you for your attention!



ΕΘΝΙΚΟ ΚΕΝΤΡΟ  
ΕΡΕΥΝΑΣ ΚΑΙ  
ΤΕΧΝΟΛΟΓΙΚΗΣ  
ΑΝΑΠΤΥΞΗΣ



# Design, integration and safety of mobile service for ecomobility

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*annie.pauzie@ifsttar.fr*

DECOMOBIL

  
Humanist

 IFSTTAR

# Mobile service and transport



## Increase access to multi-modal transport information for citizens due to:

- Spreading out of a diversity of informative media and devices, with availability of complex functionalities such as internet access and geolocation on these mobile devices (smartphone)
- Wide ratio of equipped travelers and drivers in the population of citizens



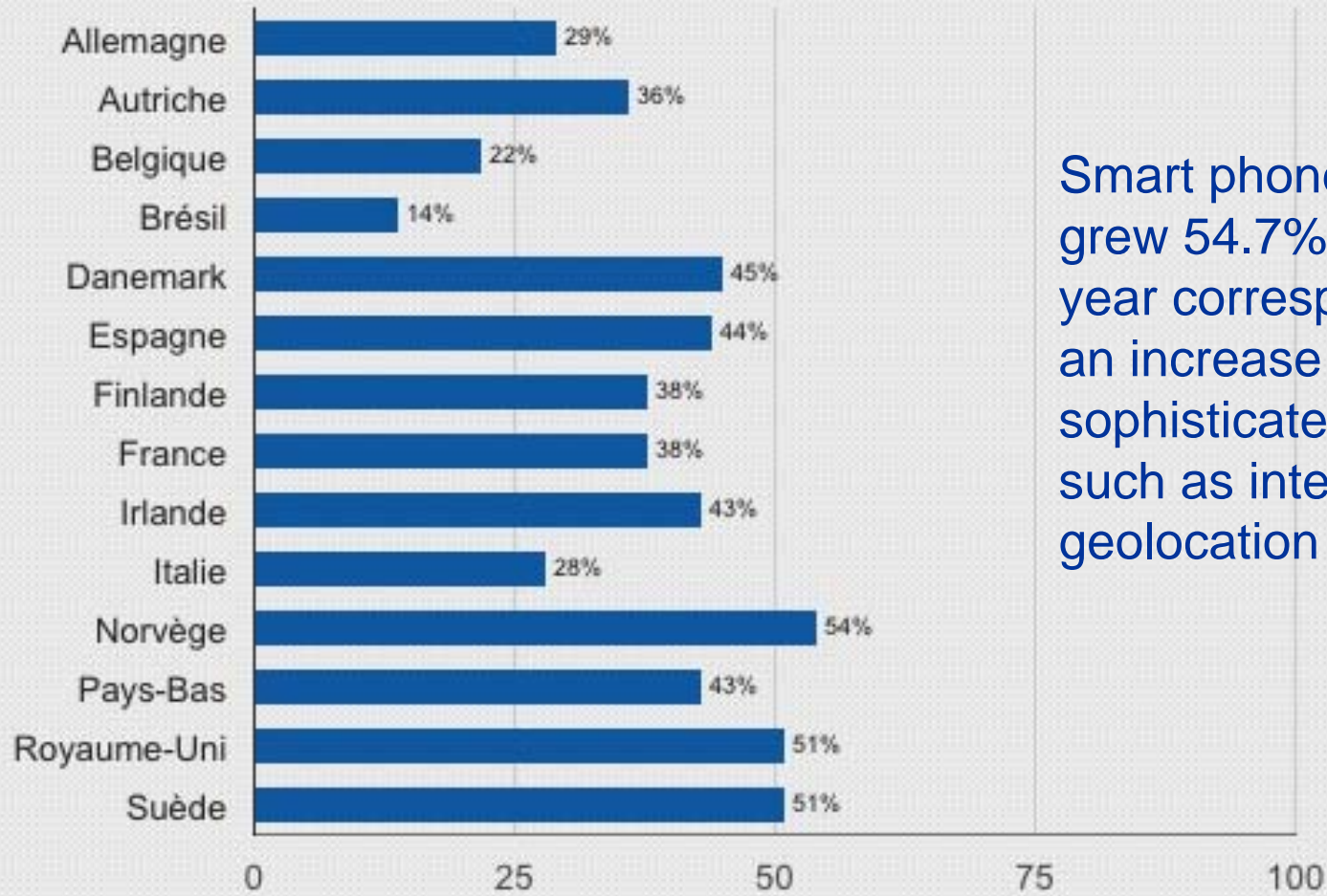
an important part of the population of travelers and drivers can be informed **“anywhere”** and **“any time”**

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# Smartphones' owners in 2012

