	# iMobility Support
	## D2.4a – iMobility Forum Recommendations progress note

Author(s)	Lina Konstantinopoulou (ERTICO)			
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Project Manager	Lina Konstantinopoulou ERTICO-ITS EUROPE Tel: +32 2 400 07 49 E-Mail: l.konstantinopoulou@mail.ertico.com			
Abstract	The report provides an overview of activities which are corresponding for each recommendation. The report is building upon 18 recommendations and the action table as developed in the recommendation workshop in March 2013. This document will be updated throughout every year.			
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Executive Summary

Complementing the ITS Action Plan and other initiatives that foster a concerted EU-wide approach, the ITS Directive — Directive 2010/40/EU— provides the legal framework for the implementation of the actions required to achieve an effective and coordinated deployment and use of ITS.

Supporting the ITS Directive, we can see several platforms and initiatives being launched. Transport Network ITS Spatial Data Deployment Platform (TN-ITS) will provide substantial support to both road authorities and map makers in establishing seamless exchange of information on changes in critical road network related spatial data, with the ultimate goal of providing near-immediate updating of the digital maps in end-user devices for such changes. Once this data chain is in operation, it can provide a substantial contribution to an improved user experience, to road safety and transport efficiency, and to the development and deployment of ITS applications in general.

Standardisation is still at the forefront of discussions, a priority area for the European Commission in the ITS Action Plan in order to achieve European and global ITS co-operation and coordination. Standardization work in accordance with the Response to Mandate M/453 is almost finalised. In particular, in April 2013 ETSI TC ITS has adopted a Technical Report for publication (TR 101 067) as Release 1of TC ITS standards in accordance with the Mandate M/453. In May 2013 CEN/TC278 and ISO/TC204 prepared the draft Release 1 list of the C-ITS standards developed by both SDO, based on resolutions/decisions taken at the ISO/TC204 plenary meeting in Moscow (October 2012) and CEN/TC278 plenary meeting in Brussels (March 2013). The final Release 1 list will be part of ISO TR 17465-3, a TR under development. When ISO TR 17465-3 is published a joint document will be developed including information from the different SDO Release process but also including other relevant standards from other SDOs such as SAE and IEEE. This joint document will be available end of 2013 beginning 2014. There is, however, also a general requirement for global harmonisation of existing and future standards for cooperative ITS which is related to the ongoing cooperation with other standards organisation.

A notable development in 2013 that will influence the development of consumer transportation is eCall. European Commission adopted two proposals to ensure that, by October 2015, cars will automatically call emergency services in case of a serious crash. This draft legislation will ensure that from October 2015, all new models of passenger cars and light duty vehicles would be fitted with 112 eCall and the necessary infrastructure would be created for the proper receipt and handling of eCalls in emergency call response centres - ensuring the compatibility, interoperability and continuity of the EU-wide eCall service. Once proposals are approved by the Council and Parliament, the Commission is aiming to have a fully functional eCall service in place throughout the EU (as well as Iceland, Norway and Switzerland) by 2015.

Over the past few years, interoperability events have become a well-known practice within several high-tech sectors, such as telecommunication, as they provide an exceptional opportunity to test a product and pledge its interoperability before placing it on the market. Even if interoperability events do not certify products and services, they allow engineers to spot problems in the product development process early enough to limit financial consequences. Such events ideally take place early on in the progress of the implementation of a standard, and have proven to create great excitement among participant operators, equipment manufacturers, standardisation bodies and interest groups. This year interoperability events through DRIVE C2X, eCoMove projects, TISA, and also eCall plug test events were held. Many new Transport ICT projects have been launched while others

finalised their research, development and demonstrations of these new technologies in the field of ICT for Safe smart and clean mobility (eg. eCoMove and Interactive IP).

The main focus of this year was on developing Strategic Research agendas for the Horizon 2020, the next European Framework Programme for Research and Innovation. This new programme represents for both the European institutions and for all the research stakeholders one important step towards a more efficient and focused research funding in Europe.

Despite the support of the EC and the involvement of important stakeholders, this approach has not yet led to large-scale service deployment. To prove effectiveness, justify investments for large-scale deployment and grow from technological development into a deployment-oriented innovation, more proof on system or societal level is needed. Besides technological aspects, successful innovation also includes solutions for moving the barriers related to organisational and institutional issues, markets and business models, finance and funding, legal, political/strategic, decision making/coordination aspects. Finally, industry readiness to produce and user acceptance to consume should not be overlooked as important goals.

To speed up the deployment of ICT for transport, it is moreover crucial to create demand and raise consumer awareness. This requires a joint effort by the industry and the wider innovation community, including public and research communities. This year, the two support action projects iMobility Support and iMobility Challenge have shown the benefits of ICT systems for efficient and sustainable mobility to end-users, decision-makers, the research community and the industry. Once again, the pan-European dimension of the objectives pursued requires raising consumer awareness in a concerted way through cooperation at European level.

1 Introduction

1.1 Intended Audience

This document was prepared for the European Commission and the iMobility Forum stakeholder community.

1.2 Objectives

The iMobility Forum recommendations are an activity (annual workshop) coordinated by the iMobility Forum support action project (iMobility Support) with the sole focus to review and monitor the recommendations stemming from the different working groups. The Working Groups focus on specific topics in the ITS field including research, innovation, deployment and International cooperation.

The iMobility Forum came up with 18 recommendations covering the whole spectrum of ICT for Safe, Smart and Clean Mobility. The recommendations are on the following areas:

1. Accident Causation Data
2. Impact Assessment
3. Human-Machine Interaction
4. Implementation Road Maps
5. Cooperative Mobility systems and services
6. Digital Map
7. In vehicle 112 emergency call (eCall)
8. Real-Time Traffic and Travel Information
9. Legal issues (privacy by design, security, liability) related to ICT for transport
10. Standardisation and interoperability
11. European large scale actions
12. Spectrum allocations
13. Stimulate demand and use
14. Nomadic/after- market devices
15. Preparation and updating of the Strategic Research Agenda on ICT for Safe, Smart and Clean Mobility
16. ICT for EE in mobility
17. Vulnerable Road Users
18. Automation in Road transport

The report shows an overview of activities which are corresponding per recommendation and also thus allow iMobility actors to quickly perceive how work is progressing per recommendation for the year 2013, and that the achievements are approaching any goals or targets that are set.

The report is building upon the recommendation list and the action table as developed in the recommendation workshop in March 2013. It will utilize the colour code criteria already used in the previous editions (under eSafety Support and iCar Support projects) to focus on the progress of the recommendation but will also provide a monitoring action table in ANNEX III. This document will be updated throughout every year, with an interactive, updated version available on the iMobility Support website

1.3 How to read this progress report

Colour code criteria have been introduced to focus on the progress of the Recommendation. In Annex III you can see the different colouring meanings of the traffic lights.

- **Red:** A recommendation which cannot be implemented at this time, running into significant issues with no clear way forward at the moment.

Attention: identify key issues causing the deviations recorded into the comments box and review them at a predetermined point of time.

- **Amber: A recommendation which is not ongoing as planned but with few challenges to face.**

Attention: solving the few challenges, and subject to review

- **Green: A recommendation which is progressing according to plan.**
- **Grey: Dormant recommendation which remains closed until further notice by the Steering group**

1.4 Acknowledgements

The author of this report would like to thank the reviewers and the iMobility Forum Working group's chairs for their contribution.

2 Progress of the iMobility Forum recommendations

2.1 Accident Causation data

a) Identify the most prominent clusters of contributing factors of accidents in the EU (Nordic, Mediterranean, Central)
b) Identify the minimum requirements for an EU database by comparing common features from national databases
c) Identify which organizations are responsible for monitoring traffic crashes

The implementation of the EC Serious injury strategy (European Commission, 2013) introduces new data requirements regarding the survivors of crashes. It is estimated that there are over 300,000 seriously injured and 1,200,000 slightly injured each year in Europe. The strategy will introduce a target for a reduction in serious injuries by 2020. However, priorities for injury prevention and mitigation are dependent on the severity of injuries with the most life-threatening injuries having a similar profile to those of fatalities. The developing injuries strategy will require information at EU level on the causation of accidents and nature of the injuries as well as the nature and extent of the consequences of injury (disability, impairment, and functional loss, social and economic costs). A link to healthcare and trauma information is needed to provide support to methods to mitigate the consequences of injury.

Increasing numbers of cars, trucks and two-wheelers are being equipped with intelligent vehicle safety systems, and introduce new challenges with the need to understand their operation. When analysing real-world collisions, existing accident investigation procedures are still based on traditional approaches. New methods are needed to gather and analyse suitable data to provide feedback on the operation of the systems and to estimate effectiveness. Accident reconstruction and simulation based methods used to predict accident reduction need to be validated for use with new technologies. The use of data recorders to gather road safety data and as a monitoring tool needs to be evaluated. A key gap is the capability to identify standard or optional safety equipment on vehicles involved in crashes.

Increasingly there is a developing view that differences in road safety between countries may be heavily dependent on driving culture and practise. Insurers use on-board data capture systems to identify and discourage risky driving. There is a need to develop and validate objective methodologies to quantify driving behaviour in order to explain road safety and to ensure the comparability of other measures.

The Commission adopted the Policy Orientations for Road Safety 2011 (European Commission, 2011), which provide a governance framework and strategic objectives for action aimed at improving road safety at all levels and include the ambitious target of halving the 2010 fatality figure by 2020.

Under a Council Decision of 1993 (European Council, 1993) Member States have the obligation to communicate to the Commission data on road accidents resulting in death or injury that occur within their territories with a view to setting up a Community data bank, the CARE database. The quality and comparability of CARE data are overall satisfactory, except for the comparability of data on the injured. Moreover, a great deal remains to be done concerning risk exposure and performance indicators.

Currently, various types of investigations are conducted on road accidents across Europe by the police, insurance companies, researchers and other accident investigators. This produces a range of data including macroscopic data giving a general overview of the accident that is included in Member States' national statistics, and highly detailed data on the roadway,

vehicles and/or injuries that results from in-depth investigations. On a European level the need for macroscopic data is met through the development of the CARE database, a disaggregated pan-European accident dataset which incorporates the national statistics of the EU15 countries, with the exception of Germany.

The CARE database (European Commission) is considered today as the only existing disaggregated pan-European accident data set. At its original version it was comprised by the road accident data bases of the 15 EU member states. This European Community database has steadily grown within the period 2004-2008, within the framework of the co-funded SafetyNet EU Project, by progressively incorporating road accident data from 12 new EU member states (plus Norway and Switzerland).

The available European road safety data and knowledge have been integrated and made publicly available on the Internet through the European Road Safety Observatory (ERSO). Since then, the content of ERSO has been integrated into the "Europa" Commission Road Safety website (European Commission, 2013) which developed and validated standard protocols for core data and knowledge tools. The European Road Safety Observatory has been first developed as a pilot stage during the period 2004 - 2008 within the RTD project SafetyNet.

Since the mid 1990's a number of EU projects including STAIRS, PENDENT, RISER, MAIDS, EACS, ETAC and SafetyNet, have been commissioned to collect and devise methods to unify European data collection activities. This would then provide an in-depth database of comparable accidents allowing wide scale analysis and ultimately improving the understanding of the EU accident population. In spite of these several attempts at European level, none has been perpetuated and there was no available common database structure which can be easily used by a new team wishing to go into this type of investigation.

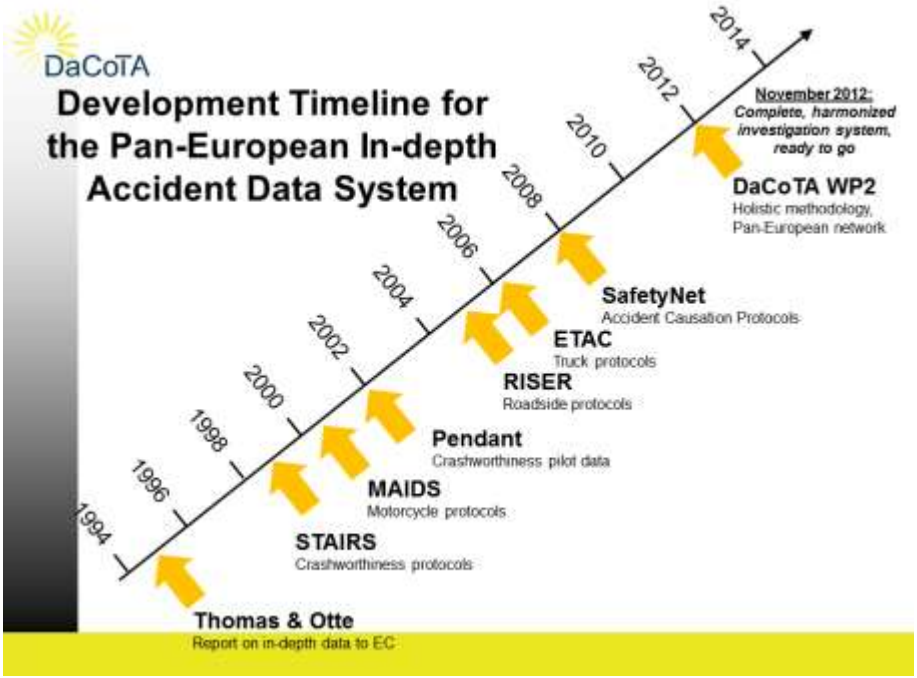

Figure 1: Key EU projects relating to in-depth data collection (DaCoTa, 2013)

The DaCoTA project (DaCoTa project, 2013) has been established with the support of DG-MOVE to further develop the content of the Observatory with additional data types and output tools. The DaCoTA project aims at further developing the European Road Safety Observatory (ERSO), specifically to improve commonly available data and tools in the road safety domain.

ERSO aims at providing objective data and information for all stakeholders that are involved in road safety, be it directly or indirectly. It is therefore important to assess thoroughly the needs felt by these actors in terms of knowledge, data, or information tool.

DaCoTa project has established a long list of recommendations based upon the final results of the project topics: road safety management systems, Pan-European in-depth accident investigation network, Data Warehouse, decision support, Safety and eSafety and Driver behaviour monitoring through naturalistic observations.

The results of the DaCoTA analyses on road safety management systems suggested that, although a number of "good practice" elements can be established as regards road safety management structures, processes and outputs, it is not possible to identify one single "good practice" model at the national level. Regarding the Pan-European in-depth accident investigation network, the next step is to initiate investigations of accident and injury causation at European scale and identify a suitable funding mechanism from a routine or research budget to support the network of teams in 19 EU Member States, each trained and having implemented the local infrastructure necessary for pilot investigations.

Furthermore, there is an absence of data in a structured manner that needs to be urgently addressed. Furthermore, there are other types of data that have not been previously addressed including health indicators, accident causation data, and information such as programmes, measures, legislation etc. The Data Warehouse as developed by DaCoTa has structured these data into a format permitting regular access through a dedicated website (http://safetyknowsys.swov.nl/). With the support of the European Commission and the Member States through the CARE experts group, this wide range of data has been gathered together in the form of Master Data Tables and used to develop a series of road safety analyses and syntheses.

Moreover, the rapid development of new sensing, communications and in-vehicle processing capabilities is opening up a host of new opportunities to improve casualty reduction. Technologies such as enhanced braking, stability control, lane keeping, driver status and others offer the capability to prevent or mitigate collisions. New autonomous systems, such as emergency braking are considered to have a great potential to improve casualty reduction. Nevertheless the capabilities to quantitively assess the benefits of the new systems has not yet matched the technological progress in the development of the systems. The proposed modification of the Periodic testing (Directive 2009/40/EC) (European Commission, 2009) to include the assessment of the continued function of electronic safety systems is considered to possibly be a mechanism to develop such a centralised resource.

In addition, the development of ERSO has largely taken place within the research domain, reflecting the need to establish coherency and rigour of the combined data and knowledge resources. While some of the products of data and tools are already available on the DG-MOVE website there are many parts that are not. However, the website is only the visible part of the underlying operation to gather and organise comparable data for the EU Member States. In order to make the transition from a series of research activities to become an institutional function, there are a number of procedures that need to be established before the Observatory can be considered to be fully functioning.

Many of the data and policymaking tools developed by the DaCoTA project and the Safetynet project are now mature and are ready to form part of ERSO. The following recommendations were made:

1. Establish terms of reference for the operation and future development of ERSO
2. Establish an advisory body
3. Establish a funding stream for routine data collection
4. Establish a procedure whereby the following data types and tools are updated annually and made available on ERSO

Table 1: Recommendations for institutional arrangements for ERSO

Another conclusion of this project is that, in principle, the Naturalistic Driving approach has substantial added value compared to more traditional data collection methods like crash registration and surveys, because Naturalistic Driving ensures continuous, automatic and standardized data collection. A prerequisite is that similar data acquisition systems and methods/definitions are applied. These systems as well as technology for data transfer and data storage are available and have been proven to be operational. Though the results of DaCoTa are purely focused on road safety and exposure data, the collected data will also be useful for other transport areas, in particular eco-driving, traffic management and even road maintenance. It can be summarised that the Naturalistic Driving approach allows for observing and analysing the interrelationship between driver, vehicle, road and other traffic in normal situations, in conflict situations and in actual crashes. So far Naturalistic Driving has been mainly used from a road safety perspective. However, in addition to road safety, Naturalistic Driving research is expected to provide valuable knowledge about human behaviour in relation to environmental issues such as exhaust emissions and fuel consumption, as well as to aspects related to traffic circulation, road capacity and traffic management.

More information on the causes and circumstances of the accidents was also provided by the project 'Promoting Real Life Observations for Gaining Understanding of road user behaviour in Europe' for short PROLOGUE (PROLOGUE, 2011) which aimed to contribute to reducing the number of road casualties in Europe by further developing and testing the naturalistic observation methodology.

This project came up with some recommendations which they were taken on board by the project UDRIVE (UDRIVE, 2013). UDRIVE aims at describing and quantifying road user behaviour in different European regions, in real conditions and near-crashes, and provide a quantified estimate of the risk of particular safety-critical behaviours, focussing especially on distraction and inattention, and on vulnerable road users; describing and quantifying road user behaviour. UDRIVE has not yet produced interim results as it has started this year.

In addition, another project that is also focusing on identifying research priorities for European road safety research over the next decade, including accident analysis is ca lledPROS is 2 year support action which that has released this year a number of interested reports.

A report (Peter Urban, 2012) produced by PROS project identifies the research topics with their priorities and addresses the data and knowledge needs of the serious injury strategy and its implementation. It will do it by developing tools that can be incorporated within the European Road Safety Observatory to enhance the available options for future casualty reduction and injury mitigation. In particular, this report provides input to the Horizon 2020 next work programme and identifies the following research needs.

Data methods - Prevention and mitigation of serious injuries to all road user types

- Common definition for serious and slight injuries among countries
- Development and validation of methods to measure the impact of injuries on individuals and on society at EU and national levels.
- Methodologies to evaluate the nature and causation of accidents with injuries (for EU level)
- Methodologies to evaluate the nature, causes and long-term effects of serious injuries
- Methods to link data from healthcare, trauma and other sources to inform safety policymaking
- Harmonisation and improvement of in-depth data collection methods for accident and injury causation
- Specification of in-depth exposure data to support measures of risk and risk reduction
- Development of methodologies for representativeness of in-depth data towards EU level

Real-world evaluation of performance of new safety systems for all types of road user

- Identification of vehicles equipped with advanced safety systems
- Methods to enhance accident analysis to quantify performance of safety systems of crash-involved vehicles
- Development and evaluation of incident data recorders to capture details of crash and near-miss events
- Improved reconstruction methods for crashes involving VRUs

Driving culture and safety

- Development of metrics to quantify driving behaviours
- Validation of metrics and relation to crash involvement rates
- Application of metrics to driver training and risk assessment

Table 2: PROS research priorities on methodological improvements in accident monitoring

The iMobility Forum SG discussed extensively this recommendation at the recommendation workshop on the 19th March 2013 but felt it was not sufficiently covered by its participants. The participants believed that the iMobility Forum should take an action in re-establishing a working group under iMobility Forum to tackle these issues in collaboration with the PROS project (European Commission, 2012) **and upon the findings and recommendations of the DaCoTa project.**

2.2 Impact Assessment

a) Consolidate and refine methodologies for an integrated approach to assess the potential impact of ICT for safe, smart and clean mobility.
b) Consolidate and refine a coordinated validation framework for operational tests in the Member States addressing ICT for safe, smart and clean mobility
c) Promote and carry out large scale evaluation and validation of priority safe, smart and clean mobility systems through Fields OperationalTests FOT or reuse of data from previous FOTs, in order to define future deployment actions.

In recent years, a lot of work has been done to evaluate new in-vehicle safety technologies in terms of their impact on road safety, efficiency and the environment, their effectiveness and costs.

The promotion of advanced technology, especially intelligent transport systems, for active safety (accident prevention) and passive safety (accident protection) was already being looked at in 2003, when the Commission adopted its Road Safety Action Programme (European Commission, 2010). The programme set out a mix of initiatives, at European and national level, focusing on improving vehicle safety, the safety of infrastructure and road users' behaviour.

Among the measures considered at that time was the use of alcohol interlocks, intelligent speed adaptation devices and collision warning devices. A lot has been achieved since then, particularly in the area of passive safety, thanks to improved technology and car design minimising injuries to passengers in the event of a collision. The rapid progress achieved in this area may be due to the greater marketing potential of such improvements, which are well understood and valued by the consumer, but also to the EU type-approval legal framework on vehicle safety in particular on frontal and lateral collision protection and pedestrian protection.

A report (Risto Öörni, Anna Schirokoff, VTT, 2012) produced by iMobility Challenge project focused on the deployment status of the ITS systems and provided information on potential impacts of the systems such as estimated CO2 reductions and safety impacts. The objective of the study was to provide a mapping of services and systems which support energy efficient and sustainable mobility. Main focus in the study was in cooperative ITS (intelligent transport systems) applications and systems which provide largest reductions in energy consumption. The aim of the study was to provide information on the deployment status of the systems, identify and list on-going research projects featuring the systems and provide information on potential impacts of the systems such as estimated CO2 reductions and safety impacts.

In total, 19 candidate systems were analysed in the study. 10 of them are covered by the list of priority iMobility systems, and 10 of them are cooperative systems. Two systems (fuel-efficient route choice including advance planning and speed alert) have both cooperative and stand-alone implementations. Nine of the 19 studied candidate systems were found to have at least potential positive impacts on environment. Of the nine systems having positive effects on environment, five systems (eco-driving assistance, eco-driving coaching, fuel-efficient route choice including advance planning, start-stop assistant and tire pressure monitoring system) had a quantitative estimate for reduction of CO2 or other emissions on the European level from earlier research. For the remaining four systems (speed alert, real-time travel and traffic information, cooperative adaptive cruise control, and dynamic traffic light optimisation and optimum speed advisory) the information on the impacts on CO2 emissions was specific to some conditions, covered only partly the functionality of the system or was a qualitative

expert assessment. Of the cooperative systems having positive impacts on environment, only one (fuel-efficient route choice including advance planning) had a quantitative estimate for CO2 reduction on the European level. Most studies on the impacts on CO2 emissions are based on simulations, expert opinion or small-scale field tests; this was expected because of the novelty of the systems under analysis. 13 of the 19 candidate systems analysed in the study were found to have at least potential positive impacts on safety of road users. Of these 13 systems, seven were cooperative systems. The methods used to estimate safety impacts are rather heterogeneous due to differences between systems and their level of maturity. For most systems, the estimates for safety impacts are based on simulations, expert opinion and small-scale field tests. Only limited amount of research was found to be available on the impacts of cooperative systems on traffic fluency and service level provided by transport system. This partly related to the novelty of the systems.

At present, effects of ITS on sustainability of transport are an active research topic. For example, assessment methods for impacts of ITS on CO_2 emissions are being developed in the ECOSTAND project discussed in a latter section of this report.

iMobility Challenge – Mapping of systems									
	Background		Criteria					Results	
	Priority iMobility system	Cooperative system	Environment	Safety	Mobility and efficiency	Technological maturity	Time horizon for deployment	System to be promoted to consumers	System to be promoted to decision-makers
Eco-driving assistance	X	-	+++	-	-	+++	+++	X	X
Eco-driving coaching	X	-	+++	-	-	+	++	-	X
eCall	X	X	-	+++	-	++	++	-	X
Fuel-efficient route choice including advance planning	-	(X)	++	-	-	+	++	-	X
Dynamic traffic light optimisation and optimum speed advisory	-	X	+	-	-	+	++	-	X
Cooperative adaptive cruise control	-	X	+	-	+	+	+	-	X
Intersection safety assistant	-	X	-	+/++	-	+	+	-	-
Start-stop assistant	(X)	-	++	-	-	+++	+++	X	X
Tyre pressure monitoring system	-	-	++	+	-	+++	+++	X	X
Cooperative local danger warning	-	X	-	+	+	+	+	-	-
Wrong way driving warning	-	X	-	+	-	+	+	-	-
Traffic signal violation warning	-	X	-	+	-	+	+	-	-
Speed alert	X	(X)	+	+++	-	+	++	-	X
Real-time traffic information	X	X	+	++	+	+++	+++	X	X
Post crash warning	-	X	-	+	-	-	+	-	-
Adaptive headlights	X	-	-	+	-	+++	+++	-	-
Emergency braking	X	-	-	++	-	+++	+++	-	-
Lane keeping support	X	-	-	++	+	+++	+++	-	-
Blind spot monitoring	X	-	-	+	-	+++	+++	-	-

Table 3: Mapping of Systems, (Risto Öörni, 2013)

Related work has been also carried out by iMobility Forum Implementation road maps working group and in eSafety Support, iCar Support and iMobility Support projects (http://www.imobilitysupport.eu). These projects have provided implementation road maps for priority iMobility systems identified by the iMobility Forum (Kulmala, R. and Öörni, 2012) and monitored the deployment of the iMobility priority systems. However, the iMobility Implementation road map mainly focused on the existing iMobility priority systems according to the priorities of the iMobility Forum but did not provide an extensive mapping of potential new priority systems to be promoted.

Detailed information provided on the impacts of the systems is already available in the iMobility effects database (iMobility Support, 2013).

The safety, traffic efficiency and environmental impacts described in the iMobility Implementation road map are presented in the tables below.

System	Accident type specifically affected	Local results in specific conditions for effects on all accidents for vehicles or roads equipped based on research incorporating accident analysis
Obstacle & collision warning	rear-end crashes	-
Emergency braking	rear-end crashes	all fatalities EU -7% all injuries EU -7%
Blind spot monitoring	side collisions	-
Lane keeping support	head-on or run-off-road, side collisions	injuries EU -2 to -6% all fatalities EU -5 to -10%
RTTI	accidents in adverse conditions, pile-ups	accidents in slippery conditions -5 to -15%
Dynamic traffic mgmt (VMS)	accidents in adverse conditions, pile-ups	all injury crashes -5 to -20% all fatal crashes -10 to -25%
Local danger warning	accidents in adverse conditions, pile-ups	all injury crashes -1 to -15%
Extended environmental information	accidents in adverse environmental conditions	-
eCall		all fatalities -2 to -15%; EU -6% severe injuries -3 to -15%; EU -6%

Speed alert (active accelerator pedal version)	accidents caused by exceeding speed limits	all injuries EU -6% all fatalities EU -9%
Dynamic navigation	all accidents	reduced exposure but increased accident rate due to driving on lower category roads
Eco-driving	accidents caused by exceeding speed limits	Similar effects as speed alert if the functionality includes that part

Table 4: Expected safety impacts of iMobility priority systems based on research results and expert assessments (Kulmala and Öörni, 2012).

System	Efficiency impacts (effects on travel time and total delays)	Environmental impacts (effects on fuel consumption and CO_2 emissions)
Obstacle & collision warning	motorways: -0.11 .. -0.12%	-3%
Emergency braking	reduction in congestion costs: 0.27% .. 0.69%	~0%
Blind spot monitoring	-	-
Adaptive head lights	-	-
Lane keeping support	reduction in congestion costs: 0.37 .. 1.25%	~0%
RTTI	-	may increase or decrease
Dynamic traffic mgmt (VMS)	ramp metering: -3.5 .. -35% ** hard shoulder running: -2% .. -26% ** variable speed limits: -5% .. +16.3%	ramp metering: -2.5% .. +2.7% ** hard shoulder running: -4% ** variable speed limits: may increase or decrease
Local danger warning	-1% .. -2% (impact on average speed: -1% .. -2%) **	very small

Extended environmental information	-	-
eCall	reduction in congestion costs: <0.1%	~0%
Speed alert (active accelerator pedal version)	urban roads: -1.1% .. -1.7% rural roads: -0.5% .. -1.0% (impact on average speed: urban roads: -1.1 .. -1.7% rural roads -0.5 .. -1.0%)	may increase or decrease
Dynamic navigation	-	-2%
Eco-driving	-	-3% .. -11%
** estimate applicable to certain location or conditions		

Table 5: Expected efficiency and environmental benefits of iMobility priority systems based on research results and expert assessments (Kulmala and Öörni, 2012).

euroFOT's motivation was to evaluate different on-board functions with regard to traffic safety, efficiency and the environment. The euroFOT project (euroFOT, 2008) developed the first large scale Field Operational Test, with a focus on intelligent vehicles equipped with Advanced Driver Assistance Systems (ADAS) and used by ordinary drivers in real traffic.

The findings of the first large-scale European Field Operational Test on active safety systems were announced in a press release (euroFOT, 2012). Adaptive Cruise Control (ACC) and Forward Collision Warning (FCW) – Cars equipped with both systems have the potential to affect these accidents for example by reducing their severity or reduce their number with the percentages up to 5.7 percent of the injury accidents on motorways, while trucks could potentially affect up to 0.6 percent of these accidents.

euroFOT findings concluded that ACC and FCW in passenger cars might have a positive effect on the overall crash statistics, for all road types. Additionally, positive indirect effects on traffic efficiency could be identified. Due to the potential reduction of accidents the annual incidental delay calculated in lost vehicle hours could be lowered about more than three million hours on an EU-27 level.

The environmental impact, which was measured in terms of fuel consumption, showed a reduction of about three percent for passenger cars and two percent for trucks without considering the benefits from changes in traffic efficiency. Drivers participating in the study also noted that ACC and FCW was a highly appreciated and used function that increased driver comfort as well as safety.

Navigation Systems – the analysis shows that navigation systems are highly accepted and widely used, particularly on long trips on unfamiliar routes. These systems allow a fuel

efficient route choice, depending on their routing algorithm. Overall, the positive effect on driver behaviour is reflected in positive changes in lane keeping behaviour, distance to the lead vehicle and harsh braking events. Blind Spot Information System (BLIS) - Approximately 80 percent of drivers felt that BLIS increases safety. It is perceived as most useful on urban roads in heavy traffic and is not perceived as increasing workload. On written feedback, most drivers consider BLIS as an important complement to visual checks, rather than as a primary source of information. Speed Regulation System (SRS = Speed Limiter (SL) + Cruise Control (CC)) - It was observed that over-speeding and harsh braking events were reduced when SL is active. The effect of CC on over-speeding was a strong increase while strong jerk, critical time gap, and harsh braking occurrences were reduced.

Impact assessment results have also been interesting in CityMobil. CityMobil2 (Citymobil , 2013) building upon the first project results is setting up a pilot platform for automated road transport systems, which will be implemented in several urban environments across Europe. Automated transport systems are made up of vehicles operating without a driver in collective mode. Among its objectives, an impact assessment of these technologies is going to take place. Many cities, regions and equivalent sites are committed to making automated transport system deployment happen. They are Reggio Calabria, La Rochelle, Brussels, Trikala, Oristano, León, Vantaa, West Lausanne region, Milan, San Sebastian, Sophia Anpolis and CERN.

TeleFOT (TeleFOT, 2008) was a large-scale collaborative project under the seventh Framework Programme, co-funded by the European Commission DG Information Society and Media within the strategic objective "ICT for Cooperative Systems". Started on 1 June 2008, TeleFOT aimed to test the impacts of driver support functions on the driving task with large fleets of test drivers in real-life driving conditions. In particular, TeleFOT assessed via Field Operational Tests (FOTs) the impacts of functions provided by aftermarket and nomadic devices, including present mature services and future interactive traffic services that will become part of driving environment systems within the next five years. Field Operational Tests developed in TeleFOT led to a comprehensive assessment of the efficiency, quality, robustness and user friendliness of in-vehicle systems, such as ICT, for smarter, safer and cleaner driving. TeleFOT concluded on 30th November 2012.

With almost 3,000 drivers covering a combined distance of more than 10 million kilometres in eight European countries, the project studied the impacts of driver support functions provided by in-vehicle aftermarket devices on safety, efficiency, mobility, and the environment and driver behaviour in road traffic. The user acceptance and uptake of the services were also studied. The services tested included Static and Dynamic Navigation Support, Green Driving Support, Speed Limit Information, Traffic Information and eCall. The main benefits of the functions were perceived by the participants to be Convenience (easy access to information), Comfort (less uncertainty, fewer driving errors), Economic (less cost) and Environment (fewer emissions).