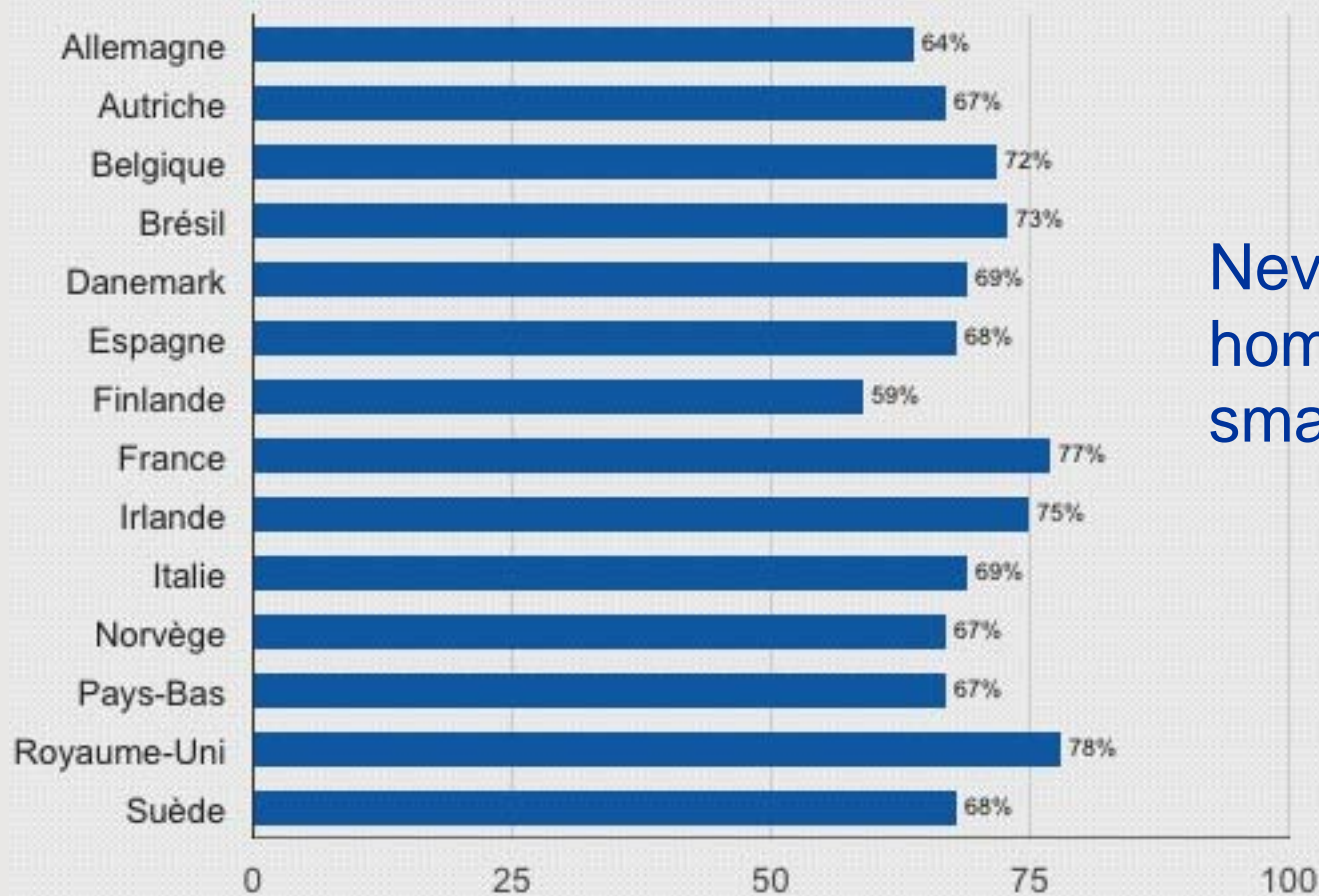


Smart phone market grew 54.7% year over year corresponding to an increase access to sophisticated services such as internet and geolocation

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# Smartphones' use in 2012

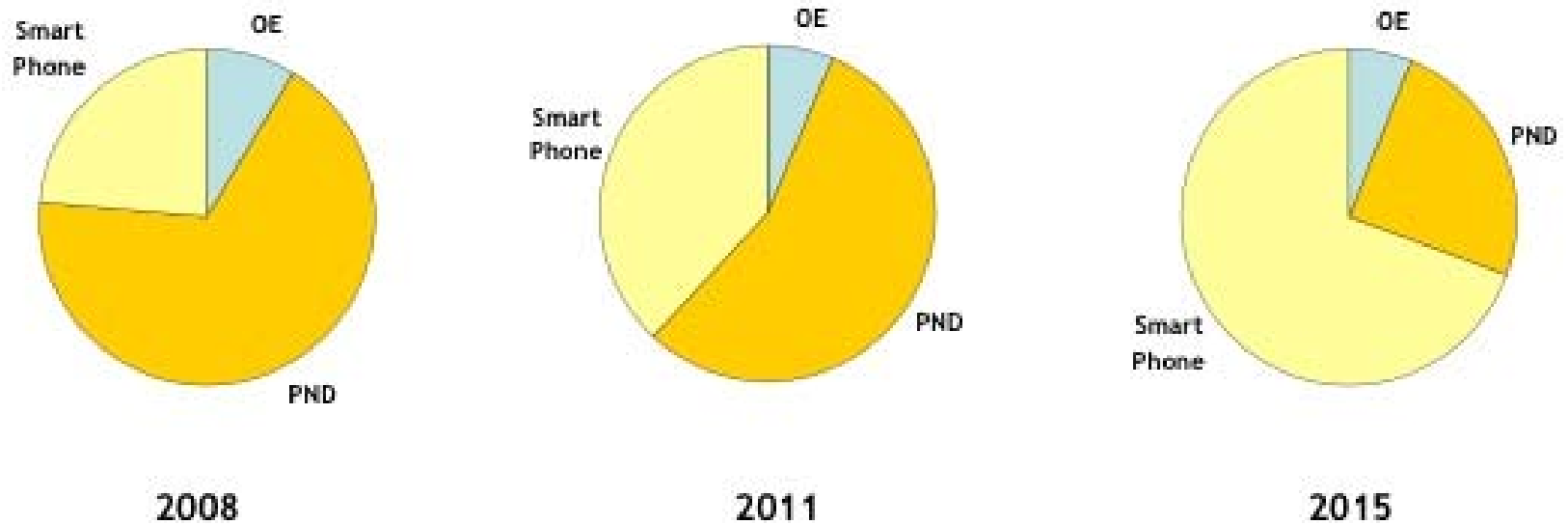


Never leave  
home without  
smartphone

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# Mobile service and navigation

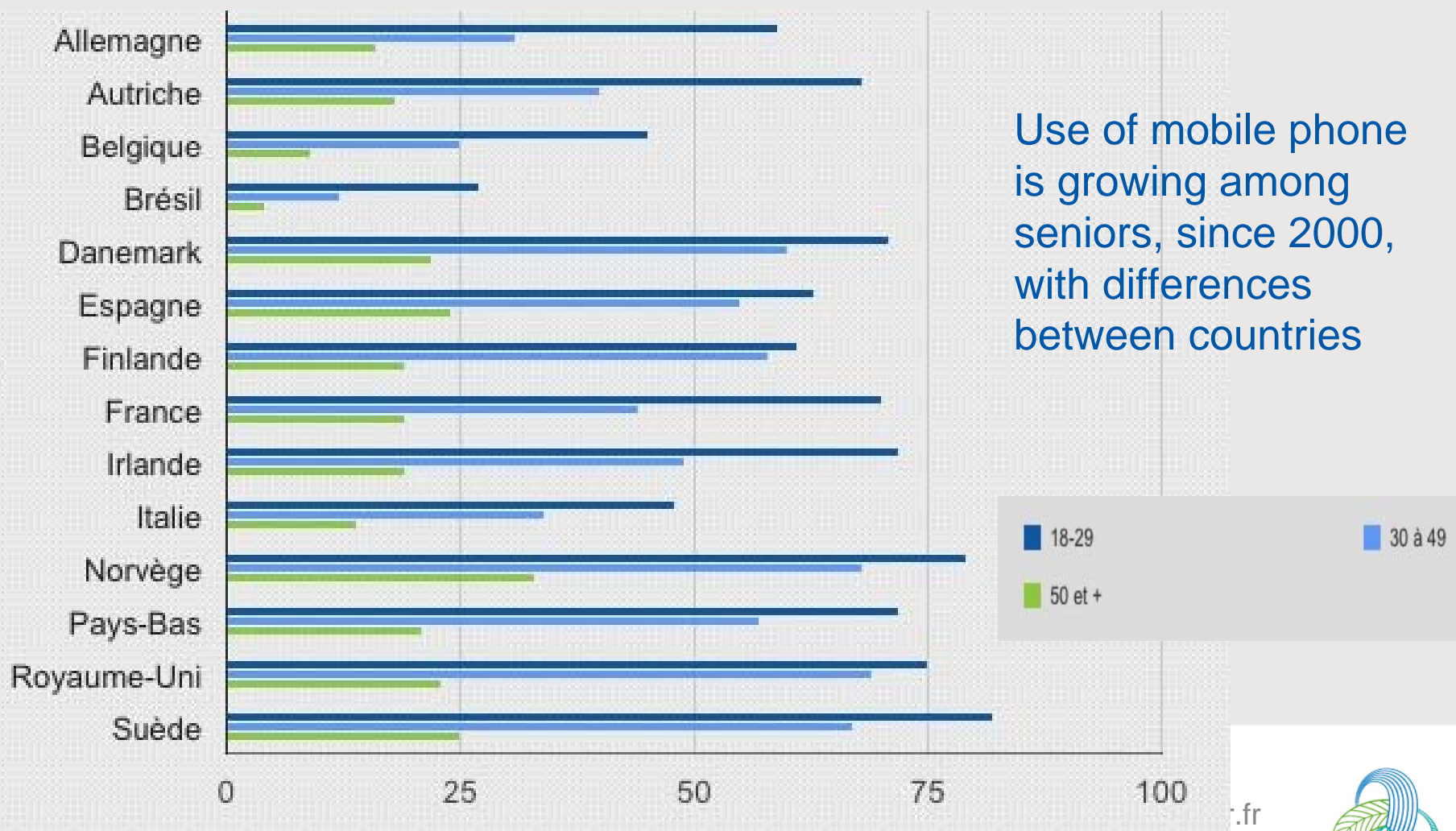


Increase ratio of smart phone use for navigation in comparison with personal nomadic device and original equipment

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# Smartphone audience by age group in 2012



# Widespread use of mobile services in transport



- **Negative aspect: road safety**

Potential distracting effect of mobile phone use while driving or riding:  
increase critical situations for road safety (visual, manual, cognitive)

Poor fixing systems for mobile device inside the vehicle: increase of  
potential driver/passenger injury in case of crash.

- **Positive aspect: ecomobility**

Easy access to information through mobile devices has high potential  
benefits for a clean and efficient multi-modal mobility :

- incentive to use public transport and self-serve bicycles,
- avoidance of traffic congestion,
- encouraging and supporting ride-sharing,...

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# Mobile phone and road safety



- **US statistics: some figures in 2011**

636 000 crashes linked to mobile phone use while driving

330 000 personal injuries

12 000 major injuries

2 600 deaths,



# Mobile device and road safety



- **Poor fixing support for mobile device inside the vehicle: issues of integration**