As described by TeleFOT project (Mononen,P., Franzen, S., Pagle, K., Morris,A. , 2013), of the tested devices, navigators and traffic information systems, in particular, increased efficiency by allowing drivers to find quicker and less congested routes. Up to 45% of participants, particularly those in large cities reported that the Traffic Information function helped them to avoid travel delays and traffic jams. Green driving systems guided drivers to routes that lowered their emissions, and towards driving more economically. Green driving advisory systems were found to reduce fuel consumption by up to 6%. The use of a green driving system in a bus fleet helped to lower fuel consumption and to reduce speeding, which also improves road safety. Another significant finding is that the systems reduced driving-related stress and anxiety across the board and, in all the participating countries, increased the drivers' sense of safety and driving comfort.

From the perspective of mobility, the results were positive for all systems. The users' expectations for the services were high at first. After using the services for some time, they were slightly disappointed not to have seen a direct benefit. The longer they used the services, the more clearly they could see the benefits and advantages, and the more satisfied they were. Participant's assessments of the designs of the devices were positive but there were some negative views. Acceptance of the devices changed over time – acceptance results in usage rather than vice-versa. There is no evidence to suggest that the TeleFOT functions affected mode of Transport and timing of commuting journeys. Eyes off road time were found to increase when the navigation function was introduced although the green-driving function did not change visual behaviour.

Navigation support has positive implications in all areas of Mobility and many aspects of Efficiency but the function effects are small for Environment. Some effects for Safety are evident in terms of distance travelled (reduces) and distraction (increases). Traffic Information is positive for mobility in terms of reduced journey duration and reductions in stress and uncertainty. It was also positive for Efficiency in terms of reduced travel durations, reduced headway variations and perception of avoidance of congestion. The impact of this function on Environment was inconclusive. Speed information/alert had a small but mainly positive effect for mobility, efficiency and safety. The green-driving function was found to decrease fuel consumption but increase journey duration. Average speed was found to decrease with use of the green-driving function. Average speed and speed variance were both smaller with this function. The green-driving function had a positive effect on efficiency and environment. This function had a mixed effect on mobility and a negative effect on safety (by changing exposure).

A general understanding of the benefits of cooperative systems exists today, but those systems have been evaluated in small-scale experiments until now, mostly on closed test tracks. There is no proof of these benefits yet with many communicating vehicles driven by ordinary people in variable conditions on roads. The DRIVE C2X project builds strongly on previous and on-going work on cooperative traffic systems. The Europe-wide testing community comprises of seven test sites in Finland, France, Germany, Italy, the Netherlands, Spain, and Sweden. Essential activities in this project are defining the test methodology and evaluating the impact of cooperative driving functions on users, the environment and society. A number of field trials with cooperative systems were also ongoing in various European member states such as simTD in Germany, SCORE@F in France or SAFER in Sweden. Also, these field trials are focusing on national particularities only and do not consider European aspects.

DRIVE C2X is above all a methodological activity, since the main objective is to show the most likely impacts of cooperative systems on users, society and provide useful information for further development of cooperative systems. The purpose of this project is to bind together and harmonise existing European test sites for common testing and coordinate this testing according to mutually agreed methodology and operation procedures.

The DRIVE C2X test sites pre-validation results (Kerry Malone, 2013) reveal that the Car2X technology is very well received among the participants. In particular, participants who have an affinity with technology and innovations are very open to this technology. More than two thirds of participants claim that they are even excited about C2X technology. Safety-related use cases are of the highest importance. Information and warnings after an accident, before the end of a traffic jam, in bad weather, and in the event of obstacles on the road are regarded as the most important. This also has an effect on the cost model regarding the C2X functions: 54% of customers state that the basic safety functions should be available as standard; however, additional functions should be activated at a one-off surcharge. A higher procurement price is therefore accepted, while additional costs are viewed critically. As this

project is moving towards its end, the final validation results from the test sites will be revealed next year.

		Use Case	Finland	France	Germany	Italy	Spain	Sweden
		Safety						
TJAW		Traffic jam ahead warning		N		C	C/N	
RWW		Roadworks warning	C	N/C	C	C	C/N	N
CBW/PCW		Car breakdown/Post crash warning	C	N/C	C	C	C/N	N
AEV		Approaching emergency vehicle			C	C	C	
WW		Weather Warning	C	N/C	C		C/N	N
EEBL		Emergency electronic brake lights			C			
SVW		Slow vehicle warning			C	T		
OW		Obstacle Warning		N/C	C	T		
WWDGS		Wrong Way driving in Gas Stations			C	T		
MAI		Motorcycle Approaching Indication			C	T		
		Traffic Efficiency						
IVS		In-vehicle signage / Speed Limit	C	N/C	C	C	C/N	N
GLOSA		Greenlight optimal speed advisory		T	C		C	N/C
		Infotainment and Commercial Back-end						
POIN		*Point of interest notification*		N/C	C			

N: Naturalistic – C: Controlled – T: Technical testing

Figure 2: DRIVE C2X test sites versus use cases (Kerry Malone, 2013)

HeERO project (European Commission) has started with a state-of the-art analysis of the eCall value chain to identify system implementation requirements and necessary infrastructure upgrades. The focus was on in-vehicle system equipment interface, Telecommunication infrastructure (specifically 112/E112 related parts) and PSAP infrastructure. Based on the analysis' results an implementation plan is prepared for each country, to guide the service implementation and testing. Similarly eCall training manuals and emergency procedures will be prepared for the handling of in-vehicles E112 emergency calls. This operation phase is happening in real-life situations and aims at testing the implemented components. The goal is to assess all systems required for the end-to-end operation of the pan-European eCall. Tests results will be evaluated and deployment enablers/ barriers will be identified. These overall pilot outcomes will be included in the final recommendations for future eCall Deployment in Europe.

Another project is UDRIVE (UDRIVE project, 2012) which is the first of its kind large-scale European Naturalistic Driving Study. By collecting and analysing data from hundreds of vehicles, experts will be able to determine the impact of driver behaviour on road safety and the environment, and therefore bring about new solutions to improve safety and efficiency on European roads. UDRIVE is collecting huge amounts of data on passenger cars, trucks, and powered two-wheelers in seven European countries. In order to ensure that the data collection process takes place in naturalistic conditions – meaning that the behaviour of road users is observed unobtrusively in a natural setting – ordinary drivers and riders will be recruited by the UDRIVE Operation Sites.

With the analysis of the collected data, UDRIVE will aim at describing and quantifying road user behaviour in different European regions, in real conditions and (near-)crashes, and provide a quantified estimate of the risk of particular safety-critical behaviours, focussing

especially on distraction and inattention, and on vulnerable road users; describing and quantifying road user behaviour in relation to emission levels and fuel consumption, focussing in particular on eco-driving; identifying new approaches, measures and tools to make the traffic system safer and more sustainable. After it is concluded, UDRIVE will offer access to the collected data so that they can be consulted and used for subsequent analyses by road safety and environmental experts from all over the world.

A recent workshop (ERTICO, 2013) organised by the FOTnet2 and COMeSafety2 support & coordination actions in May 2013, presented the current status of European activities (FOTs) around the theme of deployment of cooperative ITS (C-ITS). Main results from the workshop are that FOTs focused on C-ITS functions evaluation suffer from the difficulty to collect a high number of events. This means, according to some panelists and other workshop participants that simulation could be an important integration of FOTs. Also, as is the case of some currently running C-ITS FOTs, the experimentation, due to some prototypical characteristics of the used devices, provides valuable results in the system and functions validation. It was concluded that there is not a good frame for learning lessons from FOTs etc, and for spreading that knowledge and also there is a need to add experience learned from industrial projects, not just EU-funded research e.g. there is much to learn about integrating C-ITS with existing systems, configuration etc. CIP pilots are of quite small scale and localised, so not so favourable for learning Europe-wide lessons. eCall pilots are good example of how to share experience within a large-scale European programme.

Another report produced by FOT-Net 2 (ERTICO, 2013) described the ''FOT achievements and opportunities for the future''. Main outcomes of this workshop that is worthwhile examining:

- Definition and selection of research questions. Stakeholder's needs should drive the process. Research should be iterative (but where to stop?). There are issues balancing between theoretical and practical issues and prioritising between them.
- Understanding the mechanisms (hypotheses) in FOTs versus understanding causation (why did this happen) in naturalistic driving systems (NDS).
- The focus in FESTA still is very much on Safety, but the problem is that accidents/events do not happen often enough to allow robust statistical analysis and interpretation, FOTs and NDS, however, also target other impact areas. There needs to be an editorial in the FESTA guidelines that makes the leap between the original safety focus and general good practice for other impact areas. A revision of the FESTA handbook would need to take into account revised definitions of research questions in order to make it better applicable to Naturalistic Driving Studies.
- Different approaches can be used in a mix of methods (eg semi-controlled, simulator..) but this would require a review of the definition of a FOT. Baselines can be taken from the data but also from other projects.
- A FOT-plan is recommended as it combines the theoretical approach with practical implementation, considering where to start and incorporating feedback loops and re-assessment of activities. In order to mitigate risks it is essential to identify them early on.
- Consideration of FOT data analysis, strongly suggested taking a 'Layered approach' and automating analysis wherever possible due to the volume of data to be analysed (and also to ensure standardisation of results). Standardisation more generally was an issue for data quality (e.g. of accident data, interoperability of services, ...). . In the meantime, documentation, standardisation and automation of routines is

recommended in order to ensure that the skills and learning from FOTs are 'hard-wired' and are not lost as individuals move on. • The increasing use of probe data in studies may provide new directions and opportunities. • FOTs should not be overoptimistic in producing statistically conclusive results. Because FOTs are expensive and it is sometimes challenging to produce statistically significant and meaningful results, management of expectations amongst all project partners is therefore important. Aggregation across projects can increase the volume of data but there are barriers to doing this through different project-specific data issues and incompatibility. The group agreed that often 'Less is more' is a useful adage – i.e. FOTs should concentrate on achievable outcomes and studies that can be expanded pragmatically.

Table 6: FOT achievements and opportunities for the future, (Yvonne Barnard, 2013)

Regarding reuse of data, FOT-Net Data project has recently kicked off and is a Support Action for deeper international co-operation that targets efficient sharing and re-use of global data sets in up-coming analysis projects which will be drafted for next EU calls and also for calls on the national level. It continues European and international networking activities in the domain of Field Operational Tests (FOT).

During the lifetime of the different FOTs carried out both at national and European levels, there is a crucial need for a networking platform allowing individual FOTs to benefit from each others' experiences as well as giving a better overview of the scattered activities.

While FOT-Net 1&2 were focusing on setting up the FOT network and maintaining the FOT methodology, FOT-Net Data explicitly addresses the need to exploit the collected data. The prime goal of FOT-Net Data is to maintain and increase the momentum achieved in FOT-Net and develop the strategy for sharing and exploiting collected FOT data in National, European and international FOTs (e.g. US and Japan). FOT-Net Data develops and promotes a framework for sharing data. It takes into account the pre-requisites necessary in the FOTs, such as legal agreements, to enable future re-use of collected data. More importantly, it addresses the actual data sharing and the procedures, templates and services needed for successful research on data gathered in earlier projects. It builds a detailed catalogue of available data, enabling organizations to easily assess the value of different data sets for their research purposes.

The aim of the Amitran project (European Commission, 2013) is to develop a framework for the evaluation of the effects of ITS applications on energy efficiency and consequently on CO2emissions.Ambition of the project is to define a reference methodology that can be applied in future projects that assess the impacts on CO2emissions the deployment of various ITS applications can induce. The scope of Amitran includes all transport modes and existing types of ITS applications, except for applications related to air and deep sea transport. Additionally, the methodology is designed in such a way that future inclusion of new types of ITS applications is possible.

The calculation of CO2 emissions using the Amitran framework includes a number of steps. First step is the identification of ITS systems and services that influence parameters of user behaviour or transport characteristics, and this step is followed by the correlation of those to parameters affecting CO2emission. Then, a reference CO2assessment methodology for the various ITS applications is set up, based on the design of open interfaces for models and simulation tools. The last step in the Amitran framework is the scaling up of the

CO2emissions: the extrapolation of impacts on CO2emissionsfrom local level to a higher level, for example country or EU-27 level.

The iMobility Forum SG suggests that there is a need of a project independent and consistent on impact assessment tests on both safe smart and clean mobility systems taking into account results by Amitran and FOTnet project. This could be a probable action for the SATIE project to develop guidelines / evaluation for large scale pilot. More work is required on impact assessment and automation of the mobility system and services and vulnerable road users. Furthermore, it is important to capitalise on the existing FOT results in order to produce EU data sharing framework and fair coordinated validation framework for operational tests in the member states.

2.3 Human Machine Interaction

a) Development should be monitored such that the ESoP can be re-visited periodically (at least every 3 years) providing a balance between current relevance and stability.
b) Develop robust assessment procedures and safety-relevant criteria where practicable starting with safe fixing (including field of view) for nomadic devices.

On 21st December 1999, following requests from Member States, the Commission adopted a "Recommendation on safe and efficient in-vehicle information and communication systems: a European Statement of Principles on human machine interface”.".

In July 2001 the Commission's Expert Group published a report on updating and expanding the principles. During 2003/4 the eSafety WG on HMI provided a forum for stakeholders to discuss the ESoP further and finalised its report to the European Commission in early 2005. The Commission made some funding available through existing HMI-related projects HUMANIST and AIDE and invited a small group of HMI specialists to implement the WG-HMI recommendations concerning the ESoP. A specific focus for attention was the increasing popularity of portable "nomadic" devices by drivers within vehicles.

The resulting 2006 ESoP (Commission Recommendation of 22nd December 2006 published on 6th February 2007 applies to both portable and permanently installed information systems and hence applies to OEM systems and to after-market and nomadic devices.

Following a request for clarification from ACEA, a further ESoP was published on 12th August 2008 which includes minor modifications (one footnote) clarifying visual displays' mounting.

The first part of the ESoP incorporates 37 principles formulated as generic goals to be achieved by the design of a safe and user-friendly HMI of in-vehicle information andan communication systems intended to be used by the driver while driving.

These principles of the ESoP (2008) are organised into 6 groups:

- Design goals (5)
- Installation principles (6)
- Information presentation principles (5)
- Principles on interaction with displays and controls (9)
- System behaviour principles (5)
- Principles on information about the system (7)

In addition, there are principles concerning Recommendations on Safe Use which comprise essential safety aspects related to use of, and influencing use of, in-vehicle information and

communication systems. Following text concerning the context of use, principles are presented relevant for Employers, Point-of-sale, Vehicle Hire Companies and drivers themselves.

A meeting with Member States on 30th September 2008 made a number of recommendations and requests including the re-activation of the WG-HMI under the eSafety Forum. The WG-HMI then worked from January to October 2009 and produced a consensus report containing detailed recommendations for short?term ESoP development as well as for future investigations. It was reported that verification criteria for the ESoP as a whole was not considered achievable, but in some cases might be desirable. The WG-HMI identified a need to monitor on-going developments such that the ESoP can be re?visited periodically (at least every three years) providing a balance between current relevance and stability. Thethe WG also stressed that solutions at the level of individual Member States or regions should be avoided.

In 2012 NHTSA in the USA published work reviewing research on distraction and international guidelines (including the ESoP). They also proposed as voluntary guidelines a series of lock-out requirements for specific functions and verification criteria for visual-manual interfaces to limit distraction while driving. Following consultation and feedback a final set of guidelines was published in April 2013.

Nomadic device integration is a specific challenge and requires co-operation between automotive industry and nomadic device manufacturers. A Nomadic Devices Forum, was established as a WG under the eSafety umbrella and reported in September 2009 with proposals for technical safe integration. Since then, there has been considerable commercial activity, including proliferation of smartphonesSmartphones and also establishment of the Car Connectivity Consortium. In parallel, but separately from the WG-HMI, a new iMobility working Group (WG-SafeApps) is being established to consider verification and certification procedures for integration of Nomadic Devices into vehicles.

The new WG-HMI will take into account the 2009 work by the WG-HMI. It focuses on the interaction between the driver and on-vehicle technology such as driver information, communication and warning systems (Human Machine Interaction - HMI). The **European** Statement of Principles on HMI (ESoP) was published as an EC Recommendation in 2008 and the need for its further development was identified by the WG-HMI in 2009. Since then, the EC has published the ITS Action Plan which includes HMI. The need for new activity in the area, subject to confirmation by the EC, will also take place in the context of recent R&D and the new distraction guidelines published by NHTSA.

EC funded projects which have dealt in the past with the ESoP was the NoE Humanist project. The HUMANIST Virtual Centre of Excellence in order to assist in the revision of the ESoP proposed a "Support action to contribute to the preparation of future community research programme in user centred Design for ECO-multimodal MOBILity DECOMOBIL" project. Objective The objective of the DECOMOBIL project is to contribute to the acceptability and the usability of ICT for cleaner and safer mobility through identification, discussion and dissemination of updated knowledge and know-how in HMI and Human Centred Design areas towards the ITS community at a European and international level.

In addition, there are several projects on Cooperative ITS which are dealing with Human machine interaction such as DRIVEC2X and eCoMove. The preliminary results of both projects show that the different safety and efficiency applications which were tasted intotested within the specified test sites did not incorporate a uniform HMI interface thus comparability of the results among the test sites could not be properly evaluated. The final results of these two projects due next year are going to provide more information and recommendations.

Apart from that, there are several standardisation organisations (SDOs) who are dealing with HMI. However, standardisation activities of CEN, ISO and ITU should be strengthened and contribution by the iMobility Forum HMI with the assistance of the project partners of eCoMove and DRIVE C2X is required to ensure that standardised HMI is considered when deploying large scale.

It can be overall concluded that there is a need to update both the scope and the existing ESoP principles taking into account the latest technological developments but noting that the European approach is distinctly different from the "lockouts and specific criteria" adopted by the US's NHTSA guidelines. At the moment the iMF WG-HMI is working on this issue with a number of stakeholders and with the guidance of the EC.

2.4 Implementation Road Maps

a) **Continuously identify the priority systems, their potential to improve safe, smart and clean road mobility, and update regularly Road Maps (including the monitoring of implementation of intelligent integrated systems) with technical steps and economic implications for the introduction of safe, smart and clean systems in Europe.**

b) **Set up and maintain a good-quality quantitative process for monitoring the vehicle penetration and road infrastructure coverage of priority systems**

iMobility implementation road map provides implementation road maps for priority iMobility systems identified by the iMobility Implementation road maps working group (Öörni and Kulmala, 2012). The report provides definitions for the priority systems, summarizes their safety, traffic efficiency and environmental impacts, and provides implementation road maps for them.

For vehicle based systems, the measure used to describe deployment status is the fleet penetration. Fleet penetration can be defined as a share of vehicles equipped with the system of the whole fleet. In this study, the analysis includes only vehicles in class M1 unless otherwise stated. Data on European vehicle fleet has been obtained from Eurostat. The size of vehicle fleet in EU27 countries has been calculated by adding together the latest figures available from Eurostat for each member state.

For infrastructure based systems, measuring deployment status is a more complex task. For those systems, the availability of the whole service chain is a prerequisite for a fully operational system. This is the case, for example, with real-time traffic information and eCall. There are also priority systems which have several implementations with different functional and technical architectures. In these cases, only the most widely deployed implementations have been analysed. In case of infrastructure based systems, information on both fleet penetration and infrastructure coverage is required to assess the deployment status. In general, infrastructure coverage can be understood as the availability of the whole service chain from data sources to service provision to the end-user within some defined geographical area. In other words, analysis of the infrastructure coverage is not possible without a description of ICT infrastructure required by the service and a definition of infrastructure coverage.

The iMobility Forum working group concentrated on monitoring and promoting the deployment of the priority systems using a two way approach. The short-term approach to monitoring has to be based on existing data sources and tools. The methodology as described by iMobility Forum working group on IRM includes five main components: the expert estimates and

national data provided by iMobility observers network as a response to a questionnaire, analysis of PTI data available from Germany (FSD) for vehicle based systems, literature study, supplier interviews and analysis of mobile applications available at platform specific applications stores such as iTunes, Android Market and Nokia Ovi Store.

However, until recently, no consistent EU-wide information concerning the deployment status of the different systems had been available. Two minor studies (FSD, 2012) have been conducted under the control of the iMobility Forum / iCar Support. The first one was a combined study from FSD and IERC on the deployment state in EU Member States Implementation of vehicle based priority systems as proposed by the Implementation road Maps working group. From on one hand FSD made an OEM data evaluation for deployment rates for whole Europe for the years 2010 and 2011. On another hand, Institute for Economic Research and Consulting GmbH used its models for European fleets to make predictions to deployment rates for the future (e.g. 2015 and 2020). The study was contracted from May 2012- October 2012. Results of the study from FSD include the deployment rates for the EU in total and for each of its 27 member states for passenger cars newly registered in the years 2010 and 2011.

Reliable knowledge of the actual deployment statuses of those ITS systems would be helpful to identify systems and countries with more successful market penetration, and to create realistic market penetration predictions, which might serve as a basis of decision making for possible future type approval requirements.

Priority System	**Priority System Name**	**EU 27 Deployment Rate 2010**	**EU 27 Deployment Rate 2011**
PS 1	Blind Spot Monitoring	0,566%	0,965%
PS 2	Adaptive Headlights	9,701%	11,908%
PS 3	Obstacle & Collision Warning	1,767%	2,775%
PS 4	Lane Keeping Support	0,547%	0,896%
PS 5	Emergency Braking	0,335%	1,060%
PS 6	Eco Driving Support	4,479%	16,203%

Table 7: FSD deployment rates for 2010, 2011, (Jörg van Calker, 2011)

The study on the estimation of future deployment rates led to a reliable first guess of a demand function for electronic safety systems.

	Blind Spot Monitoring	Adaptive Headlights	Obstacle & Collision Warning	Lane Keeping Support	Emergency Braking
2015	0,56%	9,30%	1,20%	0,48%	0,43%

2020	0,57%	9,52%	1,23%	0,49%	0,44%

Table 8: Annual Average deployment rates of priority systems for new registered passenger cars for EU-27 in percent for the years 2015 to 2020, (Jörg van Calker, 2011)

While some iMobility priority systems are clearly stand-alone systems, most of them typically involve communication between vehicles, roadside and back-office systems and individual travellers. Most infrastructure related systems such as eCall, extended FCD, RTTI, dynamic traffic management, local danger warning and dynamic navigation include the cooperative element either by definition or in the typical implementation of the system. Even though most of the vehicle based priority systems are stand-alone in-vehicle systems, many of them will likely benefit from V2V or V2I communication in future (blind spot monitoring, obstacle and collision warning, emergency braking). Information on the deployment status of priority systems is needed to monitor the progress in deployment, the effectiveness of measures taken to accelerate deployment and the progress towards the political goals expressed in the Digital Agenda for Europe and the White Paper on Transport.

In the current situation, the availability of information on the deployment status of various applications is limited. The information currently available is fragmented and not available in a consistent manner for different member states and applications. This problem can be solved through the collection of information from various sources to provide an overview of the deployment status of priority systems in different member states. Whenever new cooperative or other ITS systems appear on the market, the iMobility Forum will probably consider including them in the list of priority systems when the implementation road map is updated. In this case, iMobility Support will adjust to these changes and extend the list of systems being monitored.

At the moment, with the support of iMobility Support project and the iMobility Forum WG IRM it is possible to maintain a good-quality quantitative process for monitoring the vehicle penetration. However for ensuring a good balance there is also a need for monitoring the road infrastructure coverage of priority systems.

This was performed in the past by the EasyWay project. EasyWay was the biggest European project focusing on the deployment of Intelligent Transport Systems (ITS) for roads. EasyWay involved 30 European countries and addressed EU transport objectives, regarding namely the deployment of ITS on the major road networks across Europe. The Easyway project developed the Deployment Guidelines which provide valuable information in the scope of the ITS Directive (2010/40/EU) process, which has been established to define a legal framework for ITS deployment in Europe.

The EW Deployment Guidelines (EasyWay, 2012) provide guidance to the EasyWay partners in charge of the implementation of ITS Core Services. The EasyWay Deployment Guidelines include:

- A definition of the Core Services;
- A set of functional and organisational requirements and recommendations that shall be applied when implementing an ITS Core Service;
- A set of technical requirements and recommendations that foster interoperability of Core Service implementations;•
- A set of requirements and recommendations that enable the users of the service to experience a common "look & feel" wherever they use the service (especially concerning the way information is displayed);
- A recommended level of service (a minimum and an optimum) in accordance with the considered Operating Environment.

Table 9: EW Deployment Guidelines

At the moment, the member states are requested by the ITS Directive to report about the national deployment of ITS application, however the information provided is too limited and not detailed which could provide a full picture.

Given the present constraints on public funding and the recognition that the problems of congestion and air quality, etc are unacceptable economic and social burdens, wise investment by both public and private organisations in the intelligent management of existing infrastructure is essential. The iMobility Forum working group will continue monitoring the priority systems in the future. The assistance and involvement of the iMobility WG on IRM in this process could assist the EC with this information. In addition, it would be necessary to ensure a continuation of a project (ex EasyWay) under TEN-T programme focusing on the deployment of Intelligent Transport Systems (ITS) for roads.

2.5 Cooperative Mobility services

a) Move forward international co-operation in the development and deployment of cooperative mobility systems and services.
b) Establish mechanism and processes to agree on pathway towards deployment of cooperative systems to achieve minimum level of market penetration to start the services as well as to achieve maximum sustainable interoperability and ease the provision of new services in line with market demand

As the name suggests, cooperative ITS comprises a group of technologies and systems that cooperate amongst each other, through some kind of direct communication. In the case of vehicles we talk of vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and infrastructure-to-vehicle (I2V) systems.

Figure 3: Cooperative ITS vision (Martin Arndt, 2013)

Data communication required by a cooperative ITS application can be based on any current technology suitable for mobile application, such as cellular network communications (e.g. 2.5G, 3G or LTE), wireless LAN (Wi-Fi, or IEEE 802.11b, -g, -n) or dedicated short-range communication (IEEE 802.11p and associated standards), that in Europe uses 75 MHz of reserved bandwidth at 5.9GHz (known as "ITS-G5" in ETSI TC ITS and CALM M5 in ISO TC 204). While conventional Wi-Fi is not optimised for mobile use, ITS-G5 can support communication between fast-moving vehicles or between them and roadside equipment.

The term “cooperative ITS” is defined in an ISO standard, ISO/DTR 17465 (“Intelligent transport systems - Definition of terms for "Cooperative ITS" and guidelines for standards”). The definition adopted in the EC Mandate M/453 (M/453, M/453, Joint CEN and ETSI Response to Mandate, 2010) to the European SDOs is:

“Cooperative ITS is a subset of the overall ITS that communicates and shares information between ITS stations to give advice or facilitate actions with the objective of improving safety, sustainability, efficiency and comfort beyond the scope of stand-alone systems.

Over the last decade, the interoperability and potential benefits of Cooperative Systems have been investigated and thoroughly tested in several national and European research projects. The technical systems allowing vehicles to communicate with infrastructure, known as Car2X Technology, will be ready for use in the second half of the decade on European roads.

In recent years, advanced mobile telecommunication networks such as 3G and 4G are increasingly supporting mobile internet services, and this has led to a rapid growth of machine-to-machine technologies (where devices and sensors are connected) and to the “Internet of Things”. At the same time, we are seeing a huge growth in the penetration of “smartphones” amongst ordinary users, stimulated by a vast number of user applications in “app stores” for all the main handset operating systems, such as the Apple iStore, Android Play and Windows Store. Many of these apps provide services for travellers, including traffic information, public transport timetables and arrival time information, ticketing and mobile payment, parking information and payment, eco-driving support etc. While some of these only offer one-way information, many do enable a fully interactive service, such as real-time ride-sharing.

There are several initiatives which will move closer towards deployment and interoperability of on cooperative systems. A complete list of C-ITS projects can be retrieved in the ANNEX I. In this report we examine only those projects and initiatives to date in 2013.

The CAR2CAR Communication Consortium is an industrial driven, non-profit association funded by European vehicle manufacturers and supported by equipment suppliers as well as research institutions. Currently 58 partners - 12 vehicle manufacturers, 16 suppliers and 30 research organisations - work together in the CAR2CAR Communication Consortium on non-profit basis with the aim of enhancing traffic safety and efficiency due to cooperative Intelligent Transport Systems. In particular, the CAR2CAR Communication Consortium contributes to the development of Cooperative Systems by exploring the capabilities of Inter-Vehicle Communications and Vehicle2Roadside Communication - summarised in the acronym Car2X Communication and Technology - and by creating a common standard for cooperative Intelligent Transport Systems. In addition the CAR2CAR Communication Consortium is occupied also with the international harmonisation of standards, particularly in cooperation with US- and Japanese OEMs and authorities, to increase the benefits of cooperative ITS and ensure the maximal utility for the end-user.

The Amsterdam Group, a strategic alliance of road operators and industry on a European level, is coordinating the efforts towards deploying cooperative ITS. Involved are Conference of European Directors of Europe (CEDR) as an organisation of public road operators, European Association of Operators of Toll Road Infrastructure (ASECAP) as an umbrella association of the toll road operators, the network of European cities and regions (POLIS) and the Car2Car-Communication Consortium representing the automotive manufacturers and associated industries. The Amsterdam Group has planned an ITS corridor linking Netherlands, Germany and Austria. The roadside cooperative ITS infrastructure for the initial services in the Cooperative ITS Corridor Rotterdam – Frankfurt/M. – Vienna will be installed by 2015.

The EU Member States the Netherlands, Germany and Austria have signed a Memorandum of Understanding to realise this new technology in close cooperation. The deployment of the corridor has been agreed with industry. They will bring the first vehicles and telematic infrastructure onto the market also starting 2015. Concrete declarations of intent have already been signed by the parties involved or are in preparation. Two cooperative ITS services are first planned for use in the Cooperative ITS Corridor Rotterdam – Frankfurt/M. – Vienna: Road works warning (RWW) from the traffic control centers via the roadside infrastructure to the drivers and Probe Vehicle Data (PVD) vehicles which transmit data about the current situation on the road to the roadside infrastructure and the traffic control centers. In both cases, communication from the vehicle and infrastructure is established via short range communication (Wifi 802.11p, 5.9GHz) or the cellular network (3G, 4G). Both initial applications increase road safety and provide the basis for an improved traffic flow.

The benefits of field operation tests (FOT) are also critical for deployment because they can increase cooperation by involving different stakeholders and enable users to be part of the test process. FOT is also used for research and validation of the functions and through this create trust on the supply chain and are also essential for improving HMI efficiency.

A recent workshop (ERTICO, 2013) organised by the FOTnet2 and COMeSafety2 support & coordination actions in May 2013, presented the current status of European activities (FOTs) around the theme of deployment of cooperative ITS (C-ITS). Main results from the workshop are that FOTs focused on C-ITS functions evaluation suffer from the difficulty to collect a high number of events. This means, according to some panelists and other workshop participants that simulation could/should be an important integration of FOTs . Also, as is the case of some currently running C-ITS FOTs, the experimentation, due to some prototypical characteristics of the used devices, provides valuable results in the system and functions validation. It was concluded that there is no good frame for learning lessons from FOTs etc, and for spreading that knowledge and also there is a need to add experience learned from industrial projects, not just EU-funded research e.g. there is much to learn about integrating C-ITS with existing systems, configuration etc. CIP pilots are of quite small scale and localised, so not so favourable for learning Europe-wide lessons. eCall pilots are good example of how to share experience within a large-scale European programme.

The project DRIVE C2X (a large FOT) lays the foundation for rolling out cooperative systems in Europe and carrying out comprehensive assessments of cooperative systems through Field Operational Tests. Building up on the results of the predecessor PRE-DRIVE C2X, the project deploys cooperative technologies in several European test sites. Namely, the test deployment will include seven test sites in Finland, France, Germany, Italy, Netherlands, Spain and Sweden. This effort will create a harmonized Europe-wide testing environment for C2X technologies. The results of this large-scale environment will be used to raise awareness in the general public, provide feedback for standard organizations and for initiating public-private ventures.

From the infrastructure side, the FOTsis project (FOTSIS, 2013) has successfully validated its communication's architecture as it prepares for the launch of the FOTs. The validation of the FOTsis communications architecture is part of the general FOTsis architecture validation, which includes both internal tests and different activities with external entities. One of the main tools for the communications architecture validation is the architecture pilot testing activities, undertaken with the main objective of verifying and validating on-site, several of the solutions which would finally set the base for the services deployments in different test-sites for the full FOT data collection stage. FOTsis communications architecture pilot tests have been conducted in Grândola (Baixo Alentejo, Portugal) on May/June 2012 and A2 1 st stretch (Madrid, Spain) in October 2012 and March 2013. In all three tests, the overall

objective has been to verify as thoroughly as possible several aspects of the communications systems deployed as implementation of the proposed FOTsis communications arc hitecture. These aspects cover elements such as radio links between the vehicles and the roadside equipment, IPv6 mobility tests to ensure seamless end-to-end communication with the user and performance checking for different communication parameters.