***Some pictures showing a nomadic support smashed by the air bag during the crash test of a vehicle***

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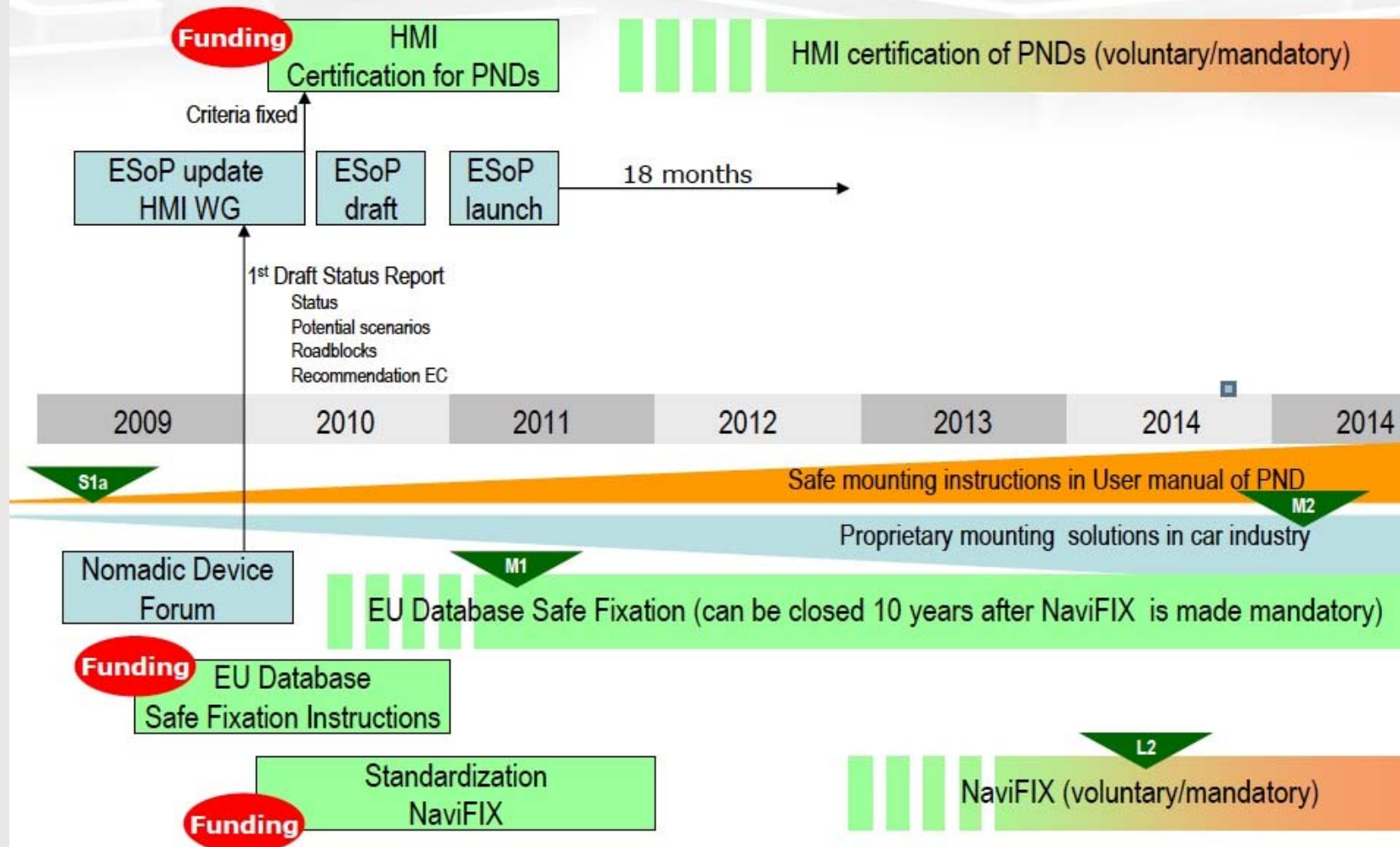




# Roadmap for safe nomadic fixing support (iMobility WG)



## Roadmap (proposal; under discussion)



# Technical solutions to integrate mobile phone in the vehicle



- Driver can keep hands on the wheel
- Visual interface more accessible and with less screen reflections
- Safer fixation in case of crash
- Applications may be forced to meet defined driver distraction guidelines

***Example of mirror link***

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# Mobile service for ecomobility

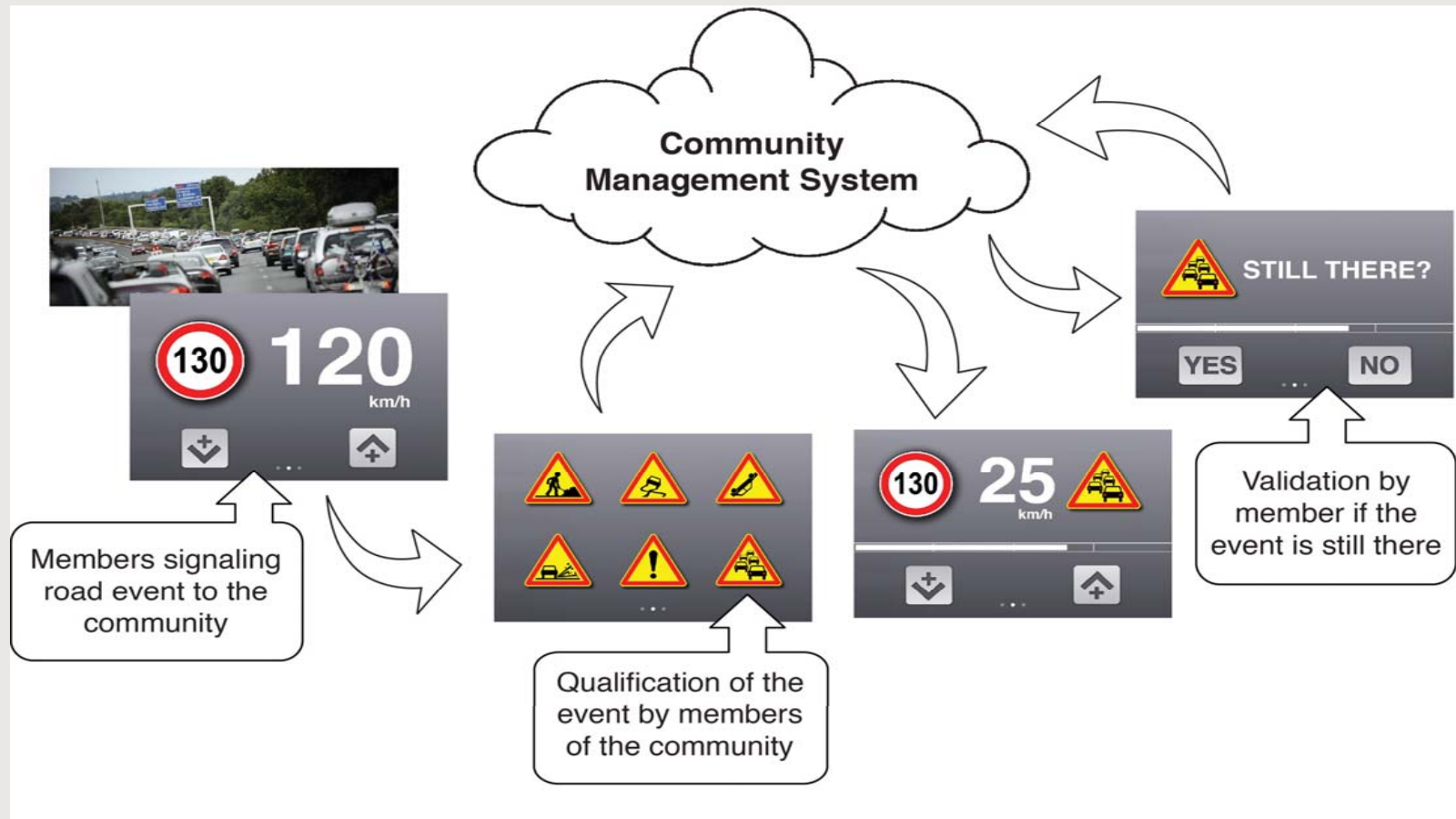
- **Ecomobility success**

- by attracting drivers out of their vehicles (high quality information on public transport real time schedule, location of stops and stations, availability and location of parking and self service bicycle stations)
- by informing on real time the community via social network about road alert and traffic congestion
- by supporting ride sharing behaviour (better efficiency of real time information on available rides, increase acceptability linked to privacy aspects)
- by wide spreading low cost access to eco driving feedback and training

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# General principle of “driver-generated content” for road alerts information



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# Benefit of social community for ecomobility and road safety



- Several danger zones have been identified by the community and displayed on a map for the benefit of any members
- This display allows also to know that 14 members with an average of 3 stars, meaning highly reliable in their contribution to the community database, are located in a close surrounding.

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# Reliability of the information



## ***Real time information on traffic event***

- reliability of information sent by the members
- number of members
- timing of communicated information

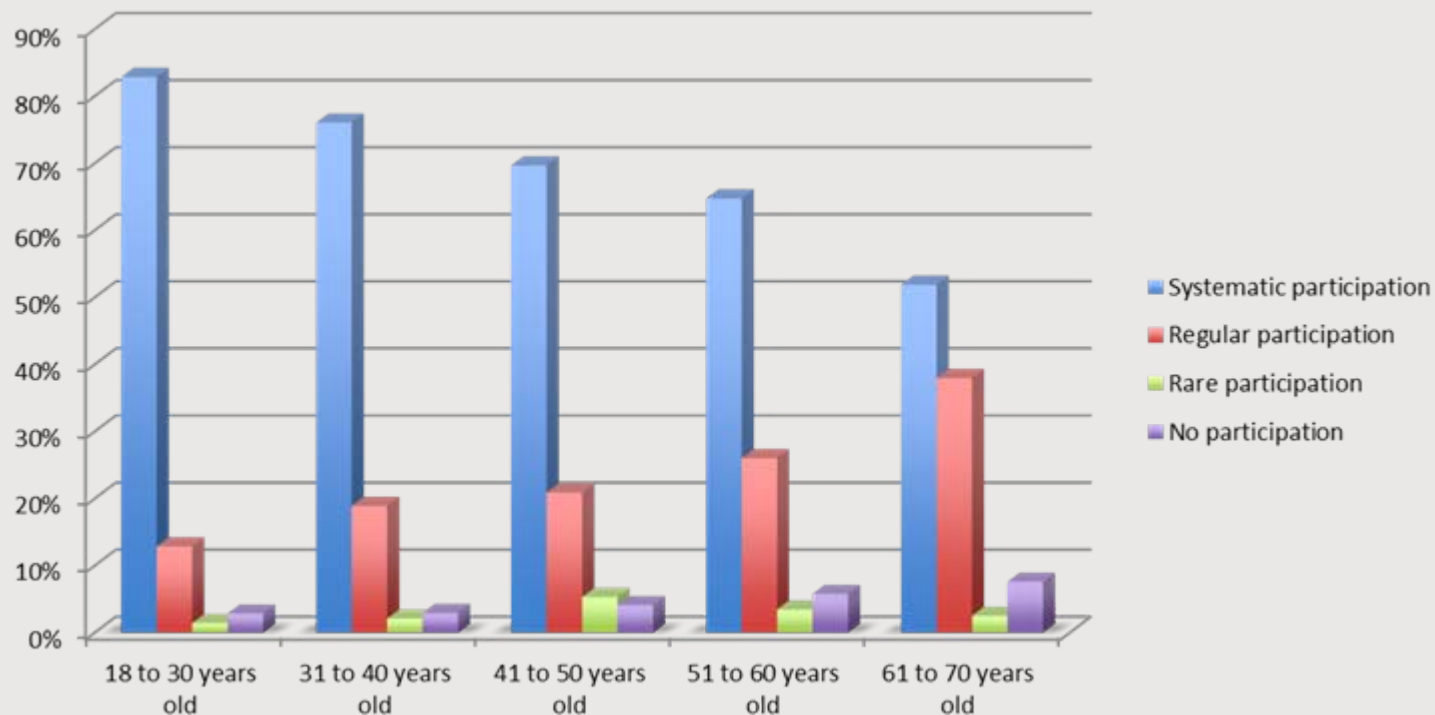
*Example: Risky zone identified by 4 members of the community, confirmation of the last one 49 minutes ago.*

This information gives some elements to the driver in order to evaluate the validity of the information.