The recently kicked off European project Compass4D is developing services for drivers of buses, taxis, trucks, emergency vehicles, electric vehicles and private cars that can use cooperative systems to make their journey safer, less stressful and more energy efficient. The project proposes itself as the natural continuation of COSMO project: Compass4D involves seven cities (Bordeaux, Copenhagen, Eindhoven-Helmond, Newcastle, Thessaloniki, Verona and Vigo) that will be testing cooperative services in order to prove the concrete benefits of cooperative systems for citizens, city administrations and companies. In order to address these challenges, the cities and industrial partners will jointly implement three cooperative services, Forward Collision Warning, Red Light Violation Warning and Energy Efficient Intersection. These services will be tested over one year of real life driving.

Another outstanding application is that of MOBiNET project which over the next three to capitalise on the widespread growth in smartphones, mobile data services, and cloud-based computing to launch a new generation of travel apps for European citizens, and transport services for businesses and local authorities. MOBiNET is a FP7 research and development (R&D) project, aiming to develop, deploy and operate the technical and organisational foundations of an open, multi-vendor platform for Europe-wide mobility services. MOBiNET central facilities will be hosted as cloud services available to the supplier community, and will be operational early during the project. These facilities will be taken up at a group of diverse pilot sites that will validate MOBiNET in trials aimed at learning from operators' and users' experience how to create, deploy and operate services in the Europe-wide platform.

The ECOMOVE project had been investigating the main causes of avoidable energy use by road transport to bring fuel wastage to minimum trough cooperative mobility systems. Additional commitment toward fuel consumption and energy efficiency evaluation in transport context was made within ECOSTAND project which was established to support cooperation between the European Union, Japan and the United States, in working towards a common assessment methodology for determining the impacts of Intelligent Transport Systems on energy efficiency and CO2 emissions standardisation. The project also served as a platform for the continuation and expansion of the EU-US collaboration, and effectively replaces the European Commission EC-METI (Japanese Ministry of Economy, Trade and Industry) Task Force. Among the objectives of the project, is to set up of a common research agenda for assessing impact of ITS on energy efficiency through actively stimulating cooperation and exchange between the 3 regions and thereby learning from the experience in Japan and the USA on modelling tools, and evaluation methodologies.

In addition a recent report (Lina Konstantinopoulou, 2012) prepared by iMobility Challenge project, aimed to bring consolidated information about the availability of products and services based on Co-operative Intelligent Transport Systems that exist in the market. It can be concluded from the report that the applications which are currently offered are those related to eCall, real-time and traffic information (infotainment and entertainment functions), navigations services and the fuel efficient route choice (only for Electric vehicles). In addition, the forming of joint ventures and strategic alliances could be seen as an important element in the connected car market. There is a whole range of partnership structuring options that exist over the entire value creation process for both suppliers and OEMs. Finally, with advent of the connected car concept and the Cloud Computing, there is also a tendency for diversification and bundling of services or products currently being offered

by the companies which are driven away from the traditional types of services, due to economies of scale.

In addition, the diversification of products needs to include the multimodal transport services concept. Greater availability and use of multimodal transport services is a promising approach to solve some mobility issues and exploit the benefits from such new modes. Multimodality means combining a number of different transport modes from both private and public transport, capitalising on the strengths of each mode while mitigating its disadvantages. Such modes: public passenger transport, comprising buses, trams, trolleybuses, minibuses, demand-responsive transport, park-and-ride, trains, ferries etc, as the cooperative version of these modes probably represents the greatest potential for significant benefits in environmental, energy, efficiency impacts. Other "action areas" include walking, cycling, goods vehicles, parking, shared transport (ride-sharing, car-sharing, bike-sharing...), demand management and so on.

Finally, multimodal C-ITS also includes goods transport and logistics in its scope. Both economics and mobility policy dictate the need to use a more sustainable approach to goods transport, especially in cities. The largest trucks are less and less welcome in built-up areas, while the growth of demand for internet-enabled online shopping leads to a move away from travelling to shops and towards home delivery. Customers will want more information about their deliveries, and more control over where they receive them – requiring interaction amongst the shop, the shopper and the delivery company. The need to use multiple modes of transport will require better real-time coordination as well as new facilities for trans-shipment. Hence it is crucial to continue the development of systems that allow transportation of goods as safely and efficiently as possible.

According to a recent report produced by ComeSafety 2 project (Paul Kompfner, 2013), it is important to create a blueprint and guidelines for C-ITS deployment, based on practical advice on what to deploy and how for particular applications and application bundles; and to broaden the scope of C-ITS to embrace fully multimodality and collective transport. The report concludes that work on the necessary standards is awaiting the emergence of interest (and a possible business case) in specific C-ITS applications in the multimodal mobility domain. It is also the case that there is no real framework clearly showing the links between existing multimodal standards. Such a "big picture" framework is missing and is a requirement to advance multimodality within C-ITS.

Within COMeSafety2 project the following concrete actions are proposed to be embraced in order to move towards a multimodal C-ITS architecture for deployment:

- Activate an online "C-ITS Architecture Forum", populated with all current C-ITS national and European projects, as well as representatives of industry, road operators, public and commercial transport operators, vehicle manufacturers, suppliers, telecom operators, service providers etc.
- Collect case studies of how each test, pilot or deployment was organised, implemented and operated, and compile this in a consistent way to a European overview.
- Organise a working group and workshop to review experience learned through these activities and identify the actors' needs for guidelines, blueprint etc. for deployment, and create a working group to prepare guidance based on these requirements.
- Organise a separate workshop to define a concept and high-level architecture for multimodality within C-ITS, and set up a working group to take this forward to a blueprint for discussion with concerned stakeholders.

Table 10: Actions for a multimodal C-ITS architecture for deployment (Paul Kompfner 2013)

There is a recommendation that these actions should be taken on board by the iMobility support project after the lifetime of the ComeSafety 2 project.

Another report produced by Comesafety2 (Paul Kompfner, Hossein Zakizadeh, 2013) discussed the research needs of Cooperative ITS which are important for fast deployment.

- Real-time traffic modelling and prediction made on floating car data3.
- Open vehicle platform
- User acceptance study of C-ITS services
- Marketing strategy
- Elderly mobility
- Climate change effects on transport with C-ITS services
- Research on biofuel
- Multimodality including personal vehicles running on renewable fuel motors or electrical vehicle
- Multimodal travel planning according to age and health factors
- Advance traffic management services
- The analysis of need for traffic rules adjustments (Vienna Convention and national/international adaptions)
- Long-term operation (backward-compatibility) – compatibility roadmap
- Intersection safety research regarding vulnerable road users
- 3research on integrating personal device in to C-ITS
- Privacy regulation and ownership of data
- Security issue
- Communication technology compatibility and adaptation
- The need for HMI standardisation and distraction aspects related to C-ITS
- Ergonomics
- The process of communicating the results of all C-ITS eu funded projects
- Cooperative electro-mobility
- Research on business models
- Research on public transport and emergency vehicles with RSU like traffic light
- Identifying road side provider's needs and stationary vehicles
- Study the effect of different deployment models

Table 11: Cooperative ITS needs (Paul Kompfner 2013

Another important topic of interest is the cooperation with the rest of the world on cooperative ITS and how we share our experience and our best practices.

The United States and European Union (EU) share many of the same transportation research issues, challenges, and goals. They also share a belief that cooperative vehicle (also termed connected vehicle) systems, based on vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications, can deliver significant societal benefits for all road users in terms of safer, more energy-efficient, less congested, and environmentally friendly transportation. Thus, in January 2009, the U.S. Department of Transportation (USDOT) Research and Innovative Technology Administration (RITA) and the European Commission (EC) Directorate General for Communication Networks, Content and Technology (CONNECT; formerly Information Society and Media) signed an Implementing Arrangement to develop coordinated

research programs, specifically focusing on cooperative vehicle systems. An EU-U.S Steering Group, Technical Task Force, and Working Groups, co-led and staffed by representatives of RITA, CONNECT, and appointed industry experts, are conducting the work for the EU and U.S. bilateral activities. Representatives from the Japanese Ministry of Land, Infrastructure, Transportation and Tourism (MLIT) participate in these groups as official observers.

The current Working Groups include:

- **Safety Applications Working Group** -- Supports the development and deployment of cooperative safety applications in Europe and the United States by collaborating on and, to the extent possible, harmonizing over-the-air data and communication interfaces.
- **Sustainability Applications Working Group** -- Identifies researches, quantifies and evaluates the environmental benefits of an intelligent transportation system (ITS) application or scenario that would improve the operation and performance of an environmentally optimized transportation network.
- **Standards Harmonization Working Group** -- Fosters the development and adoption of globally harmonized standards for cooperative ITS.
- **Assessment Tools Working Group** -- Establishes a common level of analysis capabilities, common field operational test (FOT) methodology and design practices, and shared data formats and parameters for testing and evaluation of cooperative systems.
- **Driver Distraction and Human-Machine Interaction (HMI)** Working **Group** -- Identifies opportunities for research collaboration, aligns research, and identifies differences in the areas of driver distraction and HMI.
- **Glossary Working Group** -- Establishes and publishes the common working definitions for key terms and concepts.

The Working Groups have made good progress in their bilateral endeavor. One of the most significant achievements is the development of a substantially harmonized core safety message set. Through the collaboration of EU and U.S. industry, governments, and SDOs, the revised planned contents of the EU Cooperative Awareness Message (CAM) have been harmonized with the contents of the currently adopted U.S. Basic Safety Message (BSM). While the messages are not identical, they are now sufficiently harmonized to require simple software reconfiguration for systems to use both messages. This will enable the use of common hardware and substantially common software for products destined for both regions, reducing both cost and complexity to manufacturers and, ultimately, to consumers.

A Memorandum of Cooperation (MoC) on "Cooperative Systems in the Field of Intelligent Transport Systems" was signed by the European Commission, DG Information Society and Media (EC DG INFSO), and the Road Bureau, Japanese Ministry of Land, Infrastructure, Transport and Tourism (Road Bureau, MLIT), in Lyon (France) on 9 June 2011. The MoC focuses on cooperation in Intelligent Transport Systems (ITS), in particular Cooperative Systems. A similar agreement was also signed in 2010 between MLIT and US DoT.

Since global standardisation and harmonisation can only be achieved through the involvement and contribution of all relevant stakeholders in all regions, in order to cover all relevant aspects of the matter and for the final standards to be useful for all parties with true interoperability worldwide. Under iMobility Forum the International Cooperation (INCO) Working Group commits to facilitating global cooperation on the development and deployment of cooperative ITS through the organisation of ITS workshops or congresses for stakeholders of the different continents, where it will be beneficial to discuss the progress on selected topics. These activities are supported by the iMobility Support which builds on eight years of support

to the eSafety Forum through eScope observatory, eSafety Support and iCar Support. iMobility Support supports the deployment of intelligent mobility in Europe by organising iMobility Forum activities including, but not limited to, stakeholder networking, deployment support, awareness raising and dissemination of results.

International cooperation activities are also supported by different FP7 support actions projects such as: FOTNET and 79GHz funded by EC DG CONNECT.

FOTNET exchanges information about Field Operational Test activities and fosters cooperation with North America and Asia-Pacific, through international FOT-Net workshops.

These workshops aim to address the challenges and needs of the various regions actively involved in Field Operational Tests. Examples of topics for cooperation include:

- Methodologies: Commonalities and differences across the regions
- Comparison of results: How to make sure Field Operational Test results and data are comparable? Should we synchronise research questions and Performance indicators? Are the research questions similar?
- Data exchange: relevance and willingness to establish a data exchange platform.
- Deployment issues: How to accelerate deployment after Field Operational Tests? What are the decision criteria leading to Policy or market driven deployment? Is there a need for concrete examples and eventually the best practices?

In addition, let's not forget that raising awareness of such benefits among the stakeholder groups is also important. The iMobility Challenge aims at demonstrating, promoting and boosting the deployment of ICT systems for efficient and sustainable mobility. The benefits of ICT systems for efficient and sustainable mobility should be better disseminated to end-users, decision-makers, the research community and industry.

iMobility Forum proposes to endorse the Comesafety 2 actions for a multimodal C-ITS architecture for deployment, and propose that iMobility support project will sustain these actions after the lifetime of the ComeSafety 2 project. In addition, the research needs of Cooperative ITS as proposed by ComeSafety 2 should be discussed further by the horizontal coordinators of the iMobility Forum.

2.6 Digital map database

c) Based on existing research results, define requirements for European digital road map data. In addition to road network data, the scope of the requirements should cover road network data, agreed road attributes for private and professional driver-support for information and warning purposes, such as speed information, eco driving, road configuration data.
d) Create suitable partnerships and mechanisms to produce, update, maintain, certify and distribute this digital road map data.
e) Dynamic location referencing should be given more attention in terms of reliability and accuracy, in order to answer the needs of applications from RTTI, cooperative systems, ecodriving and advanced driver assistance systems.

Intelligent digital maps are a basic requirement for a whole range of ITS tools. The problem has been that the road data needed to produce them is not always available, accurate or reliable, with a lack of rules for timely updates. This hinders Europe-wide interoperability and the development of advanced — including safety-related — ITS technologies. The challenge is

to ensure easy access to the digital road databases maintained by thousands of European road authorities in a standardised, non-discriminatory and transparent way.

An increasing number of ITS applications rely on the availability of accurate digital maps describing the road network geometry, topology and traffic related map attributes such as traffic regulations. A number of countries are implementing or developing sophisticated satellite positioning and navigation systems, such as the European Union's Galileo, the United States' GPS-III, the Russian GLONASS-K and the Chinese Beidou-2. With the improvement of accuracy and signal enhancement these systems enable new applications such as pedestrian navigation and co-operative driving applications. The likely developments in wireless and mobile connectivity also will support the development of new map-based applications.

A series of wireless communication technologies, such as WiFi, WiMAX, DVB-S, DVB-H, Bluetooth and CALM can be expected to enhance map information updating, map exchange and navigation capabilities, in real-time, for people and vehicles on the move. The prospects for digital mapping markets can be expected to be very strong over the next 10 years. More and more mapping technologies will find utility in commercial markets, extending from R&D to operational business environments, for example through the use of Floating Vehicle Data (FVD, FCD) and community based mapping technology. The mobile device markets can be expected to be buoyant too, with a growing demand for personal routing and navigation services and rich point of interest (POI) content. Meanwhile, web services and existing private vehicle navigation applications are expected to reach saturation. Product offering and diversification will drive the markets instead of costs. Products will focus more on their content and services, product innovation, product quality, and niche content (trucking, motors, pedestrian) will be covered in new generations of applications. Future digital road mapping services are expected to have strong links to the automotive market. For example, Advanced Driver Assistance Systems (ADAS) require more detailed maps and attributes, including relevant information on road geometry, road regulations, driving restrictions, accident hotspots etc. In addition, all these data will need to be highly reliable.

The EU project ROSATTE (ERTICO, 2008) has developed a complete framework to enhance quality of and facilitate European wide access to road safety data. The framework includes procedures, quality principles, specifications, and technical and organisational guidelines.

Considering the scope of Action 1.3 of the ITS Action plan (European Commission, 2008), (European Commission, 2011) and the objectives of the ITS Directive, it is clear that the framework and procedures developed in ROSATTE could provide a direct contribution, and resolve many issues to be tackled in the deployment process of the ITS Directive. At the same time, it also became evident that an alignment to the INSPIRE Directive (European Commission, 2007) would be beneficial, both in terms of providing maximum synergies and in terms of minimising administrative burden for authorities, data providers and map makers. Thus, recommendations were made to widen the scope of the ITS spatial data being exchanged with ROSATTE and to align with the INSPIRE spatial data infrastructure. A harmonised framework was needed for the provision and exchange of relevant ITS spatial data used by both public authorities and other third parties.

Following up on the recommendations, the revived iMobility Forum Digital Maps Working Group (iMobility Support, 2012) supported by the EU project eMaPS (ERTICO, 2012) initiated the establishment of an EU-wide independent organisation (Transport Network ITS Spatial Data, TN-ITS) to support the exchange of ITS spatial data between public authorities and third parties.

The concept behind TN-ITS originated some eight years ago from the EC-funded projects SpeedAlert and MAPS&ADAS. These projects focused on, respectively, speed advisory systems

and map data for (advanced) driver assistance systems (ADAS). Many ADAS applications rely on accurate map data. To help map makers keep their maps up to date for critical road attributes on a day by day basis, the idea developed of retrieving information on changes in such attributes from the most efficient and immediate source: the road authorities who make the changes. The concept of the data chain was born.

The mission of TN-ITS is to facilitate and support the provision of accurate navigation and location services to citizens by standardising the exchange of spatial data provide an overall framework enhancing effectiveness of operations & reducing costs improving the quality of ITS spatial data and their timely updating develop & maintain a set of harmonised specifications aligned with INSPIRE support members through guidelines, tools and services and through a pool of experts solve potential legal issues establish best practices for geo-referencing ITS spatial data provide a solution for quality control and monitoring. It has been and will continue to be important to liaise the work with the implementation of the ITS Directive. TN-ITS therefore commits to report to Commission services in charge and to adapt to new needs and requirements if necessary. In order to align properly with INSPIRE (organisational, legal and technical), TN-ITS will continue to work closely with experts from JRC (EU Joint Research Centre). It will propose a candidate to participate to the INSPIRE maintenance process.

Substantial work has been carried out since to move this forward and to prepare the concept for real implementation with both public and private players involved. A specification was developed and tested in the EC-funded ROSATTE project, for the exchange of road attribute information, with a focus on updates (changes in the attributes) rather than full data sets.

Deployment and roll-out across Europe have been prepared in the Digital Maps Working Group of the iMobility Forum with the support of the EC-funded eMaPS support action. The scope was widened from safety information to all kinds of ITS spatial data, and clear links were established with the ITS and INSPIRE directives. The intended data exchange will be aligned with the INSPIRE theme Transport Networks (hence the name, TN-ITS), while adding elements that are essential for ITS spatial data but not currently offered by INSPIRE, such as maintenance of the data, quality control and location referencing.

The iMobility Forum should continue supporting deployment platforms such as the TN-ITS. This platform will provide substantial support to both road authorities and map makers in establishing seamless exchange of information on changes in critical road network related spatial data, with the ultimate goal of providing near-immediate updating of the digital maps in end-user devices for such changes. Once this data chain is in operation, it can provide a substantial contribution to an improved user experience, to road safety and transport efficiency, and to the development and deployment of ITS applications in general.

2.7 In vehicle 112 emergency call (eCall)

a) **Further support measures are needed to achieve EU wide 112 eCall service deployment, e.g. through the EeIP deployment Platform.**
b) **Explore the potential of retrofit devices for eCall for existing and future vehicle fleet.**
c) **Need for wide public awareness campaign focused on wide public media (TV and web 2.0)**

To help mitigate the consequences of serious road accidents across the EU, on 13 June 2013 the European Commission adopted two proposals to ensure that, by October 2015, cars will automatically call emergency services in case of a serious crash. The "eCall" system automatically dials 112 - Europe's single emergency number - in the event of a serious accident. It communicates the vehicle's location to emergency services, even if the driver is unconscious or unable to make a phone call.

This draft legislation will ensure that from October 2015, all new models of passenger cars and light duty vehicles would be fitted with 112 eCall and the necessary infrastructure would be created for the proper receipt and handling of eCalls in emergency call response centres - ensuring the compatibility, interoperability and continuity of the EU-wide eCall service.

The Commission adopted two pieces of legislation to help create and implement the system:

1) Proposal (European Parliament, 2013) for a regulation concerning type-approval requirements for the deployment of the eCall system - making the vehicle fit for eCall.

2) Proposal (European Parliament , 2013) for a Decision of the European Parliament and of the Council on the deployment of the interoperable EU-wide eCall.

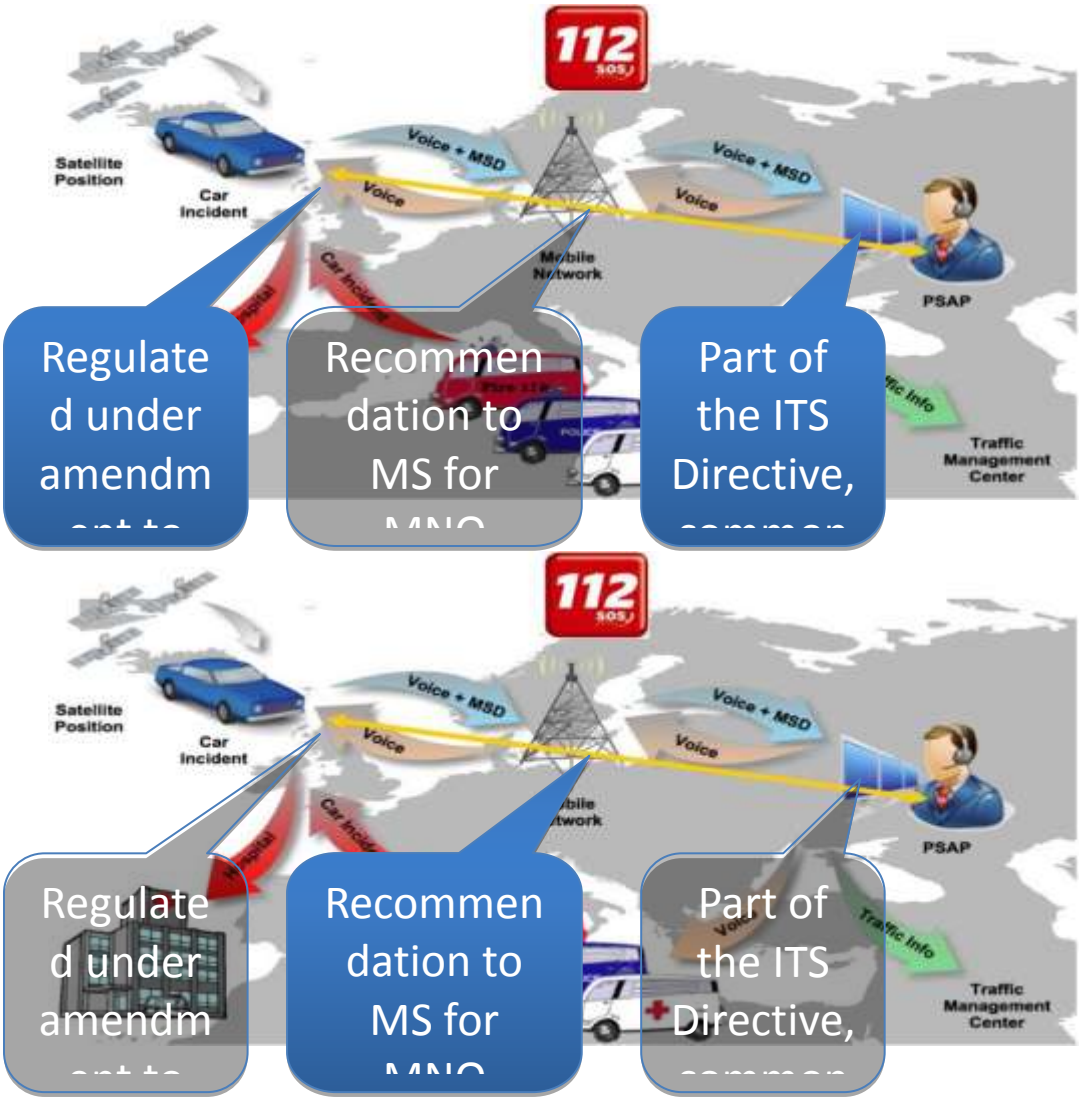

Figure 4: eCall regulatory measures (Andy Rooke, 2013)

The European eCall Implementation Platform is the coordination body bringing together all relevant stakeholders interested in the rapid implementation of the pan-European eCall. To harmonise the work of various stakeholders, the eCall Implementation Platform was set up in February 2009 at the initiative of the European Commission. It brings together all major stakeholders to synchronise the activities accelerating the deployment of eCall at national and European level. Participants include the European Commission, the Member States, industry and other associations. The Platform is co-chaired by ERTICO – ITS Europe and a Member State. The European eCall Implementation Platform is building upon the previous work done by the eCall Driving Group, PSAPs Expert Group and the European Standardisation Organisations.

The European eCall Implementation Platform aims to guide, coordinate and monitor the progress of the implementation of the eCall service across Europe to ensure a timely, effective and harmonised deployment of the eCall service in Europe. The Platform has set up a number of Task Forces to look into different open issues which need to be addressed to enable the rapid deployment of the service at European level. The eCall Implementation Platform brings together representatives of the relevant stakeholders associations and of the

National Platforms supporting the implementation of a pan-European in-vehicle emergency call in Europe.

The 11th meeting of the European eCall Implementation Platform took place in Brussels on 3rd October 2013 by providing an outlook of the EC progress with the regulatory actions where three European Commission DGs Directors and MEP attended the meeting providing each their views on the eCall implementation. In addition, the status of eCall standardisation and HeERO projects, task forces and national implementation were also presented.

The HeERO project prepares, carries-out and coordinates 112 eCall pre-deployment pilots at European level taking into account the common European standards defined and approved by the European Standardisation Bodies. The pilot starts with a state-of the-art analysis of the eCall value chain to identify system implementation requirements and necessary infrastructure upgrades. The focus is on in-vehicle system equipment interface, Telecommunication infrastructure (specifically 112/E112 related parts) and PSAP infrastructure. Based on the analysis results, an implementation plan is prepared for each country, to guide the service implementation and testing. Similarly eCall training manuals and emergency procedures are prepared for the handling of in-vehicle E112 emergency calls. This operation phase happens in real-life situations and aims at testing the implemented components. The goal is to assess all systems required for the end-to-end operation of the pan-European eCall. Tests results are evaluated and deployment enablers and barriers are identified. These overall pilot outcomes will be included in the final recommendations for future eCall Deployment in Europe.

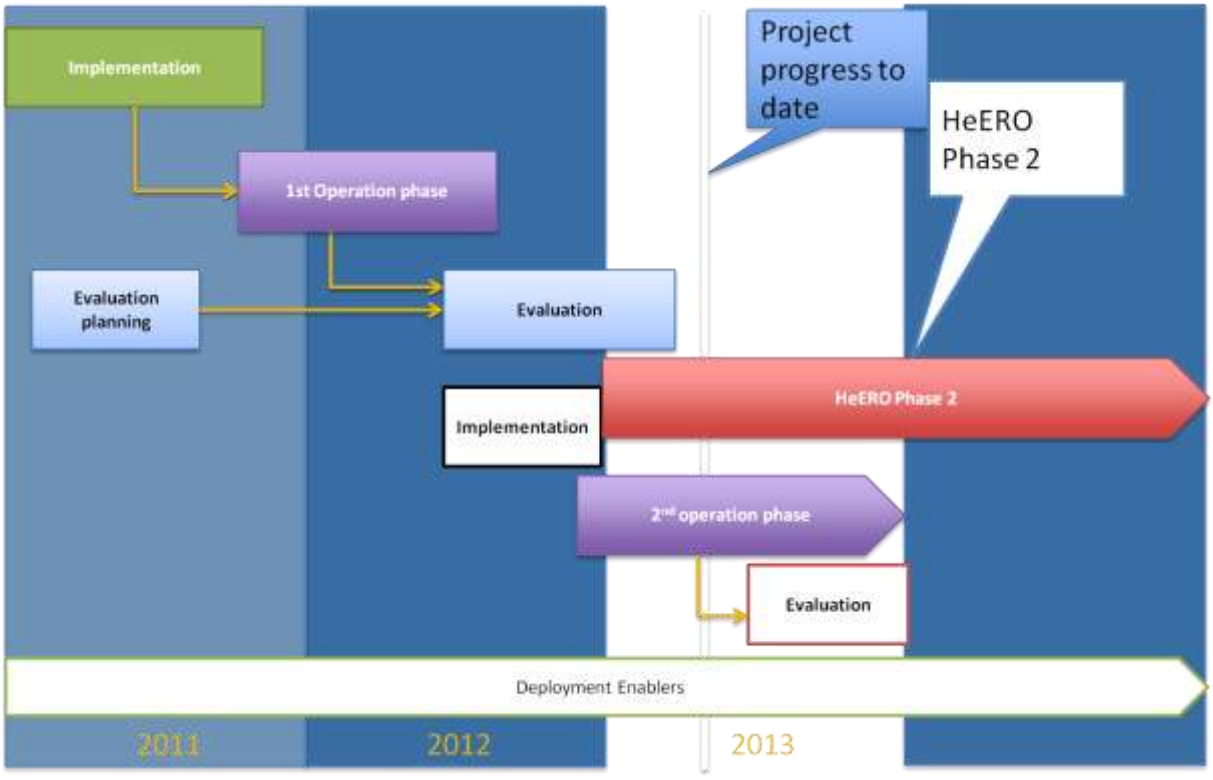

Figure 5: HeERO timeline (Andy Rooke, 2013)

The status of HeERO pilot test sites can be seen below at the table:

Country	Pilot Site Status
Czech Republic	test PSAP in Prague; 10x eCall testing Car; 13x IVS (2 different vendors)
The Netherlands	One vehicle with 4 IVS (D-FACTS) + 7 separate IVS; PSAP Test system (CIS) for 112 and PSAP 2 (4 desks); 3 involved MNOs: No eCall flag implemented;
Croatia	4 IVS units: IVS simulator (1), commercial-grade (2) and IVS prototype development by FER (1) unit; MNO (1+2): eCall Test lab, Tele2 & Vipnet; PSAP (1+1): eCall Test Lab (1) & NPRD (1);
Italy	The Varese 1° level PSAP involved; 112 & long number (national and roaming, for testing only); Telecom Italia implemented the "eCall flag" on its MN in the Varese test area and the eCall routing to the designated PSAP by its fixed network; CRF FIAT car and MM car as test vehicles;
Sweden	One car with IVSs equipped with regular SIM-cards; 2 live mobile networks: – eCall flag - nationwide coverage; PSAP system: Non-operational Test-PSAPs, PSAP/SOS Alarm operators participate for subjective evaluation;

Finland	IVS implementation to 1-5 vehicles; One MNO actively involved (Elisa); ERCA renewing the organisation to 6 national PSAP´s;
Germany	10 vehicles 2 different IVS by Continental and S1NN; 1 PSAP in Braunschweig; No mobile operator involved and no “eCall Flag” implemented;
Romania	Centralized eCall system (all the calls are received in Bucharest) 2 different IVSs were used for the majority of tests; eCall flag implemented by one MNO in all the counties where tests were made and only in test cells by other 2 MNOs
Greece	Public procurement for the acquisition of hardware and software equipment for the PSAP and vehicles on-going Agreements established with the Secretariat of Civil Protection for the actual operation of the eCall service

Table 12: HeERO status update

The implementation of the eCall service at European level should take into account two major conditions on which its successful operations depends: 1) Interoperability and cross border continuity, the possibility for any vehicle from any European country travelling across Europe to use the Call service in case of a serious accident should be a service key driver. The interoperability issue covers not only the technical solution but also operations aspect. 2) Harmonisation: the eCall service can work properly across Europe only if developed in a harmonised way in the different countries, still respecting the different national implementations. The use of 112/E112 represents the first steps of this harmonised approach.

HeERO and the standardisation bodies have identified the importance of close co-operation during the duration of the HeERO project and beyond, as the Pilot deployments offer the opportunity to test and refine the current standards. In response, both the HeERO standardisation task force leader and the HeERO Project Co-ordinator have direct contact with CEN 278 WG15, to ensure that this work is completed.

There is a list of standards and directives which are related to the Pan-European 112 eCall system available at the HeERO website.

HeERO2 has started 1st January 2013. HeERO like HeERO phase 1, addressing the pan-European in-vehicle emergency call service "eCall" based on 112/E112, the single European Emergency number. The in-vehicle eCall is an emergency call generated either manually by vehicle occupants or automatically via activation of in-vehicle sensors. When activated, the in-vehicle eCall system will establish a voice connection directly with the relevant PSAP (Public Safety Answering Point), this being either a public or a private eCall emergency centre operating under the regulation and/or authorisation of a public body. At the same time, the minimum set of data (MSD) will be sent to the PSAP operator receiving the voice call. The eCall service will use the common European standards defined by ETSI and CEN.

The phase 2 pilot will base its work on the state of the art analysis done during the phase 1 by the nine HeERO1 Member States. Based on the analysis' results an implementation plan will be prepared for each country to guide the service implementation and testing.

Cyprus volunteered to participate as an associate partner before HeERO 2 had commenced. The project is supervised by the Cypriot Government, with the Ministry of Communications and Works undertaking the study. Owing to the current difficulties experienced by Cyprus, the work is confined to a study at this time. However, the project lead for Cyprus has access to and is using all of the material available from both HeERO 1 and HeERO 2 to formulate their technical plans ready for 2015.