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# Participation to the community by drivers' age

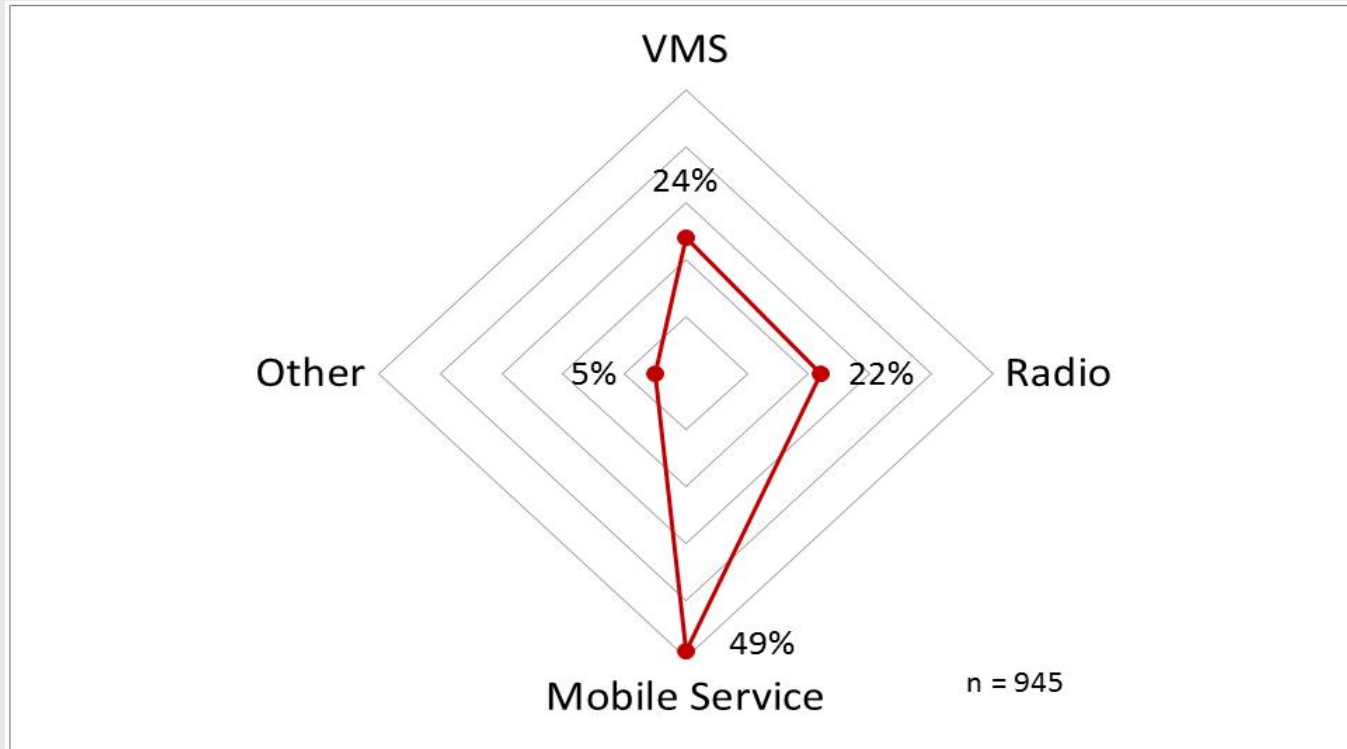


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# Drivers' evaluation of reliability for the road alert information by sources of information

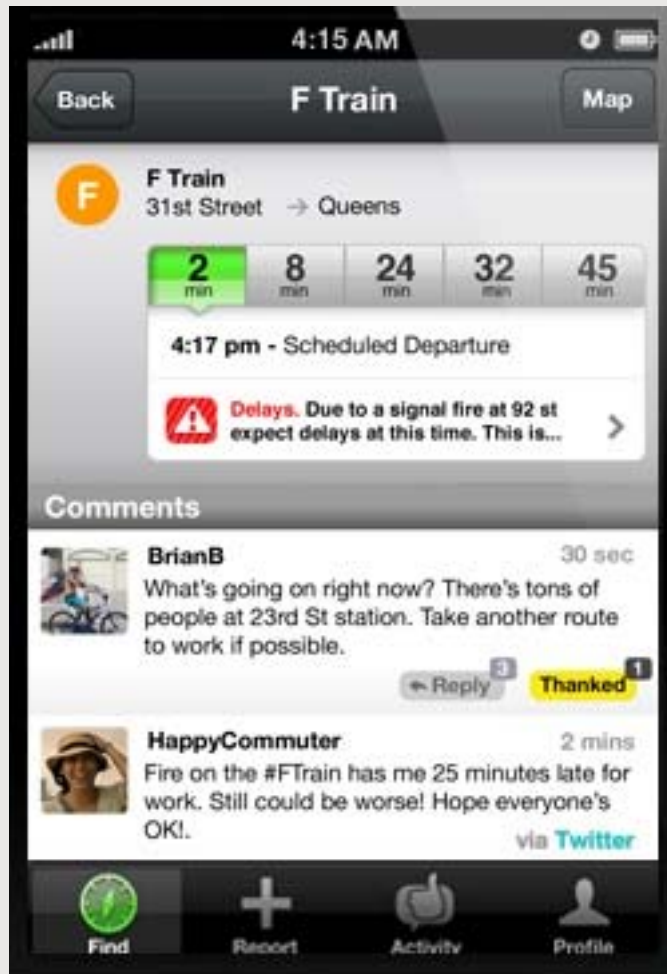


Mobile services are considered as the more reliable source for road alert information than any other (radio, VMS,...)

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# Social network and transport information via smartphone



Real time information send by travelers using social network about public transport problems and any relevant events of interest disseminated to the community of travelers

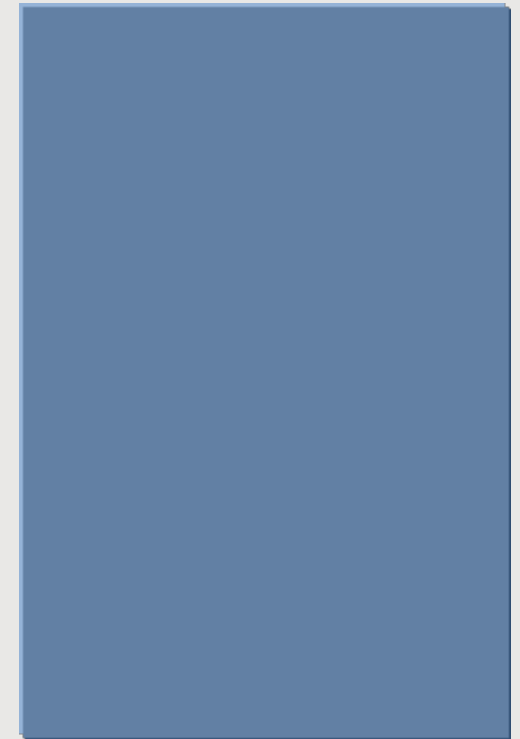
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# Instant ridesharing



- Smartphone technology enables dynamic ride-sharing systems that bring together people with similar itineraries and time schedules to share rides on short-notice
- Objective of application: setting easy and secure “**ride sharing**” services to federate these trips between drivers and travellers



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# Ridesharing service



Several mobile applications of ridesharing

- planned in advance ridesharing
- instant ridesharing (automatic updating of ridesharing offers all along drivers routes)
- mixing navigation and integrated billing system.

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# Privacy-reliability trade off of the information



## ***Ridesharing Challenges***

Driver's reliability

Matching between travelers and drivers preferences

Privacy and security



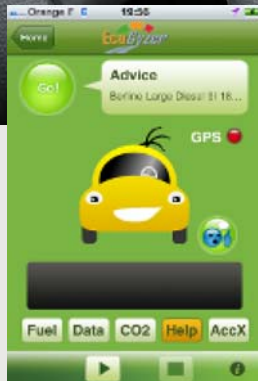
*Question:* which criteria to transmit to the member?  
Picture, location, phone number....

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# Mobile service of ecodriving



**Ecodriving  
smartphone  
applications gives  
real time feedback  
to the vehicle CO2  
emission and fuel  
consumption based  
upon driver's  
behaviour**

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# Smartphone safety application: Headway monitoring, collision and off road warning



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# Roadmap for research in transport mobile services



- **DESIGN:** Creation of **design guidelines** for usability and legibility of information on smart phone need to be defined taking into account size of the screen and mode of dialogue (tactile screen, small keyboard, vocal recognition...)
- **EVALUATION:** Setting up of efficient **methodologies** for safety evaluation of mobile transport services use (balance between positive effect linked to cognitive support and negative effect linked to distraction and workload)

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# Roadmap for research in transport mobile services



- Understanding of requirements and functional abilities of **elderly travellers/drivers** to be integrated in the mobile transport applications design (increase of this population and impact of quality mobility on the level of good health)
- Development of **technical solutions** for mobile safe use while driving, modalities of information to deliver in relation to context and drivers/riders workload and specificity (novice, senior, professional), integration of the device in the vehicle and with the other on-board functionalities coming from IVIS/OBIS and ADAS/ARAS

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THANK YOU FOR YOUR ATTENTION

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# **Cooperative service concept and Human Service Interface**

Innovative approach for a sustainable transport system

*José Manuel Menéndez, Nuria Sánchez,  
Jorge Alfonso – UPM*

**28th May 2013, Munich**

# Contents

- C-ITS Motivation
- Key development areas to consider
  - Sensoring and communications
  - Data processing and behavior understanding
  - Human service interface - HSI
- Particularities about HSI
- Conclusions

# Cooperative ITS Services

- Motivation – Transport sustainability
  - Mobility issues
    - Road traffic congestion, public transportation system overload and the general reduction of traffic efficiency and increased travel times and costs
  - Safety issues
    - Increasing numbers in traffic incidents, accidents, injuries and transportation related deaths
  - Security issues
    - Increased quantity of goods (specially hazardous goods) in the transportation network
  - Environmental issues
    - Increased impact on transportation related pollution and energy consumption.

# Cooperative ITS Services

- A service provided in a **new information paradigm** in which:
  - All the **road environment and its elements** (sensors in vehicles, infrastructure, users, ...) are **dynamic sources of data**.
  - The **data is processed on multiple levels** and made available to different users with different needs
  - The **data is sent to the user depending on different variables**, through different channels, at the proper time and place for the circumstances
  - Within a **complete framework of interaction towards the goals of transport sustainability**



# C-ITS Services key development areas

- Sensoring & Communications
  - Evolution towards concepts such as **Internet of Things** and **Smartcities**.
  - Devices are permanently interconnected, requesting or providing information about their status and context
- Data processing and behaviour understanding
  - Characterisation of the overall transport scenario
  - Focus on **algorithms** for the automated processing of acquired data, complete situational awareness and **intelligent assessment** for actuations
  - Capabilities to **monitor, react and predict/anticipate** (→**resilience**)
- Evolution of HMI – HSI: Human Service Interface
  - Processing of data to be presented to the C-ITS services' users, with special attention to the **accuracy** and **legibility** of the information, and provision at the right moment, place and through the appropriate channel
  - HSIs also collect **feedback** from the users to improve the service responses