Hungary is actively following the HeERO 2 project plan, they have recently upgraded their PSAP system and are now moving to 112. The project plan has been formulated and approved by the Hungarian Government. A point of note is that the HeERO 1 Pilot Site in Finland has strong ties with the Hungarian Government and as such is providing technical assistance to them.

Iceland opted to join as an associate partner following the HeERO nternational Conference in 2012. Since that time, the Icelandic eCall project has been led by the PSAP authority for Iceland. Iceland has sought and received assistance from the HeERO 2 project and has been directed to the appropriate IVS suppliers. They have also access rights for technical information from both of the HeERO projects.

Israel made enquiries regarding Pan European eCall following the World ITS Congress in Vienna in 2013. Israel is interested in eCall for a number of reasons.

- Casualty rates in traffic accidents compared to population in Israel are amongst the highest in the world
- Israel imports most of its vehicles from Europe
- Israel maintains a very new fleet of vehicles as most of them are leased. Therefore, the impact from the introduction of Pan European eCall could potentially be felt very quickly in Israel.

The project is led by the National Road Safety Authority of Israel, with support from the Traffic Police and ITS Israel. The authorities have appointed a project manager to oversee the project and have now produced architecture to deal with the complex situation for PSAP architecture that exists in Israel

New Zealand approached the HeERO project following the ITS World Congress in 2012. The approach was made as the majority of vehicles imported into New Zealand come from the UK or from Japan but with UK specification. The New Zealand government have recognised this as an issue and have now set up a task force headed by the Ministry of Transport, along with the Telecom regulator and the emergency services to look at the impact of eCall on New Zealand. The HeERO projects are providing technical assistance and guidance through teleconferencing.

Slovenia joined as an associate partner to the HeERO project before HeERO 2 started. They have a fully formed project team and project proposal. They have applied and received funding from within Slovenia to apply eCall to Slovenia. The project is progressing in line with the HeERO 2 project plan at this time.

Qatar made a direct approach to the HeERO project coordinator after viewing the iMobility Support website and making contract through the help desk. The eCall project in Qatar is being led by QMIC, which is a non-profit research foundation. Qatar has signed the HeERO MoU and is now formulating plans to obtain IVS and PSAP routers through HeERO project partners. The aim is to bring eCall to Qatar as soon as possible, with a proof of concept demonstration in November 2013.

In terms of specific eCall standards interfaces and protocols which will result from the pilot, these results will be transferred to the European Standards Organisations (ESO) already involved with eCall standards (CEN and ETSI) to allow finalisation of the eCall standardisation process. These specifications will also be disseminated to the eCall stakeholders not participating directly in the pilot through the European eCall Implementation Platform.

This recommendation is progressing as planned. iMobility Forum through the European eCall Implementation Platform is supporting eCall implementation and following all relevant issues both nationally and also internationally and as well with in terms of standards and regulation.

2.8 Real time Traffic traveller information

a) Support the wider use of the pan-European RDS/TMC network and further development and deployment of TPEG *services*.
b) Support the development of probe data services to improve the data quality of traffic and travel information.

Traffic and Travel Information is a key element of Intelligent Transport Systems (ITS) deployment. It can provide the European traveller with door-to-door information for well-informed travel decisions (pre-trip) as well as information during the journey (on-trip).

A key pillar of the ITS Action Plan (European Commission, 2008) is the optimal use of travel and traffic data to foster the development of Europe-wide real-time traffic and travel information services. There are two specific actions:

- Action 1.1: Definition of procedures for the provision of EU-wide real-time traffic and travel information services
- Action 1.4: Definition of specifications for data and procedures for the free provision of minimum universal traffic information services

Due to advances in data-collection technology and efficiency improvements in the way how data can be processed and distributed to users, a proliferation of traffic information services is currently taking place throughout the EU. There is, however, a continuing concern that not all relevant data is made available or is correctly processed, or that resulting information is not timely disseminated to users. Such risks can increase with the growth in the number of actors that are active in the traffic information service chain.

The ITS Directive (European Commission, 2010) foresees that specifications will be adopted by the European Commission to make EU-wide real-time traffic information services accurate and available to users across borders. These specifications will be binding and will need to aim at ensuring compatible and interoperable developments, where possible based on existing standards and technology. The initiative will contribute to EU-wide continuity and harmonised delivery of traffic information services. The European Commission has conducted a study in support to the development of the specifications on the Provision of EU-Wide Real-Time Traffic Information Services (Priority action "b" of the ITS Directive).

In March 2012 the EC commissioned a study (Tom van de Ven,, 2013), titled: “Support to Impact Assessment and Specifications” for “Priority Action C under the ITS Directive: Free Road Safety Related Traffic Information”. In this study it provided an overview of the current situation of safety related traffic information (SRTI) in Member States:

- Results of the inventory and SWOT analysis of data coding standards and distribution channels,
- Results of the assessment of the impact of SRTI on road safety in the Europe,
- The results of the impact assessment, evaluating 18 different deployment options for SRTI,
- Comparison of key deployment options, Description of Operational Objectives, Indicators and Methods for monitoring and evaluation of possible EC action.

This study argued that in most Member States, both private and public organisations collect, and aggregate and validate traffic data in parallel. The general consensus between both public and private stakeholders is that this dependency is likely to persist in the future. In nearly all Member States, TMC services are free of charge at the point of use, meaning that once a device or vehicle is purchased, no additional payments by the end-user are required to receive real-time traffic updates. Subscription based traffic information services over mobile Internet are available in at least 18 Member States, with coverage expanding year by year. DATEX is widely used and commonly accepted as standard for traffic information exchange between traffic management centres, traffic information centres and service providers throughout Europe. It provides a proven method for SRTI data exchange. Various companies offer DATEX encoding and decoding products in a competitive market, making it a cost efficient solution for both public and private organisations.

TMC services have been, or are being, deployed in most Member States. Compared to TPEG services, TMC has limited bandwidth, and low location granularity. The need for location table in the receiver further limits the effectiveness of TMC in delivering SRTI, and restricts possible

road coverage. DAB/TPEG data casting is a technically superior alternative to RDS-TMC yet it currently has a marginal market penetration. TPEG over IP (mobile internet) allows for short term deployment but suffers from high data roaming costs. Cooperative systems (V2I, V2V) could provide an efficient channel, not only for the delivery, but also the collection of SRTI. It is unclear how long time wide-scale deployment of cooperative technology in all Member States will require.

TISA (TISA, 2013) is recognised as the main organisation, by the Standards Organisations (CEN and ISO), where standards development for the ITS Traffic and Travel Information services and products domain is taking place. Current availability of TPEG traveller information services has been visualised as a map provided by Traveller Information Services Association (TISA) which is hosted by ERTICO-ITS Europe.

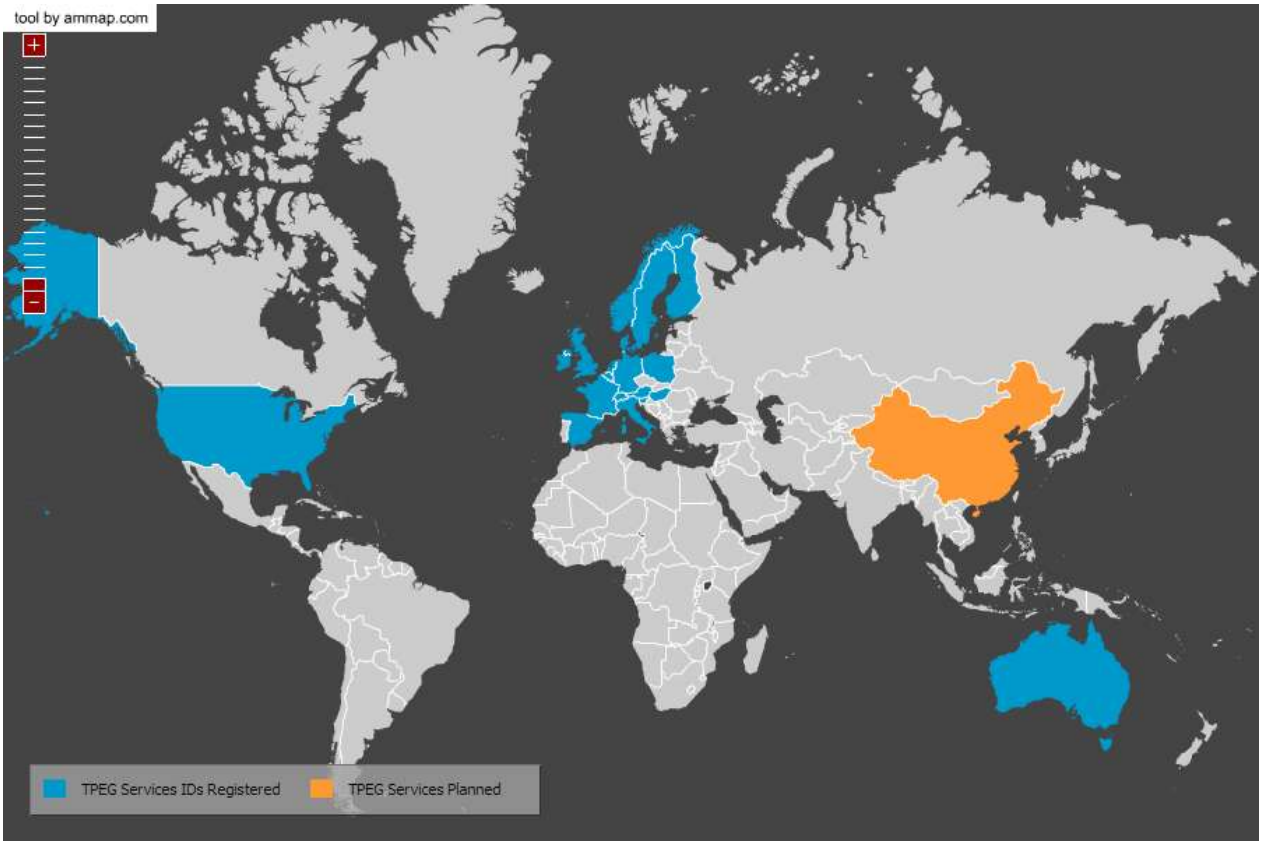

Figure 6: TPEG services worldwide (TISA, 2013)

During 2011/2012 the TISA ITS Directive Work Group has been very active and has expanded the idea of a TTI Value Chain. This is in fact a complex set of interfaces and connections that amount to some 30 identifiable activities, which are effectively in series from the point of a TTI event to finally rendering information about the event on an end-user client device. TISA has the technical, as well as business and operational, expertise to give inputs into the process of defining these specifications for all issues relevant to Real Time Traffic Information (RTTI). The TISA Position Paper (TISA executive office, 2012) makes proposals on issues that need to be dealt with, in a specification for Priority Action (c): “data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users”.

Today, traffic management plans (TMP) are not part of the dynamic traffic information delivered to the vehicles and Individual vehicle behaviour (from the route guidance system) is not made available to the traffic management system. Another initiative currently being started is TM2.0- Enable Interactive Traffic Management"; an ERTICO Innovation Platform launched by Tomtom and Swarco-Mizar. The 15 founding members are key stakeholders from public and private sectors. The expected impact is to build upon deployment of connected travellers to achieve convergence of mobility services and traffic management and focus on individual travellers, collective mobility objectives, legacy and business opportunities.

The massive development of mobile phone and applications in the last few years, which went hand in hand with the apparition of performant mobile navigation systems and with good cellular connectivity, caused that traffic information became ubiquitously available. The driver is much better informed on the real-time traffic, most cities and regions in Europe operate web sites and map applications showing real-time traffic on the roads, a part of it being obtained from Probe data.

The report (Sandford Bessler and Thomas Paulin, 2013) provides an overview of research findings, experiences, and lessons learned on the development and deployment of probe data systems in Europe (and specific regions). A mapping is made of both public and private stakeholders, and the supply chain is analysed. The ongoing developments in standardisation of probe data, especially in the standardisation bodies ISO, SAE and ETSI, are described. Existing applications and services, which can be enabled by using probe data, are discussed; examples are the provision of traffic information to drivers and information about the status of the pavement to road operators. An inventory is made of European, regional and national projects and initiatives that are concerned with probe data, such as cooperative system FOTs. Commercial products and services are also described. Finally the challenges identified in the litterature are addressed: open issues on flexibility, accuracy, scalability, timeliness, privacy, ownership of data, and costs.

The iMobility Forum is focusing on Probe data and the objectives of the group is to:

- Define Probe Data scope
- Raise awareness of collected Probe Data
- Select public-domain services that could benefit from probe data
- Identify what it takes to enable these services
- Data chain, Roles, Responsibilities,
- Possibly propose Public Private cooperation
- Clarify issues related to privacy, security, ownership, quality….
- Identify research needs, pilots, awareness campaigns, PP, Policy support
- Identify relevant standards for EU and assess the need for harmonization Support (and align with) the trilateral EU-US-Japan collaboration on Probe Data

The EU applications based on (near) Real-Time Probe Data:

- Congestion (duration, length, start queue, end queue)
- *Freight-Specific Dynamic Travel Planning:* Tracking dangerous goods
- Pavement traction conditions (skid resistance)
- Ghost driver hazard
- Road closures/detour routes/Incident management/Emergency response
- Stopped vehicles or obstacles
- Customised route guidance

In addition, there is a strong collaboration with US-JPN focussed on the benefit of Probe Data for the Road Operators, i.e. for road management use, building up on eventual fitment of V2V/V2I on vehicles, initial focus on services using post-processed data for road operations, maintenance, modelling, etc and second focus on real-time processing for traffic management.

This recommendation is progressing as planned. There is a need to continue work under TISA to support the wider use of the pan-European RDS/TMC network and further development and deployment of TPEG services. The iMobility Forum Probe data WG will continue supporting the development of probe data services to improve the data quality of traffic and travel information.

2.9 Legal issues

a) **Assess the need of evaluating the legal frameworks (e.g. Vienna convention) to deal with the road mobility improvements obtainable with some safe, smart and clean systems in vehicles and infrastructure.**
b) **Privacy by design: develop privacy by design methodology.**
c) **Security: integrate the security subsystem to FOTs apps**
d) **Liability: Develop a methodology for risk benefit assessment, achieve an industrial and societal consensus on a European Code of Practice, and establish guidelines for facilitating the market introduction of safe, smart and clean systems.**

The ITS Directive, published in the Official Journal of the EU on 6 August 2010, ensures the compatibility, interoperability and continuity for the deployment and operational use of ITS. The ITS Directive – or Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport establishes a framework in support of the coordinated and coherent deployment and use of ITS within the EU, in particular across the borders between the Member States, and sets out the general conditions necessary for that purpose. The Directive provides for priority areas and priority actions to be implemented at European level. It charges the EU Commission to develop and adopt specifications which are subsequently binding for the deployment of the related ITS applications and services. Specifications in the context of this Directive are binding measures laying down provisions (functional, technical, organisational, service) containing requirements, procedures or any relevant rules when deploying certain systems and services.

It has to be remarked the decision of European Commission to create a group of experts on ITS, the so-called ITS Advisory Group, who would advise the Commission on business and technical aspects of the deployment and the use of ITS in the European Union. On 26 February 2013, the EU ITS Advisory Group convened for its second meeting in Brussels which addressed the following agenda: the on-going efforts into developing specification supplementing the ITS Directive, deployment strategies for cooperative systems and EU instruments and strategies for funding of ITS Deployment. The meeting was the opportunity to bring great part of the work of the ITS advisory group to public; a number of statements were made by representatives in the Group on cooperative systems and a debate followed as to what strategies would be viable to push for wide deployment of cooperative systems.

It has been clear for quite some time that clarifying liability issues would be an important step in encouraging the development of ITS solutions and this has resulted in significant research into the issue by various governmental and trade bodies. Even when clearly understood, legal

issues surrounding liability can have strongly inhibitory effects on emerging technologies as interested parties seek to mitigate perceived legal risks. In the field of ITS however, there is still considerable uncertainty at both national and international levels with regard to the regulation of the technology and the legal framework surrounding liability for loss or damage caused by these systems. There is a danger that this uncertainty over the extent of the possible risks could result in parties taking overly cautious approaches to product development.

The current degree of uncertainty is, however, not at all surprising given the wide and rapidly developing range of complex ITS based products in development and the highly varied legal landscapes, both geographic and in terms of vehicular platform, in which they operate. Unfortunately, the fast-paced development of ITS products and the corresponding lag in legal and regulatory oversight means that it is not always possible to rule out all legal risks. In many developing sectors there is a grey area caused by law failing to keep pace with the technologies it seeks to regulate. Nowhere is this more true than in rapidly developing fields such as ITS.

Considering cooperative ITS, different fields of law may be touched so that consequently a possible impact of the respective legal framework on cooperative ITS has to be examined. Those different fields of law are in particular product liability law and data privacy law. Concerning cooperative ITS, different scenarios are imaginable in terms of who provides the information respectively the data the respective cooperative ITS is based on and what effect possibly faulty information or data show in terms of legal consequences for the stakeholders involved in the process of providing the necessary data for the respective cooperative ITS.

The current EU legal framework on data protection is set forth in the general Data Protection Directive 95/46/EC (European Parliament and of the Council , 1995). It is complemented by the e-Privacy Directive 2002/58/EC which applies in the field of electronic communications, and by the Data retention Directive 2006/24/EC (European parliament and the council , 2002). Early in 2012 the EC put forward a new legislative framework in relation to data protection and privacy consisting of a Regulation (replacing Directive 95/46/EC) setting out a general EU framework for data protection, and a Directive establishing rules on the protection of personal data.

On the one hand, this new legislative framework lays down data protection rules at EU level through a Regulation directly applicable in all Member State enabling data controllers to deal with a single Data Protection Authority when controller activities involve data processing in more than one Member State. On the other hand, the Regulation proposed at simplifying the regulatory environment by reducing bureaucratic rules and removing formality requirements and promoting self-regulation.

The new Regulation also introduces new measures to enhance the establishment of a digital single market within the EU by explicitly defining the principles of accountability for data controllers. These latter rules have a significant impact on the introduction of new ITS applications and services e.g. by introducing the "Privacy by Design" (PbD) principle into the text of the Regulation and by establishing the obligation to carry out Privacy Impact Assessments (PIA) for organisations involved in data processing. Such new measures not just impose new obligations on data controllers, but also require and facilitate a more transparent method of data protection compliance, and help data controllers to prepare solutions that are in conformance with data protection requirements at European level. In the new legal framework, the distinction between the “data controller” and the “data processor” is of key importance:

The data controller determines the purpose and means of the processing and has full responsibility, being the party collecting and managing personal data. The data processor acts on behalf of the controller and has limited liability (security & confidentiality).

In the ITS domain (EDPS, 2009) the distinction is not always easy since co-controllership might be set up (shared responsibility) or the identity of the data controller might not be clear. Under data protection law, "personal data" is usually understood as any information that can be used to uniquely identify, contact or locate a single person or that can be used with other sources to uniquely identify a single individual. The identification mostly depends on the particular circumstances and the applied means, but in principle a person can be identified directly by name or indirectly by a telephone number, a car registration number, an ID associated to a smart card (e-ticketing in public transport), a contract for a telematics on board unit. In certain conditions, even a dynamic IP address (if the processing of IP addresses is carried out with the purpose of identifying the users of a computer) should be considered as personal data. In particular, where communication features are involved (cooperative system), ITS applications often face privacy concerns already in the development phase. Although there are definitions, it is found difficult to determine what personal data is and what is needed for an application.

The iMobility Forum Legal Issues WG (Claudia May, 2013) endorses the "privacy by design" approach. Privacy by design shall mean a design process where privacy requirements are integrated from the beginning in relation to systemic effects of information and communication technologies and of large-scale networked data systems. This means that privacy assurance becomes an organisation's default mode of operation by proactively anticipating and preventing privacy-invasive activities before they happen.

Privacy by design involves four principles:

Minimisation: The collection of personal information should be kept to a strict minimum in the design of an application. Applied to current technology trends it means that the design process should start with the default option that no identifiable data is collected. And whenever possible, personal data should be replaced by equivalent minimized data (examples: Birth date information can be replaced by a computing proof that a person is over eighteen or clustered in a pre-defined age group; face detection preferred to face recognition). Minimization leads to requirements on what shall not be collected, on where it is collected, and on the use of specific minimisation technology. Moreover minimisation should also consider the erase of the information and the possibility that information can be transferred to other service providers.

Security: Personal data should be protected by reasonable security safeguards against risks such as loss or unauthorized access, destruction, use, modification or disclosure. An application should be designed to provide maximum protection of personal data during operation. Applied to current technology trends, this means that the design process should start with the default option that all collected personal data should be protected by technical means. They would automatically ensure that data is only accessed by the authorized parties (e.g. location data is only made available to a location-based application) and that such data is automatically removed after a defined retention period (e.g. at the end of the day; after the billing; etc).

Transparency: Applications should be designed and operated so that maximum transparency can be provided to end-users in the same way as privacy preservation is ensured. In particular, the design process should include specific verification procedures (e.g. open design, auditing). Applied to current technology trends, this means that the design process should start with the default option that mechanisms for verification during operation should be included.

Portability: IT architectures should be designed in a way to ensure the right to data portability, meaning the right to take your personal data elsewhere, moving from one electronic processor system to another. This is basically the concept of interoperability which introduces the principle of data ownership.

In calling for privacy by design, the Legal Issues WG advocates for the implementation of substantive privacy protections – such as data security, limitations on data collection and retention, and data accuracy as well as procedural safeguards aimed at integrating the substantive principles into a company's everyday business operations.

The iMobility Forum Legal issue WG recommends developing pan-European standard contracts to ensure that services provided through ITS offer the same data protection safeguards across Europe, with information provided to users sufficiently clear about the specific features used, a general description on the features of the technologies and the consequences in terms of data protection. In case new features are added, further steps should be taken by service providers to provide clear and specific information to users in respect of these additional features and to obtain their appropriate consent to the use of new features. The iMobility Forum Legal Issues Working Group urges all stakeholders to accelerate their efforts to raise consumer awareness about data practices and to provide additional transparency tools to consumers, with an eye towards developing clear and accessible messages which consumers can readily see and understand.

2.10 Preparation of Strategic Research agendas

- **With the support of the major stakeholders, analyse the specific needs and define the priorities for RTD actions on ICT for Intelligent Mobility in particular on: Sustainable Road Transport; Sustainable Urban Mobility: Road Safety; ICT and the Decarbonisation of Transport; Deployment; and the Horizontal Issues.**

"Europe 2020" is the EU's strategy to promote smart, sustainable and inclusive growth and secure jobs. Due to its size and important social and economic role, the road transport sector will contribute its portion to the ambitious objectives set by the EU to be reached by 2020:

- Employment: 75 % of the population aged 20-64 should be employed
- Innovation: 3% of the EU's GDP should be invested in research and development
- Climate change: The "20/20/20" climate/energy targets should be met (including an increase of the emissions reduction target to 30% if the conditions are right)

Innovation Union (European Commission) is an initiative at the heart of this Europe 2020. It aims at improving conditions and access to finance for research and innovation in Europe, to ensure that innovative ideas can be turned into products and services. Europe should become a world-class science performer, obstacles to innovation should be removed and the collaboration between the private and public sectors should be improved.

This is closely linked to the European Research Area (ERA) concept (European Commission). ERA is composed of all research and development activities, programmes and policies in Europe which involve a transnational perspective. These are European, national and regional programmes. They enable researchers, research institutions and businesses to increasingly circulate, compete and co-operate across borders. This facilitates the access to knowledge and technologies and supports transnational synergies and complementarities and reduces fragmentation and duplication of RTD activities. The transport policies of the European Union aim at fostering clean, safe and efficient travel throughout Europe, strengthening the internal market of goods and the right of citizens to travel freely throughout the EU. The European

Commission published its strategy for the future European transport area (covering all transport modes) and towards a competitive and resource efficient transport system as White Paper 2011 It includes 40 specific initiatives for the next decade that should increase mobility, remove major barriers and encourage growth and employment. At the same time it aims at dramatically reducing Europe's dependence on imported oil and at cutting carbon emissions in transport by 60% until 2050.

The Competitive Automotive Regulatory System for the 21st century (CARS 21) process is part of the Commission's industry policy. It makes recommendations to the white paper- short- and medium-term policy and regulatory framework of the European automotive industry. The 2012 report describes a vision for the automotive industry in 2020 and calls for concrete actions to be taken on subjects such as electro-mobility, road safety and intelligent transport systems, market access strategy as well as review of the regulations on the CO2 emissions from cars and vans.

The Strategic Transport Technology Plan (STTP) (European Commission) is a strategic framework for transport research, innovation and deployment. The first EC communication called “Research and innovation for Europe's future mobility, developing a European transport-technology strategy” addresses the following issues:

- User-oriented integrated transport
- Sustainable long-distance, intercity and urban transport
- Strengthening Europe’s transport research and innovation system
- Initiatives to improve the innovation capacity of the transport sector
- Making transport research and innovation more focused
- Better aligning of efforts

Another EC initiative under discussion is the Clean Transport Package Strategy. There are no documents publicly available yet, but it is already known that it will include guidelines and requirements for member states about e.g. the EV charging infrastructure. The European multi-annual financial framework 2014-2020 is being discussed these days and along with it “Horizon 2020”, the next framework programme for research and innovation, the trans-European transport network “TEN-T”10 as well as the European Regional Development Fund “ERDF”11 which should be increasingly used for initiatives supporting research and innovation.

Horizon 2020 (European Commission) is the key financial instrument dedicated to research and technological development in order to implement the policies mentioned above. It will run from 2014 to 2020 with a proposed €80 billion budget. Research and innovation for the road transport sector will be addressed by all three key objectives of Horizon 2020:

- It will be part of the “Excellent Science” objective which will be home of the ERC, Future and Emerging Technologies, Marie Curie Actions and Research Infrastructures.
- It plays an important role in achieving the “Competitive Industries” objective, which aims at improving the leadership in enabling and industrial technologies, access to risk finance and innovation in SMEs.
- It will significantly contribute to a “Better Society” considering the issues of demographic change, secure, clean and efficient energy, as well as smart, green and integrated transport.

Horizon 2020, the next European Framework Programme for Research and Innovation, represents for both the European institutions and for all the research stakeholders one important step towards a more efficient and focused research funding in Europe.

By fully revising its Strategic Research Agenda in 2010, ERTRAC has prepared for this new programme, adopting a consistent systems approach, and structuring its research domains

according to Grand Societal Challenges. ERTRAC - the European Road Transport Research Advisory Council has recently revised its Strategic Research Agenda by taking a system approach and addressing Grand Societal Challenges.

The ERTRAC SRA is being implemented through Roadmaps covering topics for research, development, and innovation framework. Together, the ERTRAC roadmaps cover all aspects of the transport system and allow to reach the objectives set in the SRA. The approach focuses on the following three key elements of the transport system: urban mobility; long-distance freight transport; and interfaces between transport means. Together, these elements provide an integrated core transport system that serves the road transport demand of more than 80% of the population, so they are of the greatest strategic significance to meet the European societal challenges.

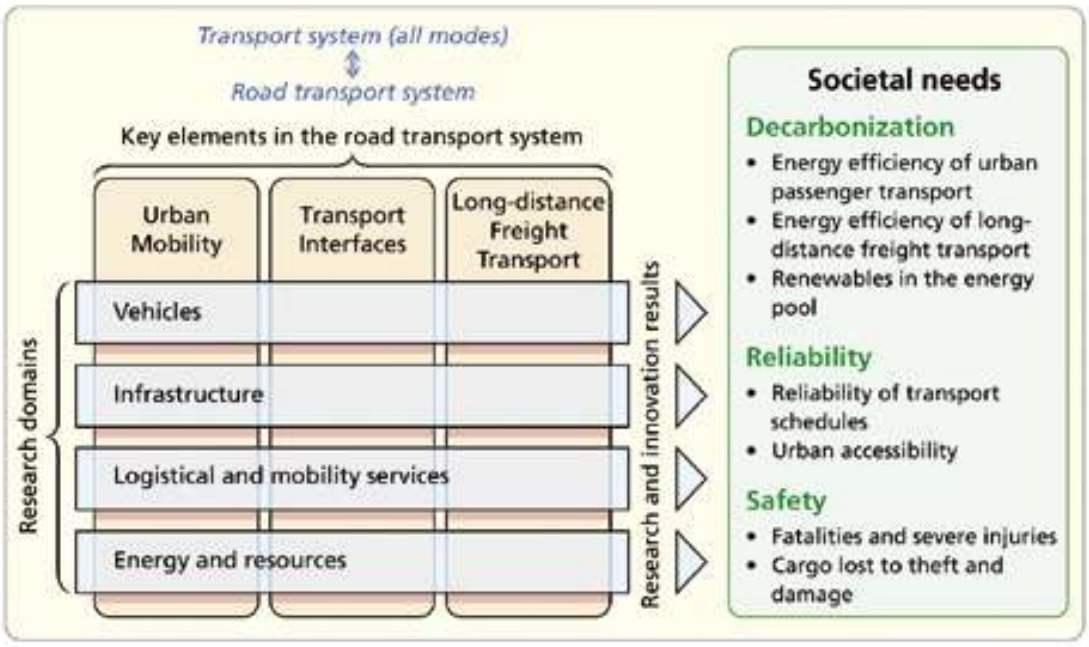

Figure 7: ERTRAC roadmap

The FOSTER-ROAD project will support the European Technology Platform ERTRAC (the European Road Transport Research Advisory Council) to create and implement the needed research and innovation strategies for a sustainable and competitive European road transport system. Linking all relevant stakeholders FOSTER-ROAD will provide the consensus-based plans and roadmaps addressing the key societal, environmental, economic and technological challenges in areas such as road transport safety, urban mobility, long distance freight transport, global competitiveness and all issues related to energy and environment. The FOSTER-ROAD activities include project monitoring, strategic research agendas, business case models and innovation plans, coordination of research on European and national level. They include multi-modal issues as well as comprehensive dissemination activities.

A report (M. Miglietta et all, 2013) produced recently by the PROS project collected a review of selected existing Strategic Research Agenda documents related to Road Safety. Starting from the main research areas on road safety identified by the ERTRAC agenda, the collection and review included other European technology platforms as wells national SRAs from different relevant stakeholders and documents currently under preparation and available as

drafts. A comparison to similar non-European documents from US, Japan, China, India, and Australia is also reported.

Main and relevant research topics individual SRAs are grouped by

1. Safety of vulnerable road users
2. Safety of new vehicles
3. Advanced driver support
4. Traffic Safety Analysis
5. Safe infrastructure
6. Cooperative systems

In this first phase of the project task, the review activity has been focused on the main documents available at European and associations, governmental bodies, research purposes with other international programmes regions have been considered.

25 SRAs have been selected and collected including:

- 13 recent European reports (from different stakeholders)
- 6 reports available at National level (Germany, France, Sweden, Netherlands, United Kingdom)
- 6 reports available from other non-European countries and Regions (US, Japan, China, India, Australia)

Document	Country	Year
ERTRAC Research and Innovation Roadmaps- Safe Road Transport	Europe	2011
ERTRAC Strategic Research Agenda 2010	Europe	2010
ERTRAC Road Transport Scenario 2030+ 'Road to Implementation	Europe	2009
ARTEMIS Strategic Research Agenda	Europe	2011
STRATEGIC RESEARCH AGENDA of The European Technology Platform on Smart Systems Integration (EPOSS)	Europe	2009
EUCAR roadmaps (work in progress documents)	Europe	2013
"Moving forward" 2010-2015 strategic roadmap - EURONCAP	Europe	2009
Further Advances in Road Safety - Importance for European Road Transport Research	Europe	2012
The Adaptable Road: A Roadmap for Research – An Element of the Forever Open Road	Europe	2013
ERF Strategic Road Infrastructure Priorities – Beyond 2010	Europe	2009

Table 13: List of Strategic Research Agendas I (PROS, 2013)

Document	Country	Year

ICT for Intelligent Mobility, iMobility Forum[1]	Europe	2010
New services enabled by the connected car SMART 2010/0065	Europe	2010
ETSC comments on Horizon 2020	(international)	2012
Mittelfristige Forschungsplanung 2011/2015" - Midterm proposal on Research 2011/2015	Germany	2011
"Verkehrssicherheitsprogramm 2011" – Traffic safety program 2011	Germany	2011
IFSTTAR scientific strategy: The main research directions in 10 years	France	2012
Strategisk färdplan för området Fordons och trafiksäkerhet inom satsningen Fordonsstrategisk Forskning & Innovation (Strategic roadmap for traffic safety within FFI)	Sweden	2012
Strategisch Plan Verkeersveiligheid 2008 – 2020 *(Strategic plan Traffic Safety 2008 -2020)* Actieprogramma Verkeersveiligheid 2011-2012 *(Action program Traffic Safety 2011 -2012)* Dutch Ministry of Infrastructure and the Environment (I&M)	Netherlands	2012
Preliminary Road Safety Research Agenda, Department for Transport (work in progress)	United Kingdom	2013
NHTSA Vehicle Safety and Fuel Economy Rulemaking and Research Priority Plan	USA	2011
White Paper on Traffic Safety in Japan – Cabinet Office	Japan	2010 2007 2004
China Road Traffic Safety (Word Bank)	China	2008
India Road safety is no accident - National Road Safety Council Ministry of Road Transport and Highways Government of India	India	2011
Synthesis Report of four Working Groups on Education, Enforcement, Engineering and Emergency Care constituted under the National Road Safety Council	India	2011
National Road Safety Strategy 2011-2020	Australia	2011

Table 14: List of Strategic Research Agendas II (PROS, 2013)

The iMobility Forum R&I WG has also provided a lot of documents for EU Research and Innovation Program or Policy Work Programs:

[1] At the time of preparation of this report, the iMobility Forum Research & Innovation WG recommendations for 2014-2015 were not available.