# C-ITS sensing & communications

- **Data acquisition** is the first critical step to the provision of quality C-ITS services
- There is a continuous development of **sensing devices** and technologies that make it possible to collect different types of information
  - Traffic data, environmental data, location and position-referenced data, vehicle data, driver and driving behaviour data, road environment data, public transport and freight-related data...
- **Ubiquitous connectivity** facilitates the deployment of complex mobile heterogeneous sensor networks
- Data fusion and heterogeneous **aggregation** make possible new transport management C-ITS services, but an integration with data processing stages is necessary

# Data Processing & Behaviour understanding

- From low level sensor data fusion to complex **behaviour analysis** and **prediction algorithms**
- Sensor data is processed and aggregated to get the most accurate image of the road environment and provide the appropriate **situational awareness**
- These methods allow the development of relevant and progressively **higher level applications** for transport services:
  - Fatigue or drowsiness detection in drivers
  - Incident detection in highways
  - Collision avoidance of pedestrians and vehicles at traffic intersections

# Human Service Interface

- **Users** of C-ITS services belong to all the entities in the C-ITS environment:
  - Road and public transport users: drivers, pedestrians, cyclists...
  - Traffic management users: traffic authorities, enforcement authorities, road operators...
  - Emergency authorities & services
  - ...
- The service interfaces must ensure that users **receive information**:
  - **Useful** for improving the user's trip in terms of time, comfort, cost...
  - **Accurate** for improving the objective service quality
  - **Not distracting** so as to not create an additional potential hazard
  - **Timely** for improving the user's trip safety conditions

# Human Service Interface

- The same **piece of information** can be given to the user in different ways depending on the situation...
  - “A car has stopped in the highway A-9” notification in the navigation application as a **pre-trip** arrangements
  - “A car has stopped in the highway A-9” notification when **entering the highway** on the way to the destination
  - “A car has stopped in the highway A-9” + “**500m ahead**” warning message
  - “A car has stopped in the highway A-9” + “**500m ahead**” (driver has been **driving for 3 hours** now) warning message + buzz
  - “A car has stopped in the highway A-9” (right **in front** of the vehicle) warning message + warning lights/buzz + **active reaction** of the car?

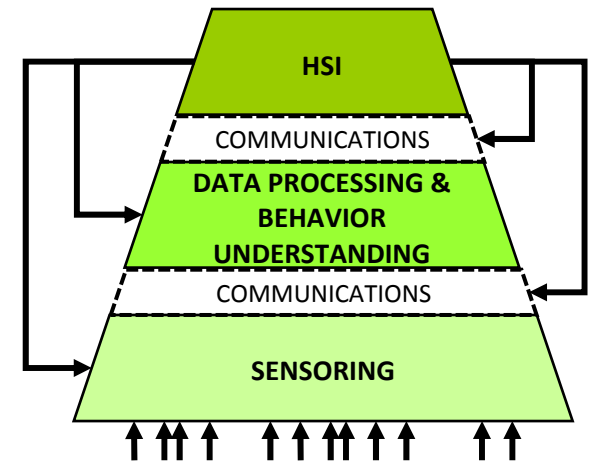
# Human Service Interface

- In short, service interfaces must provide the user with an increased awareness of its environment, but **preventing an information overload**
- Interfaces
  - **Passive** visual data can be enhanced to improve the user's perception of its environment and road events
  - **Haptic** devices can be used to further enhance the responses to the user to driving tasks
  - **Active** interfaces actuate in different degrees over the vehicle



# Human Service Interface

- HSIs can also allow collection of **feedback from the users** in order to improve the service responses.
  - User behavior and transport-related activity profiles
  - Real-time user behavior analysis and assessment
- HSIs will **become an integral part** of the whole C-ITS framework
  - Manage information using suitable **notification interfaces** and select data acquisition modules
  - The user and the context can actively or passively **influence operating parameters** of the service, at different stages or levels



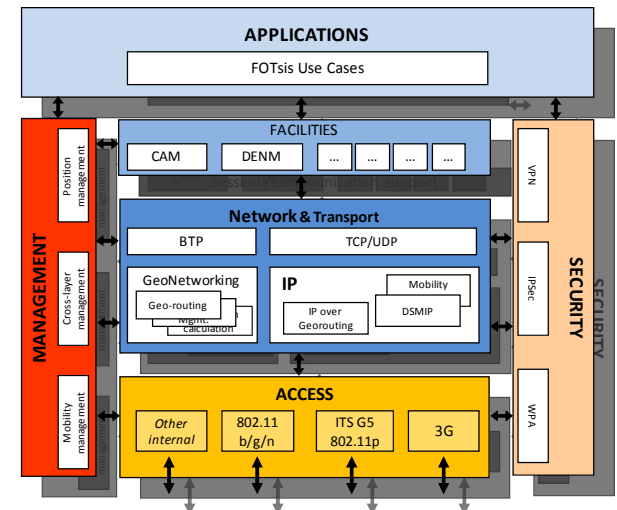


# Human Service Interface

- The same information can be more or less sensitive in terms of **security** depending on who will be the final user
- HSIs being a data acquisition platform introduces the issue of data and user's privacy



- Development of HSIs and HSI service management platform will need further integration with **Management** and **Security** modules of the C-ITS architecture!



# Conclusions

- The complexity of the transport environment translates into **complex C-ITS architecture** and services
- HSI is a **wider concept** than classical HMI
- HSI - Human Service Interfaces stay on top of the C-ITS architecture as the **interacting element to the users**
- HSI is both a **recipient and source of data** from/to the rest of the modules of the C-ITS service architecture
- C-ITS Services must **adapt** to the specific **context** and environment of the user
- HSI must **evolve** to this new paradigm!!

# Cooperative service concept and Human Service Interface

Innovative approach for a sustainable transport system

**Thank you for your attention!**

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