- iMobility Forum R&I WG answer to EC consultation on the green paper for a common strategic framework for EU research and innovation funding
- Strategic research agenda ICT for mobility - November 2010
- Updated strategic agenda 2008
- eSafety strategic agenda 2006
- ICT part of European green car initiative 2008
- ICT PSP work programs.
- Horizon 2020

The iMobility R&I Working Group's output is to identify new medium and longer term R&I priorities and to formulate a set of recommendations on future research in the area of ICT for mobility as a whole. iMobility Forum Research & Innovation WG has provided the below research needs for 2014-2015.

- Driver centred heightening of driving assistance towards autonomous driving
- Driver-vehicle collaborative automation & next generation driving environment
- Interconnected traffic
- Safe and natural interaction
- Attentive driving
- Sensors technology and 360° intelligence
- Safe testing and assessment of intelligent vehicles with increasing level of automation
- Driver behaviour and performance in cooperation with ADAS
- Road user behaviour and performance in cooperation with ADAS and automated driving
- Balancing safety measures Vehicles dynamic and motion control
- Crashworthiness and advanced compatibility of light and/or new vehicle (concepts)
- Virtual crash test
- Mobility for the individual traveler in the urban environment ICT for energy efficient driving
- The Driver in the automated environment
- Cooperative and innovative technologies for VRU
- Ensuring safety of new technologies and vehicle concepts
- Multi-Criteria Dynamic Traffic Management (Multi-Criteria Dtm)
- Accelerating Deployment of Innovative, Mature ICT for Mobility Systems
- Cloud infrastructure for sustainable logistics
- Cooperative urban freight management

Table 15: ICT for mobility research Needs

The iMobility Forum R&I will continue supporting Strategic Research agendas and thus contributing effectively to the work programmes under Horizon 2020.

2.11 Standardisation and interoperability

a) **Analyse the specific needs and priorities for standardisation in European Standardisation Organisations for ICT for mobility systems and services.**
b) **Follow-up, liaise and contribute to the standardisation work in this area in CEN, ETSI and ISO, in particular regarding the activities carried out in the framework of**

the Mandate /453 to support the interoperability of co-operative systems for intelligent transport, and promote global harmonisation when appropriate

c) **Propose a common necessary framework to ensure the interoperability, compliance and conformance and performance of ITS.**

d) **Need for an organisation to deal with pan European wide security and authentication issues. Another organisation will need to recognise and validate the trusted list of authorities.**

Standardisation is perceived by the European Commission as a priority in order to achieve European and global ITS co-operation and coordination. In order to ask the European Standardisation Organisations to draw up or adopt technical specifications of a normative nature for certain aspects, the European Commission can release mandates. Before formal submission to the ESOs, EU Member States are asked for their opinions. The ESOs can refuse mandates if they think they cannot be fulfilled.

The European Standardisation Organisations, ETSI, CEN, CENELEC, have been invited in several mandates to prepare a coherent set of standards, specifications and guidelines to support European Community wide implementation and deployment of ITS systems:

- **M/453** Co-operative systems Mandate in support of the development of technical standards and specifications in order to ensure the EU-wide deployment and interoperability of cooperative systems (2009)
- **M/338** EETS Mandate in support of the widespread introduction and interoperability of electronic road toll systems in the EU (2003)

CEN and ETSI (ETSI/CEN, 2013) formally accepted the mandate in January 2010 and provided a joint response to the Mandate in April 2010. The Response to the Mandate included a list of minimum set of standards for interoperability and the split of responsibility between the two European standards organisations (ESO). In April 2011 CEN and ETSI provided a status report on the standardisation activities in accordance with the agreed split of responsibilities in the first response to the Mandate M/453. The 2nd progress report in January 2012 provided a more extensive list of standards that had been finalised and a plan with timelines and milestones for still open issues where standards are not yet finalised. The final report is a status report as of June 2013 with detailed information about the achievements during the Mandate period and the plans for finalising the standards listed in the April 2010 response to the Mandate M/453.

In April 2013, ETSI TC ITS has adopted a Technical Report for publication (TR 101 067) as Release 1of TC ITS standards in accordance with the Mandate M/453. In May 2013 CEN/TC278 and ISO/TC204 prepared the draft Release 1 list of the C-ITS standards developed by both SDO, based on resolutions/decisions taken at the ISO/TC204 plenary meeting in Moscow (October 2012) and CEN/TC278 plenary meeting in Brussels (March 2013). The final Release 1 list will be part of ISO TR 17465-3, a TR under development. When ISO TR 17465-3 is published a joint document will be developed including information from the different SDO Release process but also including other relevant standards from other SDOs such as SAE and IEEE. This joint document will be available end of 2013 beginning 2014.

Furthermore, the ETSI TC ITS web site (www.etsi.org/m453) includes detailed information about the Mandate activities and similar information is provided by CEN/TC 278 www.itsstandards.eu.

The main aim of standardization is to enable interoperability in a multi-vendor, multi-network, multi-service environment. The absence of interoperability must not be the reason

why final services for which there is great demand do not come into being. To address the Interoperability issues, ERTICO and ETSI have joined to organized interoperability events so called Testfests dedicated to ITS technologies.

Testfests validate products to ensure that they work when connected to and communicating with products made by other manufacturers. There were several testfest events during the period organised by several organisations with support by ETSI:

- ETSI Interoperability Test (Plugtest) for ITS standards, Helmond, 14-18 November 2011
- Interoperability testing, June 2012, Versailles
- 2nd TPEG Testfest event, May 2013
- 2nd eCall Interoperability event, September 2013

Standardization is based on contributions from and active participation by a range of members with strategic interest in standardization and deployment of cooperative ITS. The results of the European research and development projects as well as the on-going FOTs are currently being included in the standardization process. These past and current EC projects have been active in the standardisation procedure: CVIS, Safespot, COOPERS, GEONET, COMeSafety2, iMobility Support, eCoMove, Preserve and other large scale field operational tests such as COMPASS4D, FOTSIS, SIM-TD, SCORE@F and Drive C2x.

There is also strong involvement in standardisation by the larger organisations like European Road Authorities (CEDR), Road operators (ASECAP), City Authorities (POLIS) automotive industry (C2C-CC), and ERTICO - ITS EUROPE (Public private ITS stakeholder) and other initiatives like Amsterdam Group and iMobility Forum.

In terms of international cooperation on standardisation there are several bilateral or even trilateral cooperation agreements:

- Japan: Support to EC-Japan bilateral cooperation agreement on standardisation, communication technologies for cooperative systems, and energy efficiency
- US: Support to EC - US bilateral cooperation agreement on standardisation, communication technologies for cooperative systems and Field Operational Tests
- China: Urban mobility, traffic and traveller information, communication in ITS and harmonisation of ITS standards
- Russia: eCall ERA GLONASS (cooperation on standards), transport corridors and ITS for large events
- Brazil: Urban mobility, traffic and traveller information, and ITS for large
- Events, harmonisation of ITS standards
- Korea: Cooperative ITS, harmonisation of ITS standards.

There are also a lot of projects which are also supporting international cooperation activities in the field of ITS:

- DRIVE C2X: Field Operational Tests in Cooperative Systems, exchange of data with US
- COMeSafety: Harmonisation of V2X communication standards with US
- FOT-Net: networking for Field Operational Tests (US, Japan)
- iMobility Support: support international cooperation activities within iMobility Forum (All)
- HeERO: cross border testing with ERA GLONASS (Russia)
- 79GHz: Global harmonisation of 79GHz frequency (All)
- ECOSTAND: Common assessment methodology of ITS impact (US, Japan)
- Viajeo: Transport planning and travel information (China, Brazil)

- Viajeo PLUS & SOLUTIONS: Innovation for sustainable mobility in cities (China, Singapore, Latin America, Mediterranean countries)
- STADIUM: ITS for large events (India, South Africa)
- EUTRAIN: Transport research (US, Japan, Russia, Australia, Latin America, India, China)

Interoperability testing is commonly used as part of the telecommunications certification scheme, and can be provided in the test laboratories. However it requires the selection of reference devices, against which each supplier device, applying for compliance assessment, shall be tested. In interoperability tests, usually a device under test is checked against devices from other vendors. This kind of ad-hoc testing requires no simulation tools, but some informal description of the test process.

ETSI is organizing interoperability test events, where all device suppliers are invited to test their implementation against other vendors' implementations. During these events (usually 3 to 5 days), all vendors are likely to get a test session against all of the other vendors (pairing session). These events enable assessing the level of interoperability of the devices and also evaluate the quality of the standards.

ERTICO and ETSI CTI have jointly organized 2 interoperability events for cooperative ITS:
- In November 2011 at the TNO in Helmond, The Netherlands
- In June 2012 at IFSTTAR in Versailles, France

Both events were carried out in strong cooperation with the DRIVE C2X EC funded project. The component suppliers of the DRIVE C2X ITS station participated in the technical organization of the event. Both events were also used to assess the interoperability of the DRIVE C2X software components. A third event was planned in 25-29 November 2013 hosted by CETECOM in Germany and will include interoperability tests, protocol conformance tests and RF regulatory conformance tests. Interoperability testing procedures are equally suitable for the compliance assessment of vehicle as well as roadside ITS stations.

The objective of compliance assessment is to ensure interoperability of the cooperative ITS applications (V2V and V2I) as conformance to the standards is a pre-requisite for interoperability. The interoperability has to be ensured on application as well as on system level. For the initial system deployment day one applications and services will define a day one system. Emphasis will be given to the basic functionality and its interoperability as opposed to everything technically possible to achieve a global and fully open system.

The compliance assessment process must involve all vehicle manufacturers and equipment suppliers. Cooperative ITS systems have to be interoperable and apply agreed minimum performance requirements. This requires unambiguous standards. ITS standards are being developed and finalized within a range of SDOs and profiling of standards leading to a joint system description by the stakeholders to deploy cooperative ITS is therefore important.
The test environments (test benches, test beds, test fields etc) do not need compliance assessment by the service as a basic test tool for the compliance assessment process. Therefore common acceptance tests shall be defined and performed to achieve a good harmonization of the test environments.

The systems must be tested based on standardized test cases and test procedures and against each other or well known implementations. In order to ensure that the tests are performed correctly, a coordinated compliance assessment process should be defined.

Additionally lifecycle management to ensure backward compatibility is critical for systems of different ages and has to be managed by a compliance assessment process.
Each OEM and supplier is following their own development rules and quality means to ensure product liability matters. No special code of practice for the development and its compliance assessment is therefore needed.

A report (Sören Hess, 2013) published by Come safety 2 provides for information on compliance assessment. The C2C-CC has initiated preparation for deployment of cooperative ITS within a competitive environment from 2015. Conformance assessment is an essential element in preparation for deployment. The C2C-CC works together with the infrastructure organizations CEDR – ASECAP – POLIS and agreements on joint compliance assessment is under development in order to ensure interoperability from day one of deployment of cooperative ITS including both V2V and V2I communication.

Compliance assessment has been defined by the stakeholders and a number of subjects relevant for compliance assessment including wireless performance – message format and protocols – performance requirements – data quality – event detection and triggering conditions – compliance assessment for infrastructure components and finally security and privacy issues and standards. These include the pilot PKI that has been established within the C2C-CC and where also external NON-C2C-CC will take part.

As the report states, the compliance assessment framework and test procedures need to be described and agreed by 2013 in order to ensure a competitive environment for the deployment in 2015. The C2C-CC has decided on an initial compliance assessment process with self-certification and public validation routine for day one deployment. For later deployment phases a migration to certification via an authority appointed by the C2C-CC will be considered. The C2C-CC has also discussed with external partners to support the compliance assessment process and in particular the test arrangements and test procedures.

The iCar Support also had launched a stakeholder survey in 2012 (Andras Czepinsky, 2012) and found out that

1. The SDOs are missing higher (European) participation/contribution from
    a. EU co-funded projects
    b. ITS stakeholders
2. At the stakeholders' side it revealed an important lack of resources (and expertise) which results in less participation generating the above issue.
3. The standardization process is slow and generating delays

All together these issues represent the major factor slowing down the standardization work. In addition to this the low participation and the missing expertise represent a long term problem for the ITS deployment: without the necessary specifications the large scale deployment of ITS services is impossible or the ITS community will again face to problems similar to the ones experienced during the early days of RDS-TMC (deployment with interoperability issues) or deployment of country specific services such as VICS in Japan.

As a possible solution the stakeholders' resource issue can be solved by integrating the standardization related work into future European projects providing independent tasks and allocating appropriate budget through which project partners/stakeholders can participate and contribute to ITS standardization. This will also strengthen the link between project results and the development of standards which will help to go for a more realistic "use of

results" policy in the framework of EU co-funded projects: the standards developed in co-operation with a given project will help the deployment of the project results.

Support actions such as iCar Support and COMeSafety2 are the platforms to understand these issues and to develop further actions to improve the co-operation between EU co-funded projects and standardization. Organizing workshops, webinars, developing different state-of-the-art dissemination channels these projects are strong tools in the hand of the European Commission to move forward in the direction of the large scale deployment of ITS solutions achieving the goals of the ITS Directive and the Action plan.

In addition to this direct link between standardization and European ITS stakeholders additional tools are already in place which can facilitate to access to information and resources: deployment platforms such as TISA (Traveller Information Services Association), ADASIS (Advanced Driver Assistance Systems' Interface Specifications) Forum and similar initiatives are being created to strengthen the cooperation between industry stakeholders (e.g. ROSATTE Implementation platform).

Another lesson learned from the result of the survey is the obvious need to have access to relevant information on ongoing standardization work (yearly reports, dissemination of the activities using different communication media), open discussion on interesting topics (workshops, webinars, "open days"). There are some initiatives in this direction (ITS workshop organized by ETSI TC ITS, "StandarDays" of CEN and CENELEC) but these are not reaching the wider public or are too generic and not targeting the specific sector. Thus the recommendation would be to the relevant Technical Committees (ISO TC204, CEN TC 278, ETSI TC ITS, etc.) to organize similar dissemination events together for instance under the umbrella of major ITS events such as the ITS World Congress or the ITS European Congress.

Important to emphasize that the identified weak points need to be evaluated and corrective actions are needed. As main concern the lengthy development model should be reconsidered and shorter development paths studied.

Upon the survey's results the following recommendations were made to the European Commission and the EC:

Recommendations to the European Commission

- Prepare and carry out similar stakeholder surveys to understand the industry needs under the umbrella of FP7 EC support action projects like iMobility Support. On the basis of the results of the survey it is recommended to establish an action plan to proceed with the necessary improvement.
- Future surveys should try to evaluate the European stakeholders' perception of the European Commission's standardization mandates. This topic was not addressed in this questionnaire but there may be interesting feedback which can be valuable for future mandates and their procedures.
- It is recommended to inform EU co-funded projects on the mutual benefit of interaction between projects and standardization. This could be achieved through the yearly concertation meetings organized by the European Commission (DG CONNECT) and Info Day for Coordinators.
- Inform the coordinators of the EU co-funded projects to contribute to the standardisation surveys for better understanding the project needs and issues.
- Inform ITS stakeholders on the impact of the initiatives like global harmonization, international cooperation and EU-US-Japan task force on standardisation.
- It is recommended that all EU co-funded projects have standardization task on their

description of work (pre-standardization study, standards monitoring, feedback to standards on the basis of the lessons learned, etc.) to create interaction between projects and standardization. .). Several duplication of work or inappropriate project actions
- It is recommended to integrate conformance/interoperability testing events in the timeframe of the EU co-funded projects and evaluate their results during the annual review of the project. This will most probably solve the issue of the cost of the participation of such events.
- The questionnaire did not focus on the standardization IPR related questions which should be one of the topics for the future stakeholder survey.
- It would be useful to create a knowledgebase to disseminate funding opportunities and motivate the ITS stakeholders to increase or simply start their activity in the ITS standardization.
- Invitation of legal and regulatory, government and liability experts into the ITS standardization scene.

Recommendations to the SDOs

- Evaluate the strong and the weak points of the organization identified by the stakeholders
- Develop alternative dissemination tools to communicate your work and achievements to the stakeholders not participating in the standardization process.
- Keep co-operation between the relevant technical committees not only in the technical work but in the dissemination activities as well.
- Liaise with relevant projects and use their results in your work (cross-cutting discussion is extremely important in such a case)
- Information about available standards and current work is mandatory for projects. Consider projects as tools to evaluate your work and provide feedbacks to improve the quality of the documents. The availability of standards (for free) is important in this particular case: liaising with them will enable their contribution to your work.
- Participate and contribute major industry events which can act as a dissemination platform for you.

Table 16: iCar Support recommendations on standardisation

The iMobility Forum endorses these recommendations under iCar Support and its forerunner iMobility Support and also will keep on analysing the specific needs and priorities for standardisation in European Standardisation Organisations for ICT for mobility systems and services. And also follow-up, liaise and contribute to the standardisation work in this area in CEN, ETSI and ISO.

2.12 European large scale actions

Work towards ICT deployment in mobility through partnerships on European large scale actions by organizing large scale test-beds in cooperation with demand and supply stakeholders and in line with the ITS Directive, in which solutions to existing societal challenges are taken through the innovation chain in a continuous programmatic approach of a sufficient scale and duration.

The SATIE project objectives are to propose to the European Commission options for large scale actions for innovation and deployment of Intelligent Transport Systems (ITS). The starting point of this exercise is the iMobility Forum ELSA Task Force report, and the new concept of "ITS incubators". The possible use of ELSA/EIPs as an instrument was considered in the EC Communication "Raising the game" of 2009. The 2010 EC Communication "Europe 2020" offers further opportunities to organize large scale actions, for example in the flagship initiative 'Innovation Union' in the framework of European Innovation Partnerships (EIP's).

As per the SATIE *Preliminary Concept of ELSA for transport* (Matti Roine) report, the strategy and design of an ELSA/EIP should address major societal challenges of transport; boost the economy and European competitiveness, while helping to overcome barriers for transport-ICT deployment. The demand side at local level - public authorities, road operators, end users - should be in the lead in defining the actual problems to be tackled with a large-scale action, in cooperation with the business sector. The demand side can also support the take-up of ITS in European and global markets, e.g. by innovative and pre-commercial procurement.

The high-level view of an ELSA/EIP structure would show a Europe-wide grouping of public and private partners able to drive and steer a large-scale action. They would ensure a transparent and effective governance of the initiative while representing the societal and commercial aims of the public and private stakeholders. The governing body would also define the organisation and procedures for an ELSA/European Innovation Partnership and its activities, such as financial and organisational aspects, as well as the work plan for constituent activities. It would also organise any selection procedures for choosing specific ELSA/EIP activities, locations and members. Underneath this umbrella would be a group of ELSA/EIP innovation and deployment sites, where specific measures would be implemented, according to a mix of European-level and local ITS measures representing both the top-down and bottom-up approaches.

SATIE project organised a workshop this year. The topics of the workshop were the status of ITS Test beds in Europe, barriers to be removed for more successful deployment of ITS, and how cross border cooperation could contribute to bigger national and European added value. Upon the conclusions of this workshop (SATIE, 2013), the SATIE consortium received a clear message that a network of ITS Test beds would bring important added value at European level. The SATIE consortium took that information to elaborate further a proposal, and the workshop audience welcomed the idea to discuss it further at another occasion.

The iMobility Forum support the SATIE project conclusions on the establishment of a network of ITS Test beds and proposes to continue on working on recommendations and guidelines for developing large scale ITS beds.

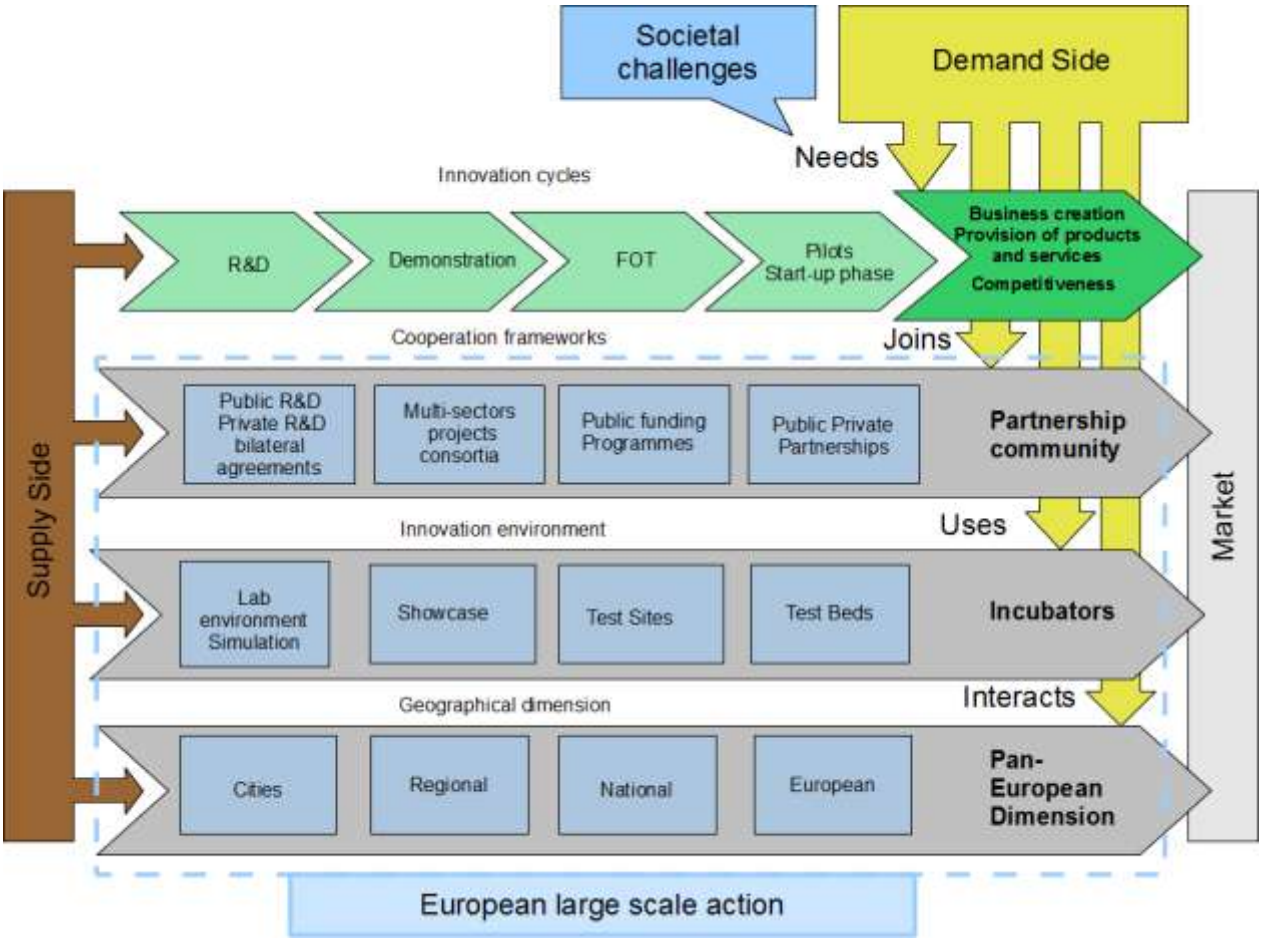

Figure 8: European large scale action (Sébastien Mure, 2012)

2.13 Spectrum Allocation

Identify spectrum allocations needs and take necessary actions for a sufficient spectrum allocations for safe, smart and clean systems and services

Support the worldwide harmonisation of spectrum allocations. Increase active participation in worldwide fora in order to support multi-modal mobility related interests and requirements in spectrum allocation

Road traffic crashes have become a major global challenge so the search is on for ways of improving road safety. Radio communication systems are more and more used by the automotive industry to equip cars. Up to now, these have largely been comfort functions, such as adaptive cruise control, collision warning systems, blind spot monitoring, lane change assistance, rear cross-traffic alerts and back-up parking assistance. These systems obviously also enhance safety to some extent, but technological advances now permit proactive safety features such as collision mitigation systems and vulnerable road user detection.

In order to provide these essential functions for traffic safety, systems must be able to distinguish more clearly between objects on the road. This requires more bandwidth than the narrowband frequency ranges in the 24 GHz and 76 GHz bands that are used at present. Wide

bandwidth and high power limitation will enable better resolution and better object distinction. These are essential for new functions such as pedestrian detection or autonomous emergency braking in urban areas. Along with a greater capability for distinguishing between objects, the main advantages of the 77 GHz to 81 GHz frequency range (79 GHz band) are that radar devices can be much smaller, a single technology can be used for all applications, and the risk of mutual interference is low because of the smaller emission power required. The automotive industry needs global frequency harmonisation (Davide Brizzolara, 2013)

In 2004, the European Commission legislated on the harmonization of the 79 GHz band for use by short range radar equipment for the European Union member States as well as the European Economic Area (EEA) States (Iceland, Liechtenstein, Switzerland and Norway). In all 27 member States of the European Union, as well as in all the other countries that are members of the European Conference of Postal and Telecommunications Administrations (CEPT), the use of short range vehicular radar operating in the 77 to 81 GHz frequency range is regulated by an ETSI standard (EN 302 264). Vehicular radar equipment transmitting in the 79 GHz band faces neither time constraints nor any other operative restriction burdens, and is thus permitted to operate in the near vicinity of radio astronomy sites (in general, such operation is prohibited).

Various other projects have been undertaken since the European Decision in 2004 to open the 79 GHz band for automotive short range radar. The Radar on Chips for Cars (RoCC) project involves Daimler, BMW, Bosch, Infineon and Continental (with financing from the German government). The RoCC project (DAIMLER, 2009) aims to further advance silicon-based radar technology in the 76–81 GHz band. Its goal is to bring down the cost of 79 GHz automotive radar sensors significantly and make them cost-competitive. The main cost drivers for 79 GHz sensors are the high frequency laminate and millimetre wave chips required for processing, and the microprocessor itself.

The 79 GHz project (79 GHz project, 2012)funded by the European Commission involves specific activities in selected countries, as well as an expert group the International Automotive Radio Regulations Expert Group to speed up global agreement to use the 79 GHz band for vehicular radars. Below the table presents the status update of 79 GHz.

Country	79 GHz Status
Belarus, Georgia, Russia, Ukraine, Turkey and the Balkan region	As members of CEPT, Belarus, Georgia, Russia, Ukraine, Turkey and the Balkan region finished their rulemaking process on the 79 GHz band by approving its use to automotive high resolution short range radars (SRR) with identical regulations and provisions as used by the European Commission and in the ETSI standard EN 302 264.
United States	In May 2012, Robert Bosch GmbH (on behalf of the 79 GHz project) filed a petition for rulemaking to the FCC to rule and order on the use of 79 GHz SRRs in the United States. This Petition is expected to be released by midyear 2013
Canada	Canada's decision regarding 79 GHz regulation

	partially follows the US FCC rules due to the cross-border situation and direct neighbourhood to the USA.
Argentina	For the 77-81 GHz band, no order or draft resolutions are on track in Argentina. The 79 GHz project is in contact with both the National Communications Commission (CNC, Comisión Nacional de Comunicaciones) and the Secretariat of Communications (SECOM, Secretaría de Comunicaciones).
Oman	In Oman, the 79GHz band has been allocated since 2009 in Annex E of the Radio Regulations for RTTT specifications (same power limit as the 79 GHz ETSI standard).
Saudi Arabia	Saudi Arabia, a draft revision of the CITC RI049 Road Transport, Traffic Telematics and Ancillary Equipment contains 79 GHz with a direct reference to the ETSI standard.
Japan	In Japan, after the notice circulated by the WTO on 29 June 2012 which mentioned that Japan's Ministry of Internal Affairs and Communications has established the regulations for 79 GHz band high-resolution radar, a draft version of the standard by the Association of Radio Industries and Businesses (ARIB) has been made available in English. The final version can be expected in 2013.
China	China currently has no regulation for 79 GHz high resolution vehicular radars.
Korea	Korea's National Radio Research Agency (RRA) is preparing to amend the legislationprocedure to accept 79GHz. Korea Automobile Manufacturers Association (KAMA) has already requested RRA to implement the 77-81 GHz range
Malaysia	MCMC is working on an automotive/UWB spectrum plan that shall be included in their Standard Radio System Plan (SRSP), a key document for spectrum planning policy in Malaysia
India	The 79 GHz band is not regulated in India.

Singapore	Singapore was the first country after the European Union member states and all other CEPT countries to adopt the 79 GHz band for SRR in 2007
Australia	Regulations for 79 GHz are already set up in Australia by the ACMA. Together with the local support from Motor Industry Association (MIA), the Radio Spectrum Management (RSM) is considering adopting the EU solution.

Table 17: 79 GHz world Status review

IMobility forum supports the work of the EC funded 79 GHz project on the global frequency harmonisation.

2.14 Stimulate demand and use

a) Design and execute awareness campaigns which explain the benefits, functioning and use of safe, smart and clean mobility systems and services to the stakeholders.

b) Initiate public awareness campaign with wide outreach using mass media such as TV and the Internet.

c) Investigate the possibility to use marketing as well as fiscal/financial incentives to stimulate and support consumers' demand of intelligent road applications and use of safe, smart and clean mobility services.

We use the term 'demand' here to refer to what businesses often call 'consumer voice': consumer wants, needs and preferences for goods and services. Demand refers to the desire or preference to purchase an affordable product or service (as opposed to unconstrained preferences or desires). Preferences may be obvious or hidden; demand can be private or public and can come from consumers, other businesses or government.

In the ITS market (Automotive Council, UK, 2011), it is essential to understand and identify who are the ''customers'' and how are they are willing to pay for ITS services. There are several groups that are already spending to the benefit of ITS (Infrastructure operators, vehicle manufacturers, service providers and lastly users).

In the public transport domain, a wide variety of travel products and services are now available to assist users plan and execute their journeys. In the private car domain, developments have been mainly concentrated in the spheres of 'infotainment', driver assistance and safety. Increasingly, these systems are reaching beyond the car itself to interact with other vehicles and the fixed infrastructure via wireless communications and the internet. In the domain of fleet/commercial operations, real-time vehicle and item tracking is common-place. Vehicle monitoring/reporting systems are increasingly integrated with enterprise management systems with the goal of increasing operational efficiency and competitive advantage. In the infrastructure domain, traffic management systems deliver variable speed limits and lane controls on our motorways. A variety of road-side sensors is used to monitor traffic conditions; number plate recognition systems are used to enforce the law; and electronic tolling is becoming common for infrastructure bottlenecks.

In the ITS context an important prerequisite for sustainable mobility is public awareness.

Even though 2013 was an exciting year full of awareness campaigns and demonstrations by the EC projects and pilots, there is a need to design and execute public awareness campaign focusing on wide public media (TV and Web2.0) as well investigating fiscal/financial incentives to stimulate and support consumers' demands for intelligent road applications and use of safe, smart and clean mobility services.

iMobility Challenge is a 24 months project aimed at demonstrating, promoting and boosting the deployment of ICT systems for efficient and sustainable mobility. The project will highlight both off-the-shelf products (i.e.: technologies that have just been launched on the market) and emerging technologies addressed by current research. In particular focus will be placed on current EU Research conducted in the field of cooperative systems for energy efficient and sustainable mobility. Intelligent mobility is notably characterised by efforts to better integrate and connect intelligent drivers, intelligent cars and intelligent infrastructures together, and this can be achieved through cooperative systems. The benefits of ICT systems for efficient and sustainable mobility should be better disseminated to end-users, decision-makers, the research community and the industry. The added value of iMobility Challenge will be to raise awareness of such benefits among those distinct target groups.

iMobility Ecodriving Challenge,Istanbul

This event took place on the same day as the FIA Motorsports Prize-Giving Ceremony at the Ciragan Kempinski Hotel, on 07/12/2012. This allowed for top FIA Racing Champions to be present as iMobility Challenge ambassadors and participate in an Ecodriving 'race' or competition. This event was used as an opportunity to launch the project in public and to the media. It also had a strong communication message, that event motorsports driver know and promote that the correct way of driving in real traffic is energy-efficient/eco-driving. It also introduced the idea that thanks to gamification and vehicle connectivity, ecodriving can be fun. A short film providing a general overview of the event is also available: http://www.youtube.com/watch?v=BB7FG3Aa4ls

iMobility Challenge at the International Transport Forum, Leipzig

From 22nd to 24th of May 2013 iMobility Challenge was present at the ITF Summit in Leipzig. The topic for this event was "Cooperative Systems for energy efficient mobility in urban areas". It was decided that this would be a good forum to showcase such a topic to the high-level ITF delegates, particularly because the delegates included politicians, civil servants and decision makers, and the message was that industry needs to work in collaboration with public authorities to develop cooperative applications. This is precisely what was demonstrated by iMobility Challenge at the event: the BMW Group agreed to be a partner for this event, since their traffic management technology department works in collaboration with the city authorities in Leizpig, BMW was able to provide test drive demonstrations of a traffic light assistant application. In total demonstrations of 3 cooperative Green ITS technologies for urban mobility were provided thanks to the support of the BMW Group:

• Traffic Light Assistant (driving demo that all ITF delegates could volunteer to test driver in real traffic in Leipzig): this application optimises speed and fuel consumption through in-vehicle information about traffic light phases.

• Strategic Routing (static demonstration inside a car at the imobility Challenge stand in the exhibition area of the Forum): this application makes navigation easier, more efficient and more adaptive through the integration of traffic management information in urban areas - for example, providing information on temporary closures or major events in the city.

• Intermodal Routing (static demonstration inside a car at the imobility Challenge stand in the exhibition area of the Forum): this application provides flexible journey options by combining individual guidance with real time traffic information about traffic jams or available public transport options. This last technology was of particular interest to demonstrate that car manufacturers can work on promoting multimodality.

With regards to the Traffic Light Assistant demo, a questionnaire was circulated among all delegates who volunteered to take a test-drive of this technology (see annex III) to determine their attitudes before and after testing it. Responses will be analysed in Deliverable 2.4 due to be issued at the end of the project, analysing all such attitude questionnaires collected in conjunction with iMobility Challenge demo events.

In addition to all delegates of the ITF, the stand was visited by high level VIPs including the Norwegian Transport Minister, German Transport Minister, and Swedish Infrastructure Minister. Celebrity driver Timo Glock was also present and acted as the iMoblity ambassador on 22nd of May. A short film providing a video overview of the event is also available: http://www.youtube.com/watch?v=XnAQfAbcHWM

iMobility Challenge and iMobility Support at European ITS Congress, Dublin

At the European ITS Congress that was held in Dublin on 4-7th of June 2013 the iMobility Challenge and iMobility Support projects were present at the stand of the European Commission.

In particular, an iMobility Challenge electronic questionnaire was developed to gather view of ITS professionals attending the Congress on the barriers to the deployment of intelligent mobility technologies identified in the mapping of technologies developed in WP2 (support studies) of the project. The presence of ITS experts was deemed a unique chance to determine what is their opinion about this mapping of technologies.

Conclusions from the answers collected among 150 experts attending the European ITS congress are that Real time traffic information, Ecodriving-assitance systems, dynamic traffic lights and optimum speed advice are in their opinion the three technologies with the most potential to reduce CO2 emissions in Europe (in order of importance). The respondents also expressed that financial aspects (cost of equipment, installation, maintenance, updates) are the single most important barrier to the deployment of intelligent mobility technologies. Finally they also believe that the best way to speed up the acceptance of these systems is to proceed with the installation of intelligent mobility systems as standard in all vehicles. Infographics with the full results of the survey are available online: http://infogr.am/iMobility-Challenge-ITS-Survey-Results

iMobility Challenge «Intelligent Mobility for Smart Cities», Valkenburg airport, Netherlands

On 11th of September 2013 iMobility Challenge organised a large scale technology demonstration day that took place at the Valkenburg Airport, close to The Hague. This was a full day event involving over 50 companies (car manufacturers, automotive suppliers, research organisations) and EU projects that agreed to take part in providing technology demonstrations at the event and participate in an exhibition inside the airport's hangar.

In total the event gathered over 1868 registered delegates and 339 staff from participating companies. The event was divided into four areas (efficient, cooperative, smart and safe mobility); and participants had a chance to take the driver's seat and experience a diverse variety of technologies (ecodriving training courses and competitions, testing of electric vehicles, testing of cooperative applications, various advanced driver assistance systems for

safety, and autonomous driving).The video introducing the eventis located at http://vimeo.com/74847293

iMobility Awards 2013

Mr. Paul Timmers, Director Sustainable and Secure Society DG CONNECT at the European Commission, presided over the 2013 iMobility Awards ceremony.

The yearly iMobility Awards represent a unique opportunity to pay tribute to the most outstanding, ambitious and innovative iMobility deployments paving the way for future of mobility. This year's ceremony took place in The Hague, The Netherlands, on 11 September 2013, on the occasion of the iMobility Challenge Netherlands.

In the Industry / Technology category, Gemalto – represented by Marcel Visser, Vice President Automotive M2M, was rewarded for its outstanding work in the deployment of eCall in Europe which helps global automakers achieve greater efficiency in time and cost.

In the Policy category the award went to the Dutch Ministry of Infrastructure and Environment (Rijkswaterstaat) – represented by Paul van der Kroon, Principal Counsellor Traffic and Road Infrastructure. Mr. Van der Kroon was awarded for his key role in iMobility working groups and CEDR activities which have encouraged the deployment of cooperative systems in Europe and support from road authorities for ITS.

Finally, in category National / Local ITS Implementation Award, VTT, the Technical Research Centre Finland - represented by Senior Scientist Petri Mononen, was awarded. Mr. Mononen was strongly involved in the TeleFOT and TeleFOT-INCO projects which accelerated the deployment of after-market and nomadic device oriented ITS.

HeERO and iMobility Support at NATO days in Ostrava

145 000 people visited this year's NATO Days in Ostrava (CZ), where the pan-European eCall and its pre-deployment pilot project HeERO were presented on the 21 and 22 September 2013. As distinguished guest, the Czech Minister of Transport honoured the HeERO project by triggering the first eCall from a Croatian vehicle in Czech territory. The success of this joint undertaking, organised by the Czech Ministry of Transport and supported by ERTICO – ITS Europe, demonstrated the interest of the public for the pan-European eCall and the readiness of the HeERO countries to deploy the solution.

HeERO and iMobility Support have participated in the exhibition with a stand in order to present related projects and activities and more specifically increase public awareness of the Pan European eCall system based on 112. ERTICO personnel contributed to the event by offering eCall and other safety related ITS applications themed promotional articles (brochures, gadgets, videos etc) to the public.

Even though 2013 was an exciting year full of awareness campaigns and demonstrations by the EC projects and pilots, iMobility Forum proposes to continue and design and execute public awareness campaign focusing on wide public media as well investigating fiscal/financial incentives to stimulate and support consumers' demands.

2.15 Nomadic after market devices

Understand and analyse the potential impact and implications of the usage of aftermarket/nomadic devices for large scale deployment of safe, smart and clean mobility applications and services

Consumers want increasingly to be connected everywhere, being always online. Today, many of them feel being disconnected from friends while driving. That's why they are using their smart phones in the car while driving and this obviously is increasing drivers distraction and the risk of traffic accidents. Politicians and industry want to reduce driver distraction on the EU roads, not by banning Nomadic Devices or APPLICATION in a car, but to make the use of devices and applications safer for drivers.

Special User Experience designs are required to make human machine interactions safe for in-vehicle use by drivers. This means in most cases that the applications need to be designed for in-vehicle use. Today, the design guidelines for in-car application are complex and sometimes ambiguous.

Under Action area 3, Road safety and security of the ITS Directive, action 3.3 aims at

- Defining the required measures for the safe use and operation while driving of in-built and nomadic information, communication and navigation equipment and for the safe interaction of nomadic devices with the driver, between themselves and with the in-built car systems
- Defining required measures for the safe mounting of nomadic devices in cars
- Facilitating the safe integration of information and communication services and functionalities such as those related to traffic and travel information

A European Commission DG MOVE study produced in 2010 a detailed analysis of the regulatory situation in the EU Member States regarding nomadic devices and their use in vehicles. The Commission is considering a possible update and revision of the existing recommendation on safe and efficient in-vehicle information and communication systems — the European statement of principles — and is looking potentially to develop a set of regulatory measures to facilitate the implementation of the principles. Moreover, this is currently also being investigated by the iMobility Forum on Human Machine Interface and a workshop in September 2012 is under its forthcoming activities.

In terms of definitions, the term Nomadic Device covers all types of portable information, communication and entertainment equipment as well as accessories that can be brought inside the vehicle by the customer to be used while driving. To especially address the challenges for nomadic devices a "Nomadic Device Forum" (NDF) was established on 20 January 2005 by the AIDE integrated project (6th FP, iMobility Strategic Objective, co-funded by EC) to bring together representatives of the key stakeholders involved. In August 2008, the NDF formulated a MoU with the purpose to promote the implementation of the "European Statement of Principles (ESoP) on human machine interface for safe and efficient in-vehicle information and communication systems", as recommended in the European Commission Recommendation 2007/78/EC. The principles should be taken into account when designing new products to enable a safer, more effective and more user friendly integration of infotainment systems as well as aftermarket and nomadic (mobile) devices in the vehicles. This MoU also applied to personal navigation devices.

The Nomadic Device Forum (NDF) concluded that most of the HMI and safety principles listed in the European Statement of Principle (ESoP) with ref. 2008/653/EC were implemented by the Personal Navigation Device industry. Remaining are those principles that require the support of other sectors to be implemented or the ones that are affecting competitiveness negatively. A meeting with the Member States to discuss the deployment of these remaining principles was scheduled in 2010, but took never place.

Before becoming dormant, the NDF raised the issue of driver distraction by APPs. It concluded that most APPs were never designed to be used by the driver during executing their driving task but that Smartphones enable the APPs to hitchhike into the car environment.

The iMobility Forum SafeAPP WG relaunched again in 2012 wants to analyze existing guidelines and solutions and provide recommendations how to improve the situation:

This list of potential issues is based on experiences and lessons learned in the NDF, Car Connectivity Consortium and in the cooperation of TISA with CEN, ISO, Genivi, RDS Forum and worldDMB.

- Intellectual Properties, ownership and NDAs may hamper or delay cooperation.
- Availability of experts to evaluate existing proposals, guidelines, requirements and solutions
- Guidelines, recommendations and requirements without pass/fail criteria, examined with a standard measuring method, can probably never lead to certification. Previous versions of the ESoP describe in most cases design principles without hard pass criteria. The reason for doing this is to leave enough freedom in HMI designs for innovative concepts for future applications, but this works counter- productive to certification.
- Exclusive OEM solutions can solve only a small part of the potential safety issues. Consumers decide to have a device with a CE label. Therefore the solution has to support all APPs that are brought into the car by consumers on their portable CE devices.
- Safe individual APPs and OEM applications alone can never guarantee acceptable driver distraction. Applications running simultaneously may increase the driver's workload to an unacceptable level and this may affect traffic road safety as well. This topic needs to be covered either in the HMI or SafeAPP working group. The relevant scope needs to cover it.

Some examples of EC funded FP7 projects which are focusing on the impacts of functions provided by nomadic devices are TELEFOT, DRIVE C2X, HeERO.

TeleFOT project aimed to test the impacts of driver support functions on the driving task with large fleets of test drivers in real-life driving conditions. In particular, TeleFOT assessed via Field Operational Tests the impacts of functions provided by aftermarket and nomadic devices, including future interactive traffic services that will become part of driving environment systems.

One of the components in the DRIVE C2X system is the nomadic device and it could be either provided through a public interface (3G) or ITS. For example, in one of the DRIVE C2X Test sites in Finland, VTT tests the following primary functions: Weather warning (+ extended floating car data), Road works warning, In-vehicle signage and the Parking guidance (POI info) which are going to be implemented via tablet and 3G (client-server app). In addition, the next phase of HeERO 2 included nomadic devices on Smart Phone type devices and navigation.

Follow up activities of the iMobility Forum SafeAPP WG is encouraged, especially on the issue of driver distraction by APPs.

2.16 ICT for Energy and Efficiency in Transport

a) **Follow-up and promote the deployment of ICT and ITS measures for clean and efficient mobility**

b) **Identify the current state of mobility, provide a vision of eco-friendly and**

sustainable mobility using ICT and a roadmap to achieve efficient transition. This will be achieved by suggesting and implementing technical, management and political measures.

Successful deployment of Intelligent Transport Systems (ITS) can make a significant contribution to CO2 reduction targets – possibly up to 25% with certain measures. In order to realise agreement on the potential of ITS with respect to CO2 reduction the common denominator for the applications needs to be understood by all parties in order to properly understand the mechanisms that influence the emissions. This common denominator is based on a common terminology but also a common agreed assessment methodology is necessary to be able to speak about similar impacts and similar emissions.

Specifically, this last part has been the major focus of the ECOSTAND project in which intensive cooperation has been sought with both experts and policy makers from the US and Japan. An International Joint report (Satoshi Inoue, 2013) produced by the trilateral EU-US-Japan cooperation described the approaches being adopted by the three parties. In particular, it set out the areas of agreement which have been established in relation to methods for the assessment of the impact of ITS on energy efficiency. The aspiration of ECOSTAND is to further the development of a globally accepted methodology and the necessary tools that enable an accurate, cost-effective and valid evaluation of any ITS of the applications considered in terms of its short and long term energy/CO2 impact. The aim of the ECOSTAND Roadmap (TNO, 2013) is to guide progress towards an internationally accepted Methodology for assessing the impact of ITS applications on the energy efficiency and CO2 emissions of road vehicles. It includes actions whose aim is to conclude the development of the Methodology and supporting tools, to favour the widespread use of the Methodology and also ensure that it is continuously maintained and upgraded in the future.

The supporting actions and tools are therefore to:

- Begin a process leading to the (full or partial) **standardisation of the Methodology** with a recognised international body.
- Creation of a **web-based access point** where it is possible to obtain all necessary information to enable the correct use of the Methodology.
- Set up of an **International Data Repository** to permit easy access to relevant information, including existing studies in the field, best practice (e.g. examples from Field Operational Tests), data sets, vehicle classifications, etc..
- Establishment of an **organisational structure** which will ensure that responsibility is taken for any necessary upgrades of the Methodology and that an independent body to oversee its correct implementation.
- drawing up of a **Certification procedure** which permits the approval of specific models as being compliant with the Methodology

Standardisation is necessary since it makes results from different initiatives comparable and enables the efficient production of unambiguous data sets. Although it is accepted that standardisation of the Common Methodology should be the end result, it is agreed that it is too early to standardise the methodology itself. Its definition is still at preliminary stage and the Methodology will need widespread testing and evidence of acceptance before standardisation is appropriate.

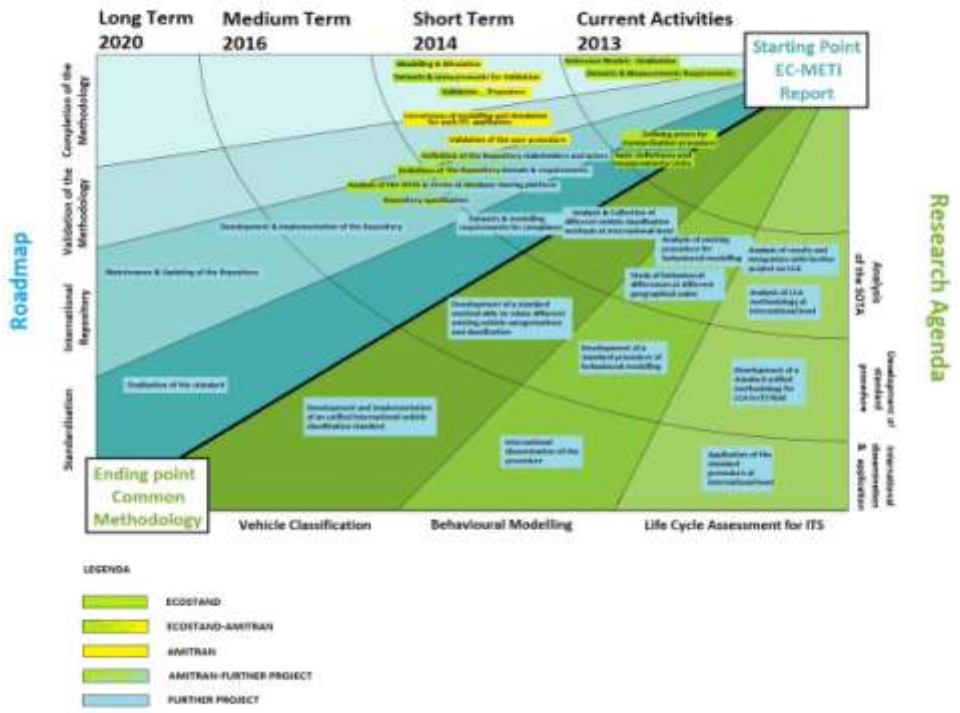

Figure 9: Draft eCostand Roadmap (Martijn de Kievit, 2013)

Since there is no standardised method for estimating the impact of such ITS implementations on emissions, different methodologies have been deployed up to now, leading to a lack of comparable data and difficulties in benchmarking. Within the EU, other assessment methodologies have been developed and used for different purposes, such as FOT-Net (FESTA), eIMPACT (SEiSS). ECOSTAND had its specific focus on energy efficiency and CO2 emissions, this focus is taken over by AMITRAN which will expand the methodology from a European perspective and elaborate the basis laid down by ECOSTAND. Amitran is defining such a methodology, which can be used as a reference in future projects.

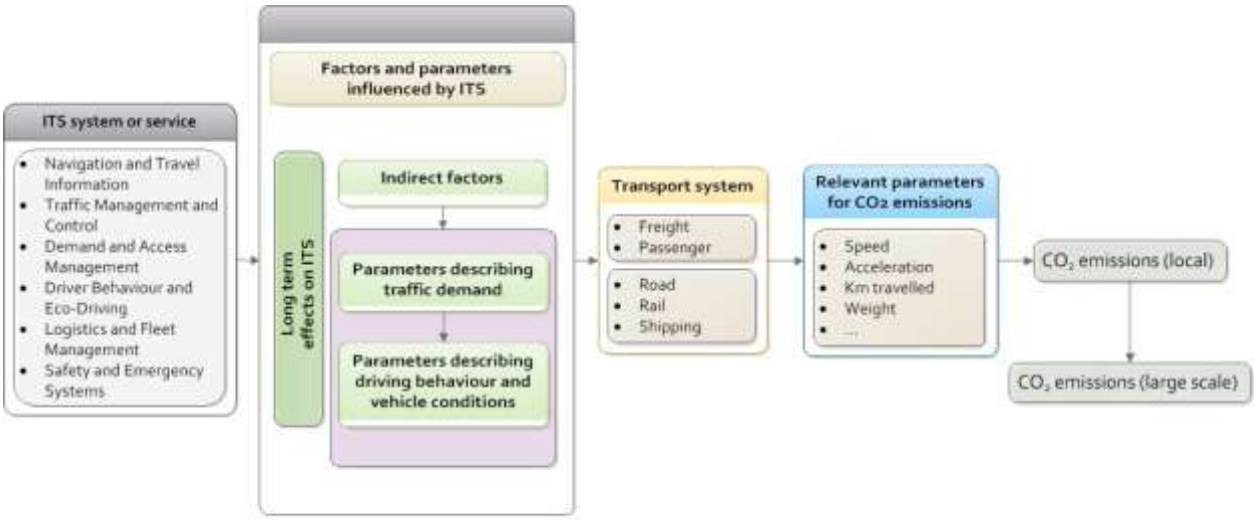

Figure 10: ARMITRAN (ERTICO, 2013)

Furthermore a connection has been made to ITU-T with respect to their impact assessment for ICT focusing on CO2 emissions, it appears that both activities are complimentary and cooperation has been established.

In addition, there are numerous recent or ongoing initiatives both within EU and internationally which deal with ITS and CO2 emissions.

Different European project exist for which impact assessments with respect to CO2 impacts are an important part of the research being performed. These projects (ecoMove, FreiLot, COSMO, In-time) show a mix of R&D and demonstration projects all with a focus on increasing energy efficiency and/or reducing CO2 emissions.

Energy ITS

The Energy ITS project (short for "Development of Energy-saving ITS Technology" project) has been established by NEDO (New Energy and technology Development Organization) in Japan in 2008 to establish an international standardised assessment methodology for measuring the effects of ITS. The aim of this five-year project, sponsored by the Japanese Ministry of Economy, Trade, and Industry (METI), is to:

• produce a CO2 emissions evaluation tool (i.e. a methodology)

• reach agreements with researchers in Europe (and possibly also in US)

on the key issues, e.g. vehicles classification and on elements of tools which could be useful elsewhere.

AERIS program

With main goal to improve air quality through the use of "smarter" transport, the AERIS (ITS DOT, 2013) (Applications for the Environment: Real-Time Information Synthesis) research programme aims to generate and acquire environmentally-relevant real-time transportation data, and use these data to create actionable information that facilitate applications for the environment.

Employing a multi-modal approach, the AERIS programme will work in partnership with the vehicle-to-vehicle communications research effort to better define how connected vehicle

data and applications might contribute to mitigating some of the negative environmental impacts of surface transportation.

From a governmental point of view, there is the need to make data available not only to allow travellers to make efficient but also "green" transportation choices. The basic research questions for this relate to data availability and how to use data to obtain useful information, connectivity aspects and the potential benefits that can be realised. To assist the development of useful applications to support travellers, transformative concepts were developed.

iMobility Working group for Clean and Efficient Mobility (WG4CEM).

The objective of the WG4CEM is to identify the current state of mobility, provide a vision of eco-friendly and sustainable mobility using ICT and a roadmap to achieve efficient transition. This is achieved by suggesting and implementing technical, management and political measures.

Some actions of the WG4CEM are:

- Define and or find pilot projects (business cases) for road owners, road user organisations and/or industry to further develop and implement ITS measures for clean and efficient mobility
- Identify fruitful lines of further development: which options can successfully developed further within reasonable limits of time, offer good potential for effectiveness, in a European dimension
- Promote the found solutions, especially through the European Commission, and also through national and local authorities.

The iMobility Working group for Clean and Efficient Mobility has recently published a report (iMobility Forum, 2013) with recommendations focusing research in the Horizon 2020 on the measures with the highest expected impact. The measures with highest estimated effect on CO_2 are:

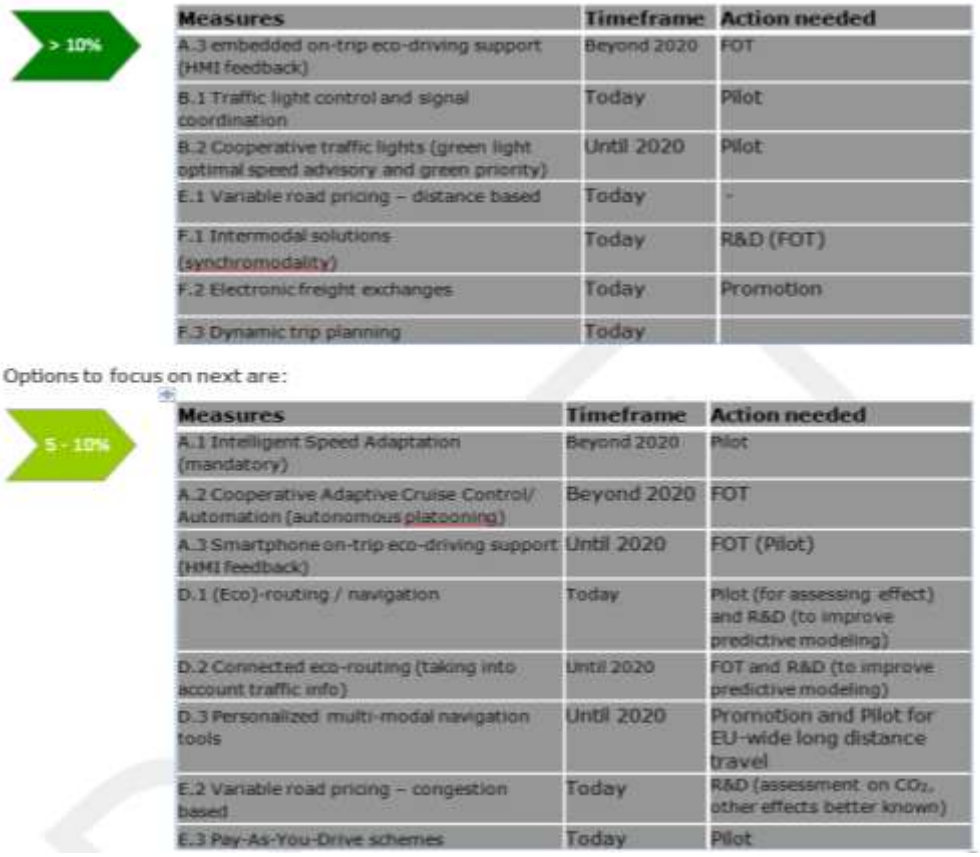

Figure 11: Measures with estimated effect on CO_2, (Luca Pascotto, 2013)

The action the WG recommends for the EC depends on the current state of development of the measure. For the fastest effect the focus should be on the measures that can already be implemented or are already (partially) implemented today. However, the timeframe for implementation stated here is not related to the ease of implementation. Even though the measures are feasible to be implemented today, their implementation may still prove to be very difficult (for instance the Eco-freight measures).

The report mentions several recommendations which we copy here at this report:

- For traffic management there is a clear distinction between cooperative systems and non cooperative systems. For cooperative systems there is more potential for CO_2 reduction, however in general the expected timeframe for implementation is later than for the non cooperative systems.
- Smartphones offer potential for multiple measures as a less advanced version of the measure. This can be relevant for earlier implementation of measures than the embedded version of a measure. Also it can function as a stepping stone towards larger scale implementation and acceptance of a measure. Also, a drawback for embedded systems might be that the systems become outdates, as the lifetime of a car is much longer than that of an ICT system.
- The WG expects connectivity to grow and improve in the future, however we don't know what to expect exactly (will it go towards more embedded systems or towards nomadic systems?). This uncertainty makes making our estimations harder. We recommend more integration and more research on this (phone industry and car industry should work together on this). For a lot of the measures, large scale tests are

needed for better insights into real effects, with the objective to get real life estimates of EU level effects. Tests need to be done with real penetration rate, focussing both on determining CO_2 effect and implementation issues.

- For measures that are already applied at the moment, data logging and assessment for the measures on CO_2 effects is essential to get more insight into real life effects. Modelling and evaluation of ITS is covered by ICT emissions, Amitran, Ecostand, the WG can endorse these results.
- A next step in comparing the effect on CO_2 between measures is determining the effect in kg CO_2 on EU level. This will make the comparison much more transparent than the comparison in percentages give in this memo. Making FOT or piloting possible for cooperative adaptive cruise control/ autonomous platooning is an issue for the automation and regulation WG as this is not allowed in real traffic yet. For traffic light control and signal coordination, the maintenance is critical and also the possible effect and implementation depends very much on current state (how much is still to gain). For some measures CO_2 effects may be minimal and there is much more potential for local effects. However even though CO_2 effect are small, these measures may be a no regret option as the local effect weigh in (e.g. parking guidance, car sharing and bike sharing schemes, congestion based road pricing). Enforcement by cameras may increase effect of speed limits. For connected eco routing and navigation taking into account real time traffic data actions are needed to make data better accessible. For mobility sharing schemes the local (urban) effect is expected to be much larger than the effect on EU level, also integrated effect of these measures and effect beyond 2020 is expected to be larger. Although eco-freight measures are already applied today, this is on a very small scale and penetration rate and therefore effect is still very low, especially for multimodal solutions and electronic freight exchange. Intermodal solutions and electronic freight exchanges have proven to be difficult to be implemented due to large number of different parties that need to cooperate to make it a success. Also parties are hesitant to share sensitive information with others. Therefore although estimated possible effect is large, this is very uncertain. Dynamic trip planning has more potential as this can be done within one logistics party and reducing fuel consumption for trip is an important benefit for a company.

Table 18: iMobility Forum WGCEM recommendations

The iMobility Forum supports the recommendations focusing research in the HO2020 on the measures with the highest expected impact, as being developed by the iMobility Working group for Clean and Efficient Mobility.

2.17 Vulnerable Road users

Investigate the most suitable safe, services and applications for the VRU

In its Policy Orientations on Road Safety 2011 - 2020, the European Commission is putting particular emphasis on the need to improve the safety of vulnerable road users (riders of powered two-wheelers, cyclists and pedestrians), since statistics indicate that their safety has not been given sufficient attention yet, and the number of fatalities and severe injuries among them is still rising in some European states. Actually, vulnerable road users (VRUs) account for about 45% of EU road fatalities.

Vulnerable Road Users (VRU) are defined in the ITS Directive as "non-motorised road users, such as pedestrians and cyclists as well as motor-cyclists and persons with disabilities or reduced mobility and orientation".

This comprises a series of heterogeneous sub-groups:

- Elderly (as pedestrian, cyclist, passenger, driver/rider);
- Child (as pedestrian, cyclist, passenger);
- Disabled (motor, sensorial, cognitive as pedestrian, cyclist, passenger, driver/rider);
- Cyclists;
- PTW riders.

ITS-based road safety and security applications have proved their effectiveness, but the overall benefit for society depends on their wider deployment. At the same time there are some safety-related issues that require further attention, e.g. the Human-Machine Interface (HMI) deployed or the safe integration of Nomadic Devices. It is recommended to verify the impact of a broader roll-out of mainstream ITS services on the 'Vulnerable Road User' – a heterogeneous group that is disproportionately represented in statistics on injuries and road traffic casualties. Deployment of the services that turn out to be beneficial should be accelerated whereas the potential negative effects should be mitigated as much as possible. The challenge of action 3.4 of the ITS Action Plan is to identify, and in a second stage prioritise, those ITS applications and services that can have a most significant impact on the various categories of vulnerable road users. In particular:

- identify significant sub-groups of vulnerable road users and the most relevant ITS applications/services
- assess (positive/negative) impacts of ITS applications and services on the safety and comfort of vulnerable road users, and if possible quantify these impacts
- prioritise among ITS applications and services, and detail concrete measures to enhance positive impacts or to limit/mitigate identified negative effects
- propose, develop and detail targeted European action

The European Commission in 2011 completed a dedicated study to assess the application areas and services that demonstrate maximum benefits, enclose potential risks, or include issues that need further attention for the various categories of VRU. The results of this study and the recommendations for follow-up action at European level provide valuable input for complementary analysis or research and evaluation. The outcome of this work provides a foundation for potential work towards specifications under the ITS Directive.

Within the context of the iMobility Forum, aiming at well-established targets related to safety and efficient transport and road management by using Information and Communication Technologies, a new Working Group on Vulnerable Road Users safety (VRU WG) had been established last year. The VRU WG aims at creating a forum encompassing all key stakeholders in the area of Vulnerable Road Users safety enhancement, and at contributing to the specific objectives and targets of the European Commission addressed within the “Horizon 2020” initiative. Within this context, the working group has contributed both to the iMF R&I WG and also to the PROS project.The iMobility Forum WG is also cooperating with related projects, and one of these projects is the VRUITS project.

VRUITS FP7 project (VTT) aims on the following objectives:

1. Assess societal impacts of selected ITS and provide recommendations for policy and industry regarding ITS in order to improve the safety and mobility of VRUs;

2. Provide evidence-based recommended practices on how VRU can be integrated in Intelligent Transport Systems and on how HMI designs can be adapted to meet the needs of VRUs, and test these recommendations in field trials.

The first Interest Group Workshop of the VRUITS project was organised in collaboration with the iMobility Forum VRU WG. The main purpose of the workshop was to get feedback on the work performed by the VRUITS project during the first half year and to assist the Consortium in prioritising the ITS applications.

The VRUITS First Interest Group Workshop (1ST IGW) was held in Brussels on September 18, 2013. The main objective of the VRUITS 1st IGW was to assist the project in the prioritisation of the ITS applications. In the morning sessions several presentations were made on the results of the work performed so far. In the afternoon sessions, group discussions were conducted on the most suitable ITS applications to address the most important critical scenarios for major VRU groups (pedestrians, cyclists, PTW riders).

Based on the group discussions, the following applications were seen as the most promising (Alejandra B. Garcia, 2013):

Pedestrians

- Speed cameras and ISA,
- Tags for kids,
- Mobile phone tracking for transport planners,
- In-vehicle pedestrian detection,
- Countdown signals,
- Intelligent Pedestrian Traffic Signals.

Cyclists

- Intersection Safety,
- Blind spot detection,
- Bicycle green wave & pre-green for bikes,
- Safe route planner, with information on black spots,
- Bike Sharing (including navigation),
- Information on bikes in public transport systems,
- Automatic Bicycle identification.

Powered Two Wheelers

- Intelligent Speed Warning,
- Rider monitoring,
- Intersection safety,
- Cooperative systems,
- in-vehicle detection of PTW.

In the same report, the Preliminary results from VRUITS is shown below on the prioritisation of these applications in terms of

- Mobility,
- Safety

- Maturity,
- Deployment potential
- Acceptance by VRU, driver, authorities ,
- Relevance for elderly drivers, disabled, children ,
- Communication of alerts, understanding, guidance, no overload

ITS application	number of experts	Average score	Total score
Blind Spot Detection	8	3.90	31.22
Intelligent Pedestrians Traffic Signal	7	4.29	30.05
ISA (Intelligent Speed Adaptation)	5	3.42	17.12
Red Light Camera/Speed Camera	4	4.02	16.09
Intersection Safety	4	3.82	15.26
Pedestrian Detection System and Automatic Braking	4	3.68	14.70
Navigation systems for VRUs	4	3.55	14.19
PTW Oncoming vehicle info system	4	3.17	12.68
VRU Beacon System	4	3.16	12.64
Cyclist digital bicycle rear-view mirror	3	4.04	12.13
Roadside Pedestrian Presence	3	3.54	10.62
Urban sensing system	3	3.19	9.58
Bike on Public Transport information	2	4.36	8.72
Autonomous driving	2	4.03	8.07
Automatic Bicycle Identification	1	3.88	3.88
Lane Change Assistant	1	3.66	3.66
Night Vision and Warning	1	3.64	3.64
Pedestrian safety app	1	3.58	3.58
Linked braking system	1	3.45	3.45
Information on vacancy on bicycle racks	1	2.81	2.81
Bicycle to car communication	1	2.75	2.75
Rider Monitoring System	1	2.43	2.43

Figure 12: VRUITS Prioritization of ITS for VRUs, (Johan Scholliers, 2013)

Overall, the visibility of VRUs is perceived as a major factor in view of traffic safety, especially in connection with heavy traffic and high speed situations. Correspondingly, technologies and systems enhancing the detectability and visibility of VRUs are considered to have high potential to increase the traffic safety of VRUs. In this regard, systems dealing with high speeds also have significant potential to reduce the injury consequences of VRUs crashes. With regard to comfort and mobility of VRUs, navigation systems for pedestrians and cyclists and intelligent pedestrian signals are among the systems seen as the most promising.

Some other related EC projects are the: SAVECAP, SAFERIDER SAFEWAY2SCHOOL and HUMANIST VCE. A Dutch project called SAVECAP focuses on the development and testing of vehicle systems for passenger cars and protecting cyclists and pedestrians in case of a crash. This could be an airbag system or a mitigation system like automatic braking. Important feature of the systems being worked on is the detection system that takes care of a timely detection and recognition of a pedestrian or cyclist in the driving path of the vehicle. SAFERIDER FP6 project aimed at studying the ADAS and IVIS integration on Powered-Two-Wheelers (PTW) and the development of an efficient and rider-friendly user interfaces for

riders comfort and safety. 2-BE-SAFE officially started on January 15th 2009, with its main objective to target behavioural and ergonomic systems research to develop countermeasures for enhancing Powered Two Wheeler (PTW), riders safety, including research on crash causes and human errors, and the world's first naturalistic riding study involving instrumented PTWs. SAFEWAY2SCHOOL project aims to design, develop, integrate and evaluate technologies for providing a holistic and safe transportation service for children, from their home door to the school door and vice versa, encompassing tools, services and training for all key actors in the relevant transportation chain.

It is recommended to verify the impact of a broader rollout of mainstream ITS services on the Vulnerable Road User'. Efficient countermeasures have to be designed through an understanding of behaviour. By behaviour, we have to consider not only the vehicle and its dynamics but also, and this is particularly the case for PTW riders, the practices of the riders when acting and interacting in sometimes complex road situations. The design of PTW-oriented ITS, has to take in consideration the specificities of both the vehicle and the riding task. The ergonomics of the human-machine interface has to be specific, and must take into account the way systems interfere with the vehicle dynamics. There is a need to investigate and develop the Naturalistic Riding Studies in order to observe the riders' behaviour with cooperative systems. There is also a need to assess the impacts of ITS applications and services on the safety and comfort of vulnerable road users, and if possible quantify these impacts.

In particular, especially for safety of children, surrounding traffic information and warning systems fulfil a very important role in giving information to oncoming vehicle, PTW or bicycle about a condition that calls for increased awareness or action. Areas for future research could include further exploring using VRU Units to facilitate accurate, real-time warning through interaction with the traffic environment (through cooperative systems), as well as increasing the amount of real time information on the actual bus stop itself, to increase service and usability.

It is also recommended to identify the most relevant advanced ITS technologies for the enhancement of safety of children in road transport for each sub area: PTW, bicycle and motor vehicle aspects. In addition there is a need to assess the impacts of these advanced ITS technologies for PTW, bicycle and motor vehicle and in combination with all.

Through the connected vehicle concept, there is a need to test information systems which will have the possibility to detect the imminence of the collision (special focus to vehicle occupants). This system can take a number of immediate measures to reduce the force of the impact. For example, it can measure the weight, morphology and position of each occupant in the vehicle in order to determine exactly when the airbags should be triggered and their possible degree of inflation to reduce the inflation shock.

The biggest number of VRUs killed or injured happens at the intersections. There has been some research in this domain (Intersection safety research regarding Vulnerable Road Users) but it is shown that more is needed since the percentage of the fatalities is significantly high.

Nowadays, personal nomadic devices are more and more used on a daily basis. An obvious need exists in connecting them with C-ITS solutions. Those are all intelligent systems and most definitely they could benefit from each other. VRUs (Vulnerable Road Users) could communicate among each other and more importantly with the vehicles as well, over the PDs/NDs. They also will be used as a mean to deliver traffic related data and for multimodal travel planning.

The iMobility Forum supports the research priorities as developed by the VRU WG and also suggest taking upon the recommendations as been explained in this section.

2.18 Automation in Road Transport

a) **Develop a roadmap for automation on future research needs and legal action and identify milestones and stakeholders.**
b) **Develop priority systems for automated vehicles.**
c) **Support the trilateral cooperation between EU-US-Japan Task force on automation.**

In Europe, most of these achievements have been accomplished through EC-funded research projects such as CyberCars, CyberCars2, EDICT, CyberMove, NetMobil, Have-IT, CityMobil, CityNetMobil and CATS.

All these research projects have demonstrated how the automation of road vehicles can lead to different transport concepts, from automation on-assisted car-sharing schemes, through cybercars and Power trains, to advanced BRT which, combined with demand management measures such as parking pricing and access restriction, can make urban mobility more sustainable.

From a technical point of view, current technology for highly automated driving in controlled environments is quite mature. Currently, two Personal Rapid Transit (PRT) systems are operated as public transport systems (at Heathrow airport in UK and at Masdar city in Abu Dhabi) and one cybercar system (the Rivium Park Shuttle in The Netherlands) is currently in operation.

Furthermore, today's technologies enable automated vehicle to drive on normal road (outside controlled environment). However, further research and enhancements of existing prototypes and systems are needed, in order to succeed in mixed traffic scenarios and real driving conditions.

EU projects like CityMobil, CityNetMobil or NICHE+ highlighted different barrier for the deployment of autonomous road vehicles, like for instance:

- The legal background, as autonomous vehicles are not allowed on public roads,
- The system complexity
- The need for sustainable business models

The EU project CityMobil2 will handle these barriers. Vehicle platooning (Eric Chan, 2012) is another type of fully automated transport concept. The SARTRE (Safe Road Trains for the Environment) was a FP7 project, funded by the European Commission and worked on the development of vehicle platoon operation on normal roads.

The efficiency gains of platooning are both, at vehicle level, lowering fuel consumption and thus CO2 emissions, and at road level, by reducing congestion. Results from the SARTRE project (IDIADA, 2013) show that fuel consumption decreases for about 8% for the lead truck and about 14% for the following vehicles whereas in a platoon at 85 km/h and a distance of 6m due to the aerodynamic drag. Furthermore, the vehicle following gaps and the speed variations can be reduced with platooning, reducing thus the so called shockwaves, which finally result in reducing road congestions.

As evaluated in the same report, SARTRE project: "*The introduction of platooning on normal roads with private vehicles will achieve environmental benefits (with an estimated 20% emissions reduction), safety benefits (reduction of accidents caused by driver action) and a*

reduction on congestion (smoother traffic flow with potential consequential increase in throughput)".

Another national initiative which has been launched recently is the Dutch Automated Vehicle Initiative (DAVI) which aims at the investigation, improvement, evaluation and demonstration of automated driving on public roads. In its white paper DAVI (Raymond Hoogendoorn, 2013) is discussing the collaboration scheme between Delft University of Technology, Connekt, RDW, TNO, Toyota Motors Europe as well as many other Dutch and selected international partners and how they would like to bridge the gap between individual vehicle automation and traffic management.

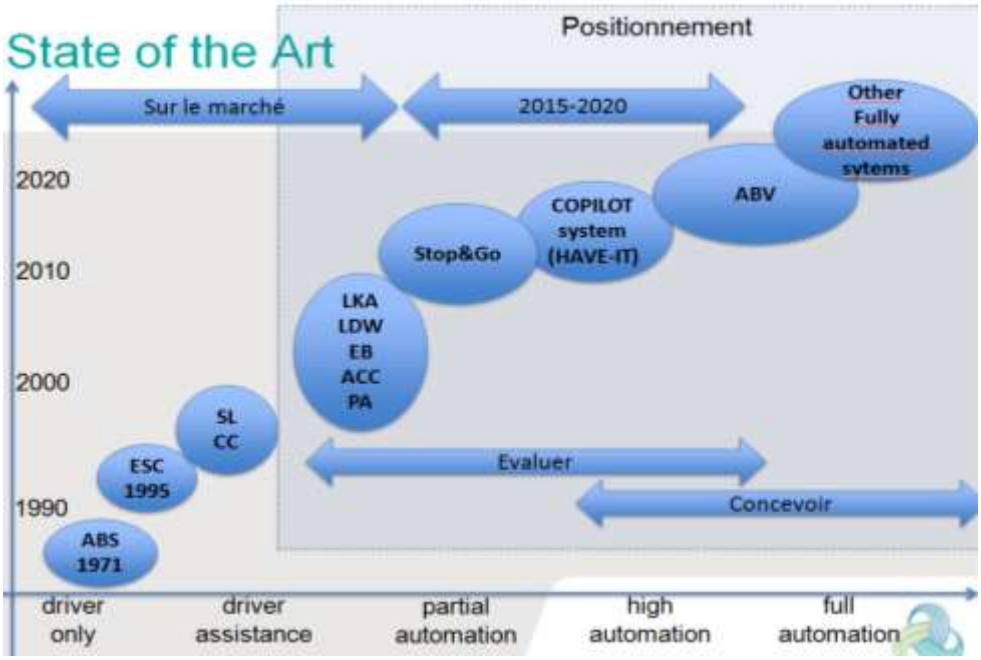

Figure 13: Atelier MOV'EO : Automation state of the Art , (MOVE'O, 2012)

In addition, there are currently several approaches under research and development, from assistance (EU-project Interactive) and automation of specific driving tasks (ACC, LKAS), highly automated driving (HAVEit, CityMobil) up to fully automated driving (CityMobil). In most of these approaches, the human driver plays an important role for the overall safety of the driver-vehicle system. Either he is requested to do the driving (assistance) or be requested to monitor the automation and take over in cases of system limits or system failures (semi-automated up to highly automated driving). To support him in these different roles the HMI appears to be most important. For a safe and effective use of the new technology not only the driver is in response but also several stakeholders can help to improve the use of this technique. OEMs have to provide clear instructions in their manuals. Driving schools can provide detailed information and trainings on new forms of assistance and automation, and regulatory authorities have to decide if there are additional testing or training requirements.

One of the main conclusions of the SMART 2010/0064 study (TNO: Margriet van Schijndel-de Nooij, 2010) was that there is an increasing need for deploying the automated driving applications cost-effectively, at the right time, with the right partners, and maybe in a more pragmatic manner. It is necessary to create a short- to long-term plan that could efficiently

lead the gradual introduction of automated driving applications in groups, categorized according to specific criteria and fulfilling categories of requirements.

In October 2011, the European Commission DG INFSO held a workshop on automation for road transport, with the aim of exploring and promoting the potential of highly automated vehicles and applications for intelligent and sustainable mobility. Additional requirements for automation including HMI, user acceptance, standardisation and certification, liability and legal aspects were presented and discussed, in addition to application areas such as cooperative systems, urban and inter-urban mobility, platooning and freight and logistics. The high level of participation and broad range of conclusions from this event demonstrated a clear remit for further work to be carried out, therefore encouraging the creation of a dedicated Working Group by the iMobility Forum. The main objective of the iMobility Forum Working Group on Automation is: *"Act as a forum for understanding the current state of the art in automation in Road Transport, explores and promote the potential of automation and applications for intelligent and sustainable mobility and providing a clear direction for the challenges of the future"*.

The working group is addressing all these topics and defined a widely accepted roadmap. The group identified two roadmaps: one for the highway scenario and one for the urban scenario. The roadmaps have a basic setup in which they discriminate between 3 phases with its subsequent TRL levels: 1. Technological research; 2. Piloting, large scale demonstrators; 3. Industrialisation. The roadmaps were setup in a way that they describe the sequence in which functions will be available or can become available. The next step for the group is to see how certain scenarios might quicken or delay the development for deploying these functions.

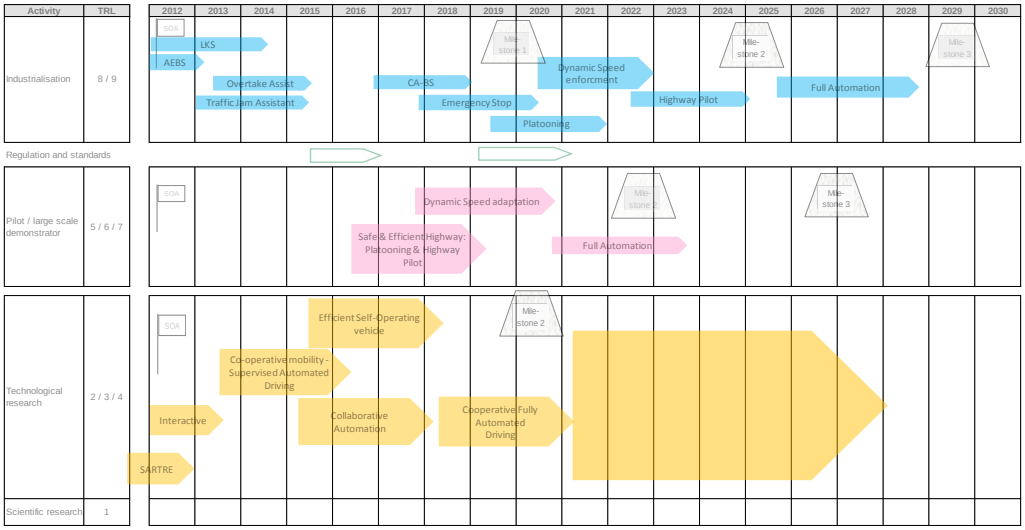

Figure 14: iMF Automation Roadmap- Urban scenario (iMobility forum, 2013)

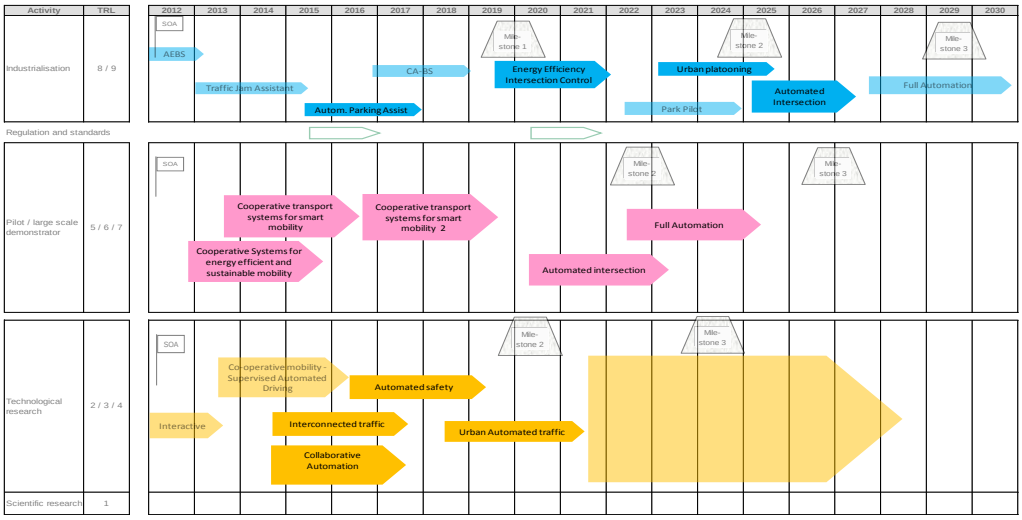

Figure 15;' iMF Automation Roadmap- Highway scenario, (iMobility forum, 2013)

In order to be able to define a comprehensive road map encompassing the whole spectrum of automation, use cases were selected that cover all levels of automation and find their application in all common scenarios (urban, highway and rural). These uses cases were mapped accordingly (see below).

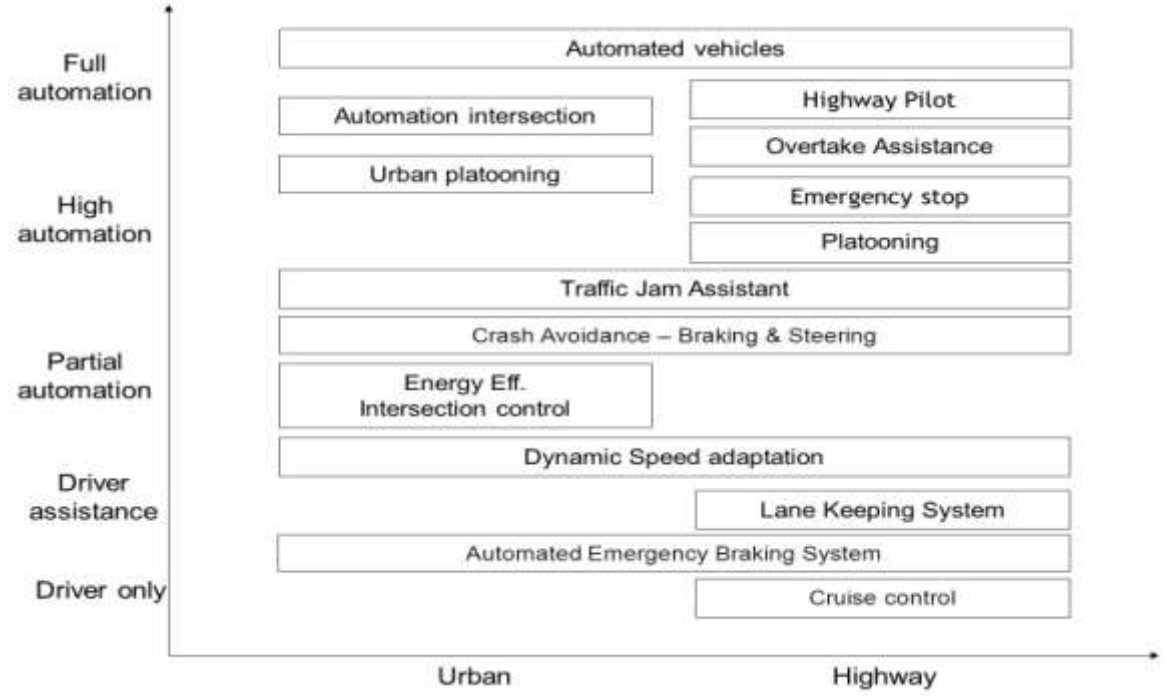

Figure 16: Functional mapping of applications, (Maarten Oonk, 2013)

The working group has also provided its research needs and roadmap to the Horizon 2020 through the iMobility Forum R&I WG and also to the PROS project. In addition, there are several organisations which have also contributed independently under this topic.

The current priority list of research as defined by the working group is underlined below:

Perception One very important enabler for reliable and safe automated driving is the capability to perceive the traffic environment in a very accurate real-time and integrated manner. To achieve this enhanced perception the vehicle should be equipped with numerous sensors such as laser scanners, radars as well as (mono and stereo) cameras to monitor the complete surroundings of the vehicle as well as exploiting wireless V2X communication. Vehicle automation Even though current technology for highly and fully automated driving in controlled environments is quite mature, further research and enhancements of existing prototypes and systems are needed in order to succeed in mixed traffic scenarios and real driving conditions Cognition and human factors The research area of cognition and human factors is essential since partially and highly automated driving still include the human driver at least in certain phases. Hence, the system behaviour and HMI must take into account the role of the driver in partially and highly automated vehicles and an appropriate interaction design should be tailored to the driver's needs. Traffic Management Highly automated driving offers even higher potential benefits if combined with traffic management, especially within urban environments. Modelling The research area of modelling plays an instrumental role in the development and evaluation of highly automated driving and its related applications Fail safe actuation of the automated vehicle Reliable and robust perception is necessary for automated vehicles to determine potential hazards and ensure safe driving from A to B. Independent validation of automated systems And finally, when automated systems are ready for actually driving on the road, it is essential that these systems can be validated and/or certified by independent organisations to determine if the vehicle meets the required safety levels. Liability and legal aspects Although this is not a scientific research topic, all of the above research needs can be met, but are useless unless the legal and liability aspects are adjusted for the highly/fully automated driving case.

Table 19: iMF Automation research priorities (source: iMobility Forum)

Whilst further research and development is required for certain technical aspects of Vehicle and Road Automation, it is clear that many non technical barriers are remaining. Currently, some envisioned functionalities are not yet covered by laws and standards, and deployment needs should be identified, for example with respect to:

- Legal foundations to clarify responsibilities and liability,
- Regulation needs to allow highly automated driving on the roads,

- Monitoring and steering standardisation,
- A suitable and global certification scheme for Vehicle and Road Automation devices and systems,
- Business models.

In addition the iMobility Forum WG on Automation (under the supervision of EC DG CONNECT) is liaising and collaborating with the US Department of Transport and Japanese Ministry of Transport. They have established Tri Lateral Working Group on Vehicle Automation in Road Transportation: EU-US-JP Joint Research on Vehicle Automation. The working group will exchange and discuss views and perspectives on relevant topics in the area of vehicle and road transport automation that apply to the role of public authorities with all stakeholders, to disseminate the state-of-the art and to define needs for harmonization and standardization in order to support international developments and deployment. The working group is focused on connected automation as a mean of achieving maximum benefits in safety, mobility and environmental impacts.

So, different research and stakeholders' communities, which are quite isolated from each other, need to meet and exchange their points of view on the topic of Automation. Therefore, networking activities are necessary to support stakeholders with international collaboration as well as European concertation, by extending for instance the role of the iMobility Forum Automation working group and supporting international meetings in the framework of the EU-US task force or the EU-Japan collaboration.

VRA is a Support action (ERTICO, 2013) for networking and international cooperation on Vehicle and Road automation addressing in particular the deployment needs. VRA intends to tackle common issues and agree on solutions enabling a healthy market condition for fast deployment. This support action for Vehicle and Road Automation is an initiative to share expertise and cooperate, at European and International level, which aims to:

- Maintain an active European network of Vehicle and Road Automation experts and stakeholders,
- Contribute to EU-US-JPN international collaboration on Vehicle and Road Automation,
- Identify deployment needs for the different domains of Vehicle and Road Automation,
- Promote the European Research on Vehicle and Road Automation through an innovative set of dissemination tools

The results of the VRA project will feed the iMobility Automation WG and the Trilateral (EU-US-JP) Working Group on Automation for road transport. While the iMobility Forum Automation WG provides for future research needs and recommendations for the EC, the VRA support action is gathering past and current activities to feed and motivate these needs.

The iMobility Forum supports the recommendations and the roadmap as developed by the Automation WG.

3 Conclusions

3.1 General outlook of 2013

Complementing the ITS Action Plan and other initiatives that foster a concerted EU-wide approach, the ITS Directive — Directive 2010/40/EU— provides the legal framework for the implementation of the actions required to achieve an effective and coordinated deployment and use of ITS.

Supporting the ITS Directive, we can see several platforms and initiatives being launched. TN-ITS will provide substantial support to both road authorities and map makers in establishing seamless exchange of information on changes in critical road network related spatial data, with the ultimate goal of providing near-immediate updating of the digital maps in end-user devices for such changes. Once this data chain is in operation, it can provide a substantial contribution to an improved user experience, to road safety and transport efficiency, and to the development and deployment of ITS applications in general.

Standardisation is still at the forefront of discussions, a priority area for the European Commission in the ITS Action Plan in order to achieve European and global ITS co-operation and coordination. Standardization work in accordance with the Response to Mandate M/453 is almost finalised. In particular, in April 2013 ETSI TC ITS has adopted a Technical Report for publication (TR 101 067) as Release 1 of TC ITS standards in accordance with the Mandate M/453. In May 2013 CEN/TC278 and ISO/TC204 prepared the draft Release 1 list of the C-ITS standards developed by both SDO, based on resolutions/decisions taken at the ISO/TC204 plenary meeting in Moscow (October 2012) and CEN/TC278 plenary meeting in Brussels (March 2013). The final Release 1 list will be part of ISO TR 17465-3, a technical report under development. When ISO TR 17465-3 is published a joint document will be developed including information from the different SDO Release process but also including other relevant standards from other SDOs such as SAE and IEEE. This joint document will be available at the end of 2013 or in the beginning 2014. There is, however, also a general requirement for global harmonisation of existing and future standards for cooperative ITS which is related to the ongoing cooperation with other standards organisations.

A notable development in 2013 that will influence the development of consumer transportation is eCall. European Commission adopted two proposals to ensure that, by October 2015, cars will automatically call emergency services in case of a serious crash. This draft legislation will ensure that from October 2015, all new models of passenger cars and light duty vehicles would be fitted with 112 eCall and the necessary infrastructure would be created for the proper receipt and handling of eCalls in emergency call response centres - ensuring the compatibility, interoperability and continuity of the EU-wide eCall service. Once proposals are approved by the Council and Parliament, the Commission is aiming to have a fully functional eCall service in place throughout the EU (as well as Iceland, Norway and Switzerland) by 2015.

Over the past few years, interoperability events have become a well-known practice within several high-tech sectors, such as telecommunication, as they provide an exceptional opportunity to test a product and pledge its interoperability before placing it on the market. Even if interoperability events do not certify products and services, they allow engineers to spot problems in the product development process early enough to limit financial consequences. Such events ideally take place early on in the progress of the implementation of a standard, and have proven to create great excitement among participant operators, equipment manufacturers, standardisation bodies and interest groups. This year interoperability events through DRIVE C2X, eCoMove projects, TISA, and also eCall plug test

events were held. Many new Transport ICT projects have been launched while others finalised their research, development and demonstrations of these new technologies in the field of ICT for Safe smart and clean mobility (eg. eCoMove and Interactive IP).

The main focus of this year was on developing Strategic Research agendas for the Horizon 2020, the next European Framework Programme for Research and Innovation. This new programme represents for both the European institutions and for all the research stakeholders one important step towards a more efficient and focused research funding in Europe.

Despite the support of the EC and the involvement of important stakeholders, this approach has not yet led to large-scale service deployment. To prove effectiveness, justify investments for large-scale deployment and grow from technological development into a deployment-oriented innovation, more proof on system rather societal level is needed. Besides technological aspects, successful innovation also includes solutions for moving the barriers related to organisational and institutional issues, markets and business models, finance and funding, legal, political/strategic and decision making and coordination aspects. Finally, industry readiness to produce and user acceptance to use and buy the solutions should not be overlooked as important goals.

To speed up the deployment of ICT for transport, it is moreover crucial to create demand and raise consumer awareness. This requires a joint effort by the industry and the wider innovation community, including public sector and research communities. This year, the two support action projects iMobility Support and iMobility Challenge have shown the benefits of ICT systems for efficient and sustainable mobility to end-users, decision-makers, the research community and the industry. Once again, the pan-European dimension of the objectives pursued requires raising consumer awareness in a concerted way through cooperation at European level.

3.2 iMobility Forum achievements 2013

Automation WG

The mission of the working group on Automation in Road Transport is to identify how automation and its subsequent applications can help to improve efficient, clean, safe and reliable road transport now and in the future and what is needed to foster deployment and implementation. To be more specific the working group focussed its activities on the common agreement on developing one or more roadmaps for future developments in the area of automation in road transport

The Working Group has finalised the first roadmap for enhanced automation in the road transport sector. The Working Group has met in total 6 times this year with the aim to define this first roadmap. The Working Group was created under the iMobility Forum after the successful workshop organized by the European Commission, DG INFSO in October 2011. This workshop commenced the three SMART studies, executed in 2011 for the European Commission, DG INFSO specifically focusing on automation, the future of internet and the connected car and during the workshop a clear need was identified to further discuss and guide the research, development and deployment of automation for road traffic and road transport systems.

HMI WG

The European Statement of Principles on HMI (ESoP) was published as an EC Recommendation in 2008 and the need for its further development was identified by the WG-HMI in 2009. Since then, the EC has published the ITS Action Plan which includes HMI. The iMF HMI WG will review SoA and technological progress made since 2008, it will cooperate closely with WG

SafeApps, discuss needs for international harmonisation and determine the need for an ESoP update. The HMI WG met twice and the main results of its meetings were that the WG-HMI recommendations 2009 need to be reconsidered. A basic agreement on ESoP scope has been achieved at the second meeting, in particular on vehicle classes, functions, HMI technology and assessment of compliance. The next steps would be to analyse results from standardisation and recent technological developments and work on the recommendations on the process for EsoP development.

Safe Apps WG

The working group provides a platform for all ITS stakeholders in Europe and APP suppliers to develop guidelines for the successful development and deployment of safe APPs for drivers used while driving and to support the international cooperation of the iMobility Forum related to safe APPs. The WG started 2 months ago and had two meetings. In these meetings the ToR and scope were discussed. The SafeAPP WG was introduced at the Car Connectivity Consortium (CCC) summit and cooperation opportunities are discussed.

This WG is following work by the Nomadic Device Forum (NDF) which concluded that most of the principles listed in the European Statement of Principle (ESoP, ref. 2008/653/EC), which could be implemented without the support of other sectors and which had no negative impact on competitiveness in the market, were implemented by the key players of the Portable Navigation Device Industry. As a final act, before becoming dormant, the NDF raised the issue of driver distraction of APPs. There are APPs to support the driver with his driving task. Other APPs inform or entertain end-users. In most cases these APPs are not designed to be used by drivers when executing their driving task. All APPs are carried into the vehicle by the personalized Nomadic Devices and become accessible by the driver. Special requirements will be needed to ensure traffic safety. It is obvious that the ESoP applies to all applications operated by the driver while driving.

WGCEM

The objective of the WG4CEM is to provide a vision on eco-friendly and sustainable mobility supported by Intelligent Transport Systems (ITS) and a roadmap to achieve efficient transition.

The working group will 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
- Identifying fruitful lines of further development and research

The WG has collected literature and data on measures within the WG scope, to be published in a report of the WG work. On this available data the WG has based its expert judgement. The WG has made an estimation of the effect of measures on CO_2 emissions of mobility in the EU, an estimation of the possible timeframe for implementation of measures and an estimation of the technology readiness level and phase of research and development of the measure. Following this, the WG has some recommendations for further research;

Vulnerable Road Users

The iMF Vulnerable Road Users WG aims to support ITS stakeholders with the development of individual goals and targets for the improvement of the safety of VRU along with recommendations and guidelines to achieve these goals . The focus is on both passive and active systems (both in-vehicle & infrastructure based) as well as the potential improvements from the combination of both.

The working group has finalized a document on critical scenarios per target VRU group (draft available). In addition, the WG is currently finalising a report on identifying the most critical scenarios per VRU WG group and match them with the Systems Matrix. The WG will also revise document on research priorities and build a realistic roadmap.

Probe data

A minor study has being performed by FTW, providing with an overview of research findings, experiences, and lessons learned on the development and deployment of probe data systems in Europe (and specific regions).

Probe data (floating car data) has the potential to develop transformative applications and services that can improve road operations; planning and maintenance based on traffic conditions; in addition to offering real-time information to travelers of traffic and travel conditions. In addition to probe data from vehicles, data may also be collected from mobile devices, such as smart phones or navigation devices, wherein travellers act as "probes."

Building upon these findings, the iMobility Forum Probe Data WG commenced its activities very dynamically. The objectives of the group is to:

- Define Probe Data scope
- Raise awareness of collected Probe Data
- Select public-domain services that could benefit from probe data
- Identify what it takes to enable these services
- Data chain, Roles, Responsibilities,
- Possibly propose Public Private cooperation
- Clarify issues related to privacy, security, ownership, quality….
- Identify research needs, pilots, awareness campaigns, PP, Policy support
- Identify relevant standards for EU and assess the need for harmonization Support (and align with) the trilateral EU-US-Japan collaboration on Probe Data

Implementation Roadmaps

The Working Group aims at investigating how to promote the roll-out and deployment of vehicle and infrastructure based systems, and at regularly monitoring the deployment status of existing applications in terms of vehicle fleet penetration and road network coverage. The work is focussed on selected priority systems that are mature enough for deployment and effective with regard to reaching the iMobility goals of safety, efficient, smart and clean road mobility.

The Working Group has identified key deployment issues and developed and updated implementation road maps for 14 priority systems. The list of priority systems and their road maps are regularly updated, and the impacts of each system on iMobility goals have been monitored and published on http://www.imobility-effects-database.org/. The market and fleet penetration and road network coverage of the priority systems have been monitored in 2012 and the WG is working on the 2013 updates.

Legal Issues

The Working Group aims at contributing to the general objectives of the iMobility Forum; investigating legal and liability issues related to safe, smart, and clean mobility and new technologies; establishing recommendations on legal issues(thus facilitating the market introduction of safe, smart, and clean systems)-, privacy issues (taking into account data

protection and 'privacy by design' concept), product and service liability issues; and investigating the effect of Road Traffic Legislation on future vehicle technologies

The WG provides regular status reports on its progress to the iMobility Forum Steering Group and actively participates in the policy development of the ITS Action Plan. Reaching consensus amongst its members (industry, researchers, representatives of users, road operators) the working Group delivered a final report setting up recommendations and guidelines on how to promote innovation in transport, while respecting privacy and data protection.

Research and Innovation

The iMobility Forum Research & Innovation (R&I) Working Group is a permanent Working Group dealing with research and innovation issues for the whole Forum, such as the update of Strategic Research and Innovation Agendas and Road Maps linked to ICT for smart, clean and efficient mobility, and to the transport of goods and people in linkage to the various implementation platforms. The iMobility Forum R&I WG has also contributed to a lot of documents for EU Research and Innovation Program or Policy Work Programs:

- iMobility Forum R&I WG answer to EC consultation on the green paper for a common strategic framework for EU research and innovation funding
- Strategic research agenda ICT for mobility - November 2010
- Updated strategic agenda 2008
- eSafety strategic agenda 2006
- ICT part of European green car initiative 2008
- ICT PSP work programs.

Recently, the iMobility Forum R&I has contributed effectively to the work programmes under Horizon 2020.The iMobility R&I Working Group's output is to identify new medium and longer term R&I priorities and to formulate a set of recommendations on future research in the area of ICT for mobility as a whole.

International Cooperation

The Working Group aims at supporting "inter-continental" co-operation, focusing on the global harmonisation and standardisation of cooperative systems, enhancing the tri-lateral EU-US-Japan cooperation through increased support to government-industry cooperation of the three regions, and building on this basis extending the cooperation to a world-wide forum.

Under its umbrella, the Tri Lateral Working Group on Vehicle Automation: EU-US-JP Joint Research on Vehicle Automation has been established. The Tri-Lateral Working Group focuses on automated operation involving all road users, within a connected environment, for broad information sharing and focused collaboration across the regions. The working group will exchange and discuss views and perspectives on relevant topics in the area of vehicle and road transport automation that apply to the role of public authorities with all stakeholders, to disseminate the state-of-the art and to define needs for harmonization and standardization in order to support international developments and deployment. In addition, there is a strong collaboration with US-JPN focussed on the benefit of Probe Data for the Road Operators, i.e. for road management use, building up on eventual fitment of V2V/V2I on vehicles, initial focus on services using post-processed data for road operations, maintenance, modelling, etc and second focus on real-time processing for traffic management.

3.3 Summary of the findings

The report shows an overview of activities which are corresponding per recommendation and also thus allow iMobility actors to quickly perceive how work is progressing per

recommendation for the year 2013, and whether the achievements are approaching any goals or targets that have been set. Upon the main findings of this report, we can propose several conclusions per recommendation.

1. Accident Causation Data

The iMobility Forum SG discussed extensively this recommendation at the recommendation workshop on the 19th March 2013 but felt it was not sufficiently covered by its participants. The participants believe that the iMobility Forum should take an action in re-establishing a working group under iMobility Forum to tackle these issues in collaboration with the PROS project (European Commission, 2012) and upon the findings and recommendations of the DaCoTa project.

2. Impact Assessment

The iMobility Forum SG suggests that there is a need of a project independent and consistent on impact assessment tests on safe smart and clean mobility systems. A probable action for the SATIE project (develop guidelines / evaluation for large scale pilot). More work is required on impact assessment, automation of the mobility system and services and vulnerable road users. Furthermore, it is important to capitalise on the existing FOT results in order to produce EU data sharing framework and fair coordinated validation framework for operational tests in the member states.

3. Human-Machine Interaction

In genera, itIt can be concluded that there is a need to update both the scope and the existing ESoP principles taking into account the latest technological developments but noting that the European approach is distinctly different from the "lockouts and specific criteria" adopted by the US's NHTSA guidelines. At the moment the iMF WG-HMI is working on this issue with a number of stakeholders and with the guidance of the EC.

4. Implementation Road Maps

Given the present constraints on public funding and the recognition that the problems of congestion and air quality, etc are unacceptable economic and social burdens, wise investment by both public and private organisations in the intelligent management of existing infrastructure is essential. The iMobility Forum working group will continue monitoring the priority systems in the future. The assistance and involvement of the iMobility WG on IRM in this process could assist the EC with this information. In addition, it would be necessary to ensure a continuation of a project (ex EaSyWay) under TEN-T programme focusing on the deployment of Intelligent Transport Systems (ITS) for roads.

5. Cooperative Mobility systems and services

iMobility Forum proposes to endorse the Comesafety 2 actions for a multimodal C-ITS architecture for deployment, and propose that iMobility support project will sustain these actions after the lifetime of the ComeSafety 2 project. In addition, the research needs of Cooperative ITS as proposed by ComeSafety 2 should be discussed further by the horizontal coordinators of the iMobility Forum.

6. Digital Map

The iMobility Forum should continue supporting deployment platforms such as the TN-ITS. This platform will provide substantial support to both road authorities and map makers in establishing seamless exchange of information on changes in critical road network related spatial data, with the ultimate goal of providing near-immediate updating of the digital maps in end-user devices for such changes. Once this data chain is in operation, it can provide a

substantial contribution to an improved user experience, to road safety and transport efficiency, and to the development and deployment of ITS applications in general.

7. In vehicle 112 emergency call (eCall)

This recommendation is progressing as planned. iMobility Forum through the European eCall Implementation Platform is supporting eCall implementation and following all relevant issues both nationally and also internationally and as well with in terms of standards and regulation.

8. Real-Time Traffic and Travel Information

This recommendation is progressing as planned. There is a need to continue work under TISA to support the wider use of the pan-European RDS/TMC network and further development and deployment of TPEG services. The iMobility Forum Probe data WG will continue supporting the development of probe data services to improve the data quality of traffic and travel information.

9. Legal issues (privacy by design, security, liability) related to ICT for transport

The iMobility Forum Legal issue WG recommends developing pan-European standard contracts to ensure that services provided through ITS offer the same data protection safeguards across Europe, with information provided to users sufficiently clear about the specific features used, a general description on the features of the technologies and the consequences in terms of data protection. In case new features are added, further steps should be taken by service providers to provide clear and specific information to users in respect of these additional features and to obtain their appropriate consent to the use of new features. The iMobility Forum Legal Issues Working Group urges all stakeholders to accelerate their efforts to raise consumer awareness about data practices and to provide additional transparency tools to consumers, with an eye towards developing clear and accessible messages which consumers can readily see and understand.

10. Standardisation and interoperability

This recommendation is progressing as planned. Follow up and active contribution on standards is required.

11. European large scale actions

Upon the conclusions of this workshop (SATIE, 2013), the SATIE consortium received a clear message that a network of ITS Test beds would bring important value added at European level. The SATIE consortium took that information to elaborate further a proposal, and the workshop audience welcomed the idea to discuss it further at another occasion.

The iMobility Working group for Clean and Efficient Mobility has recently published a report (iMobility Forum, 2013) with recommendations focusing research in the HO2020 on the measures with the highest expected impact.

Even though 2013 was an exciting year full of awareness campaigns and demonstrations by the EC projects and pilots, there is a need to continue to design and execute public awareness campaigns focusing on wide public media as well investigating fiscal/financial incentives to stimulate and support consumers' demands for intelligent road applications and use of safe, smart and clean mobility services.

12. Nomadic and aftermarket devices

Follow up activities of the iMobility Forum SafeAPP WG, especially on the issue of driver distraction by APPs.

13. Preparation of Strategic Research agendas

The iMobility Forum SG supports the iMobility R&I Working Group's output i.e identify new medium and longer term R&I priorities and to formulate a set of recommendations on future research in the area of ICT for mobility as a whole. The iMobility Forum collects research priorities and needs by all ITS stakeholders.

The iMobility Forum R&I will continue supporting Strategic Research agendas and thus contributing effectively to the work programmes under Horizon 2020.

14. Standardisation and interoperability

This recommendation is progressing as planned. The iMobility Forum endorses these recommendations under iCar Support and its forerunner iMobility Support and also will keep on analysing the specific needs and priorities for standardisation in European Standardisation Organisations for ICT for mobility systems and services. And also follow-up, liaise and contribute to the standardisation work in this area in CEN, ETSI and ISO.

15. European large scale actions

The iMobility Forum support the SATIE project conclusions on the establishment of a network of ITS Test beds and proposes to continue on working on recommendations and guidelines for developing large scale ITS beds.

Spectrum allocations

16. Stimulate demand and use

Even though 2013 was an exciting year full of awareness campaigns and demonstrations by the EC projects and pilots, iMobility Forum proposes to continue and design and execute public awareness campaign focusing on wide public media as well investigating fiscal/financial incentives to stimulate and support consumers' demands.

17. Nomadic/after- market devices

Follow up activities of the iMobility Forum SafeAPP WG, especially on the issue of driver distraction by APPs

18. ICT for EE in mobility

The iMobility Forum supports the recommendations focusing research in the HO2020 on the measures with the highest expected impact, as being developed by the iMobility Working group for Clean and Efficient Mobility.

19. Vulnerable Road Users

The iMobility Forum supports the research priorities as developed by the VRU WG and also suggest to take upon the recommendations as been explained in the relevant section.

20. Automation in Road transport

The iMobility Forum supports the recommendations and the roadmap as developed by the Automation WG. Automated driving could help to reduce the amount of accidents and the impact thereof, to increase the throughput on highways and in the end it could allow the driver to be increasingly less active in the actual driving. Besides legal, liability and human driver aspects, many technical issues need to be solved regarding reliability and robustness of control, actuation systems, sensor and positioning devices.

Automated and cooperative driving will have its influence on the needs from the infra-structure and traffic management. A system of automated driving vehicles needs traffic

management systems as enabler to manage the flow of all automated vehicles, to distribute them across the road network in such a way that societal goals of safety, optimal network utilisation and environmental boundaries are reached. Distributed traffic management is a key success factor to ensure that the individual cars receive the needed information.

Last but no less important, the communication to the driver via the HMI and the human factors are key enablers to make automated driving successful. The development and implementation of a combined solution, in which cooperative technology enhances automated vehicle technologies, requires the involvement of many stakeholders from the automotive industry, road operators, (local) authorities, service providers, policy makers, standardisation and certification bodies, the research community and, of course, the driver. Cooperation between these parties is vital to a vigorous deployment of these technologies.

4 References

European Commission. (2010). Road Safety Programme 2011-2020: detailed measures.

79 GHz project. (2012). *79 GHz project*. Retrieved from www.79ghz.eu

Alejandra B. Garcia, C. (2013). *Minutes of the First Interest Group Workshop*. VTT.

Andras Czepinsky. (2012). *iCar Support Standardisation stakeholder survey*.

Automotive Council, UK. (2011). *Intelligent Mobility, a national need*. London: Automotive Council, UK.

CARE database. (2013). *CARE database*. Retrieved from http://www.careproject.eu/database/

Citymobil . (2013). *Citymobil* . Retrieved from http://citymobil2.eu: http://citymobil2.eu/en/upload/public-docs/1st%20CityMobil2%20Newsletter.pdf

Claudia May, L. P. (2013). *Working Document on:privacy and Liability*. iMobility Forum.

DACOTA project. (2013). *DACOTA project*. Retrieved from http://www.dacota-project.eu/

DAIMLER. (2009). RoCC Technology Cooperation Project Promotes Wide Use of Modern Safety Technologies; Car Manufacturers and Suppliers Aim to Make Radar Sensor Systems Useable in All Vehicle Classes. Neubiberg, Germany.

Davide Brizzolara. (2013). Future trends for automotive radars: Towards the 79 GHz band. ITU.

EasyWay. (2012). *Deployment Guidelines*. Retrieved from easyway: http://www.easyway-its.eu/deployment-guidelines/

EDPS. (2009, July). *Opinion of the European Data Protection Supervisor on the Communication from the Commission on an Action Plan for the Deployment of Intelligent Transport Systems in Europe*. Retrieved from http://www.edps.europa.eu/EDPSWEB/webdav/site/mySite/shared/Documents/Consultation/Opinions/2009/09-07-

(n.d.). *EN 15722, June 2011: Road transport and traffic telematics - ESafety - ECall minimum Set of Data*.

(n.d.). *EN 16102, December 2011: Intelligent transport systems - ECall - Operating requirements for third party support* .

Eric Chan. (2012). *SARTRE-project*. Retrieved from SARTRE-project: http://www.sartre-project.eu/en/publications/Documents/SARTRE_Final-Report.pdf

ERTICO. (2008). *ERTICO*. Retrieved from http://www.ertico.com/rosatte

ERTICO. (2012). *eMaps project*. Retrieved from http://www.ertico.com/emaps

ERTICO. (2013). *FOT-Net -COMeSafety Joint Workshop Cooperative ITS deployment*. Retrieved from FOT-Net: http://www.fot-net.eu/download/workshops/fot-net_comesafety2_jws_20130523_report_2.pdf

ERTICO. (2013). *FOT-Net Seminar: FOT Achievements and opportunities for the future, 23-09-2013*.

ERTICO. (2013). *VRA project - Concertation Workshop on Automation*. Retrieved from iMoiblity Support: http://www.imobilitysupport.eu/news/entry/vra-fp7-project-concertation-workshop-on-automation-presentations-and-outcomes-available

ETSI/CEN. (2013, July). *Final joint CEN/ETSI-Progress Report to the European Commission*. Retrieved from ETSI: http://www.etsi.org/images/files/technologies/Final_Joint_Mandate_M453_Report_2013-07-15.pdf

euroFOT. (2008). *euroFOT*. Retrieved 2013, from http://www.eurofot-ip.eu/en/about_eurofot/objectives/

euroFOT. (2012). euroFOT study demonstrates how driver assistance systems can increase safety and fuel efficiency across Europe. Brussels: euroFOT.

European Commission. (2007). Infrastructure for Spatial Information (INSPIRE). *Directive 2007/2/EC*.

European Commission. (2008, December). Action Plan for the Deployment of Intelligent Transport Systems in Europe . *COM(2008)886*.

European Commission. (2009). Directive 2009/40/EC on periodic roadworthiness tests for motor vehicles and their trailers and repealing. *Directive 2009/40/EC*.

European Commission. (2010). Communication from the commission to the European parliament, the council, the European economic and social Committee and the committee of the regions, Towards a European road safety area: policy orientations on road safety 2011-2020. *COM (2010) 389 final*.

European Commission. (2010). *Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport Text with EEA relevance*. Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010L0040:EN:NOT

European Commission. (2011). Availability of Public Data for Digital Maps, D7 –Final Report, . *ITS Action plan, Action 1.3* .

European Commission. (2011). Towards a European road safety area: policy orientations on road safety 2011-2020. *COM(2010) 389 final*.

European Commission. (2012). *PROS project*. Retrieved from PROS project: http://www.pros-project.eu/

European Commission. (2013). *Amitran presentes interim results in Dublin*. Retrieved from Amitran: http://www.amitran.eu/news-and-events/news/amitran-presents-interim-results-in-dublin/

European Commission. (2013). On the implementation of objective 6 of the European Commission's policy orientations. *Commission Staff working document*.

European Commission. (2013). *SafetyNet*. Retrieved from http://ec.europa.eu/transport/wcm/road_safety/erso/safetynet/content/safetynet.htm

European Commission. (n.d.). *CARE DATABASE*. Retrieved from CARE DATABASE: http://www.careproject.eu/database/

European Commission. (n.d.). European Commission, CARS21 High Level Group on the on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union, Final Report 2012.

European Commission. (n.d.). European Commission, Europe 2020 Flagship Initiative Innovation Union, SEC(2010) 1161.

European Commission. (n.d.). European Commission, Europe 2020, A strategy for smart, sustainable and inclusive growth, COM(2010) 2020 final.

European Commission. (n.d.). European Commission, White Paper, Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, COM(2011) 144 final.

European Commission. (n.d.). *HeERO project*. Retrieved from HeERO project: http://www.heero-pilot.eu/view/en/heero/vision.html

European Council. (1993). 93/704/EC: Council Decision of 30 November 1993 on the creation of a Community database on road accidents,. *OJ L 329*, 63-65.

European Council. (1993). Council Decision of 30 November 1993 on the creation of a Community database on road accidents. (93/704/EC), 63. Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31993D0704:EN:NOT

European Parliament . (2013). Proposal for a Decision of the European Parliament and of the Council on the deployment of the interoperable EU-wide eCall. *Directive*.

European Parliament. (2013). Proposal for a Regulation of the European Parliament and of the Council concerning type-approval requirements for the deployment of the eCall in-vehicle system and amending. *Directive 2007/46/EC* .

European Parliament and of the Council . (1995). Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing. Retrieved from http://ec.europa.eu/justice/policies/privacy/docs/95-46-ce/dir1995-46_part1_en.pdf

European parliament and the council . (2002). Directive 2002/58 on Privacy and Electronic Communications, otherwise known as E-Privacy Directive.

FOTSIS. (2013, May). *Validation of Communication Architecture and Configuration of Test Sites*. Retrieved from FOTSIS: http://www.fotsis.com/index.php/newsevents/project-news/item/211-validation-of-communication-architecture-and-configuration-of-test-sites

FSD. (2012). *iCar - implementation status survey by use of OEM data* . Germany: iCar Support .

HeERO pilot. (2013). *HeERO pilot project*. Retrieved from http://www.heero-pilot.eu/view/en/home.html

http://ec.europa.eu/transport/its/studies/its_en.htm. (n.d.). Retrieved from http://ec.europa.eu.

IDIADA. (2013). *D4.3 Report on Fuel Consumption*.

iMobility Forum. (2013). *iMobility Forum WGCEM conclusions and recommendations*. Brussels: iMobility Forum.

iMobility Support. (2012). *iMobility Forum Digital maps*. Retrieved from http://www.imobilitysupport.eu/working-groups/digital-maps

iMobility Support. (2013). *iMobility Effects database*. Retrieved from iMobility Support.

ITS DOT. (2013). *AERIS*. Retrieved from ITS DOT: http://www.its.dot.gov/aeris

Kerry Malone, J. R. (2013). User related results from DRIVE C2X test sites.

Kulmala, R. and Öörni. (2012, November). iMobility Implementation road map. Deliverable D3.1 of iCar Support. Brussels, Belgium.

Lina Konstantinopoulou. (2012). *D2.2 Mapping of products and services*. Brussels: iMobility Challenge.

M. Miglietta et all. (2013). *D1.2 Overview of existing strategic agendas and research activities*.

M/453, J. C. (2010, April 15). *M/453, Joint CEN and ETSI Response to Mandate*. Retrieved from www.etsi.org: http://www.etsi.org/website/document/technologies/first_joint_cen_and_etsi_response_to_mandate_453.pdf

M/453, J. C. (l 2010, Apri 15). *http://www.etsi.org*. Retrieved from http://www.etsi.org: http://www.etsi.org/WebSite/document/Technologies/First_Joint_CEN_and_ETSI_Response_to_Mandate_453.pdf

Matti Roine, V. (n.d.). *http://satie.eu/media-library/deliverables/*. Retrieved from SATIE project.

Mononen,P., Franzen, S., Pagle, K., Morris,A. . (2013). *TeleFOT final report*. TeleFOT.

Öörni and Kulmala. (2012). *iMobility Implementation road maps report*.

Paul Kompfner. (2013). *Deliverable D3.2 Multimodal cooperative ITS architecture: a first concept*. Brussels: Comesafety.

Paul Kompfner, Hossein Zakizadeh. (2013). *D3.2 Report on Gap Analysis - Research needs for cooperative systems*. Comesafety2.

Peter Urban, F. (2012). *D2.2 Research Topics with their Priorities*.

PROLOGUE. (2011). *http://www.prologue-eu.eu/prologue/deliverables/*. Retrieved from http://www.prologue-eu.eu.

PROLOGUE project. (2013). *PROLOGUE project*. Retrieved from http://www.prologue-eu.eu/

Raymond Hoogendoorn, B. v. (2013). *DAVI*. Retrieved from DAVI: http://davi.connekt.nl

Risto Öörni, Anna Schirokoff, VTT. (2012). *D2.1 Mapping of the Systems*. Brussels: iMobility Challenge.

S.E. Shladover. (December 2012). *Literature Review on Recent International Activity in Cooperative Vehicle-Highway Automation Systems*. Federal Highway Administration.

Sandford Bessler and Thomas Paulin. (2013). *Literature study on the state of the art of probe data systems in Europe*.

SATIE. (2013). *SATIE workshop from test beds to deployment*. Retrieved from SATIE: http://www.satie.eu/news/satie-workshop-from-test-beds-to-deployment-news/

Satoshi Inoue, M. K. (2013). *Guidelines for Assessing the Effects of ITS on CO2 Emissions International Joint Report*.

Sören Hess, F. F. (2013). *D5.5 Certification and homologation*. Comesafety2.

Tapani,M., Schulze,M., Krajzewicz,D. (2011). *DRIVE C2X methodology framework*. DRIVE C2X.

TeleFOT. (2008). *TeleFOT*. Retrieved from http://www.telefot.eu/

TISA. (2013). *TISA*. Retrieved 2013, from http://www.tisa.org/

TISA executive office. (2012). *TISA*. Retrieved 2013, from http://www.tisa.org/assets/Uploads/Public/EO12004PositionPaperMinimumSetSafetyInformation-v26b.pdf

TNO. (2010). *SMART – 2010/0065, Connected Car Study*.

TNO. (2013). *D4.2 ECOSTAND Roadmap and Research Agenda*.

TNO: Margriet van Schijndel-de Nooij, B. K. (2010). *SMART 2010/0064 Definition of necessary vehicle and infrastructure systems*. EC.

Tom van de Ven,. (2013). *European Commission, DG MOVE*. Retrieved from http://ec.europa.eu/transport/themes/its/studies/doc/final_report.pdf

UDRIVE. (2013). Retrieved from http://www.udrive.eu/.

UDRIVE project. (2012). *UDRIVE*. Retrieved from http://www.udrive.eu/index.php/about-udrive/what-is-nds

Van Schijndel-de Nooij, M. K. (n.d.). *http://ec.europa.eu/information_society/activities/esafety*.

VTT. (n.d.). Retrieved from http://www.vruits.eu/

ANNEX I –Cooperative ITS projects

Annex I contains a detailed list of the C-ITS projects

Project name	Funding	End date	Keywords
MOBINICITY	FP7	30/06/2015	FEV, V2I,
Mobility2.0	FP7	28/02/2015	FEV, V2I, V2V, 802.11p
PRESERVE	FP7	31/12/2012	Security, protocol design
FOTsis	FP7	30/09/2014	V2I, I2I, FOT
ICT-Emissions	FP7	30/09/2014	Transport emissions
AsPeCSS	FP7	28/02/2014	VRU, radar
ITSSV6	FP7	31/01/2014	IPv6, protocol design
DRIVE C2X	FP7	31/12/2013	V2I, V2V, 802.11p, FOT
Interactive	FP7	30/06/2013	In-vehicle system
eCoMove	FP7	31/03/2013	V2I
ELVIRE	FP7	31/03/2013	FEV, V2I
SARTRE	FP7	31/10/2012	V2V, 802.11p
SAFEWAY2SCHOOL	FP7	31/08/2012	Sensor system, V2I, I2V, HMI
Instant Mobility	FP7	31/03/2013	V2I, V2V, 3G
MODUM	FP7	01/03/2013	V2I, V2V

ECOGEM	FP7	28/02/2012	FEV, ADAS, V2I
euroFOT	FP7	31/08/2011	ADAS, radar, in-vehicle system
ROADIDEA	FP7	30/09/2010	Back office, traffic management
PRE-DRIVE C2X	FP7	30/06/2010	V2V, V2I, architecture
SMARTFREIGHT	FP7	30/06/2010	CALM
GeoNet	FP7	31/01/2010	Geonetworking, protocol design
SAFESPOT	FP7	31/01/2010	V2V, V2I,
iMobility Support	FP7	31/12/2015	architecture, standardisation
iMobilityChallenge	FP7	31/08/2014	awareness raining of C-ITS
COOPERS	FP6	31/01/2010	V2I, V2V
CVIS	FP6	31/01/2010	V2I, V2V, architecture, 802.11p, 2G/3G, CALM
I-WAY	FP6	31/01/2009	V2I, V2V
CyberCars-2	FP6	31/12/2008	V2I, V2V
GOOD ROUTE	FP6	31/12/2008	V2I, CEN DSRC, 2G

SEVECOM	FP6	31/12/2008	Security, protocols
WATCH-OVER	FP6	31/12/2008	VRU, sensor system, radar, camera, IR, 802.15.4, RFID
TRACKSS	FP6	31/10/2008	Sensor system, V2I, V2V
PReVENT	FP6	01/03/2008	V2I, V2V, VRU, sensor system
ICiNG	FP6	30/06/2008	ND
COM2REACT	FP6	31/12/2007	V2I, V2V
FREILOT	CIP PSP Pilot	31/03/2012	V2I, V2V, 802.11p
COMPASS4D	CIP PSP Pilot	31/03/2015	V2I, V2V

ANNEX II - Abbreviations

Abbreviation	Definition
ADAS	Advanced Driver Assistance System
AERIS	Applications for the Environment: Real-Time Information Synthesis
BbD	Privacy by Design
CARE	Community Road Accident Database
CEN	Comité Européen de Normalisation
CEN	European Committee for Standardization
DATEX	standard for traffic information exchange between traffic management centres
DSRC	Dedicated Short-Range Communications
ECDG	eCall Driving Group
EDPS	European Data Protection Supervisor
EeIP	European eCall Implementation Platform
EGCI	European Green Car Initiative
EIP	European Innovation Partnerships
ELSA	European Large Scale bridging Action
ERSO	European Road Safety Observatory
ESoP	European Statement of Principles
ETSI	European Telecommunications Standards Institute
EV	Electric Vehicles
FCD, FVD	Floating Vehicle (car) Data
FOTs	Field Operational Tests
FP6	Framework Programme 6
FP7	Framework Programme 7
FPI	Fuel Price Information
FVD	Floating Vehicle Data
GPS	Global Positioning System
HMI	Human Machine Interaction
ICT	Information and Communication Technology
IETF	Internet Engineering Task Force
ISO	International Standards Organisation
ITS	Intelligent Transport Systems
MoU	Memorandum of Understanding
MSD	Minimum Set of Data
NAFTA	North-American Free Trade Agreement
PIA	Privacy Impact Assessments
POI	Point of Interest
PRT	Public Road Tour
PSAP	Public Safety Answering Point
PTW	Powered Two-Wheelers
R&D	Research and Technological Development

RDS	Radio Data System
RFID	Radio Frequency Identification
RTD	Research and Technological Development
RTTI	Real-time Travel and Traffic Information
RTTI	Real Time Traffic Information
SARA	Strategic Automotive Radar Frequency Allocation Group
SDO	Standardisation Organisations
SLA	Service Level Agreements
SOA	Service-Oriented Architecture
SRA	Strategic Research Agenda
TISA	Traveller Information Services Association
TMC	Traffic Message Channel
TNITS	Transport Network ITS Spatial Data
TPEG	Transport Protocol Experts Group
TTI	Traffic and Travel Information
UNECE	United Nations Economic Commission for Europe
V2V	Vehicle to Vehicle
VIN	Vehicle Identification Number
VMC	Vehicle Management Centres
VRU	Vulnerable Road Users
WiFi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access
WRC	World Radio Communication Conferences
ETSI	European Telecommunications Standards Institute
VIN	Vehicle Identification Number
EeIP	European eCall Implementation Platform
RDS	Radio Data System
TMC	Traffic Message Channel
TPEG	Transport Protocol Experts Group
CEN	Comité Européen de Normalisation
	(European Committee for Standardization)
ISO	International Standards Organisation
ICT	Information and Communication Technology
ITS	Intelligent Transport Systems
SOA	Service-Oriented Architecture
RTD	Research and Technological Development
VRU	Vulnerable Road Users
ERSO	European Road Safety Observatory
CARE	Community Road Accident Database
FOTs	Field Operational Tests
PRT	Public Road Tour

CVIS	Cooperative Vehicle Infrastructure Systems
COOPERS	Co-operative Systems for Intelligent Road Safety
VMC	Vehicle Management Centres
PSAP	Public Safety Answering Point
ESoP	European Statement of Principles
HMI	Human Machine Interaction
RTTI	Real-time Travel and Traffic Information
FP6	Framework Programme 6
FP7	Framework Programme 7
WiFi	Wireless Fidelity
WiMAX	Worldwide Interoperability for Microwave Access
DSRC	Dedicated Short-Range Communications
RFID	Radio Frequency Identification
V2V	Vehicle to Vehicle
GPS	Global Positioning System
POI	Point of Interest
FVD	Floating Vehicle Data
ADAS	Advanced Driver Assistance System
MSD	Minimum Set of Data
ECDG	eCall Driving Group
MoU	Memorandum of Understanding
TISA	Traveller Information Services Association
CEN	European Committee for Standardization
TTI	Traffic – and Travel Information
FPI	Fuel Price Information
POI	Points Of Interest
EDPS	European Data Protection Supervisor
UNECE	United Nations Economic Commission for Europe
SLA	Service Level Agreements
SDO	Standardisation Organisations
ELSA	European Large Scale bridging Action
EIP	European Innovation Partnerships
NAFTA	North-American Free Trade Agreement
SARA	Strategic Automotive Radar Frequency Allocation Group
WRC	World Radio Communication Conferences
SRA	Strategic Research Agenda
EV	Electric Vehicles
AERIS	Applications for the Environment: Real-Time Information Synthesis
EGCI	European Green Car Initiative
PTW	Powered Two-Wheelers
IETF	Internet Engineering Task Force

ANNEX III Recommendations table

	In line with the new iMobility Forum focus, the new recommendations address not only safety but also smart and clean mobility in Europe						
Number / Topic	**Recommendation**	**Whom (stakeholder)** (iMobility WGs, EC, Member state, other)	**How** (Actions towards implementation of recommendations)	**Related Initiatives**	**Traffic Light**	**Safety / Smart / Clean**	**Research / Deployment**

	In line with the new iMobility Forum focus, the new recommendations address not only safety but also smart and clean mobility in Europe						
Number / Topic	**Recommendation**	**Whom (stakeholder)** (iMobility WGs, EC, Member state, other)	**How** (Actions towards implementation of recommendations)	**Related Initiatives**	**Traffic Light**	**Safety / Smart / Clean**	**Research / Deployment**
1. Accident Causation Data	a) Identify the most prominent clusters of contributing factors of accident in the EU (Nordic, Mediterranean, Central) b) Identify the minimum requirements for an EU database (by comparing common features from national databases) c) Identify which organizations are responsible for monitoring / controlling traffic crashes	ERSO -European Road Safety Observatory(DaCoTa FP7 project) EU-US task force on driver distraction ITU working group on driver distraction DG MOVE (CARE database) Re-launch of the working group (DGDG MOVE road safety unit, DG ENTR) or link with PROS project	Naturalistic Driving studies (MIDAS programme). Establish large scale pan European accident causation database where emphasis is not only based on quantitative but also qualitative analysis of driver behaviour Best practices guidelines on how to collect data. CARE database (pan European accident data set) Literature study on projects dealing with accident related info. Involvement of new stakeholders, a new business model	Road Safety programme ITS Directive DaCoTa project (develop ERSO) UDRIVE, PROLOGUE EU-US task force on driver distraction develops taxonomy for measuring crashed and near-misses. ITU also has a Working Group focusing on standardisation and this area.	a)  b)  c) 	Safety	Research

	In line with the new iMobility Forum focus, the new recommendations address not only safety but also smart and clean mobility in Europe						
Number / Topic	**Recommendation**	**Whom (stakeholder)** (iMobility WGs, EC, Member state, other)	**How** (Actions towards implementation of recommendations)	**Related Initiatives**	**Traffic Light**	**Safety / Smart / Clean**	**Research / Deployment**
2. Impact Assessment	a) Consolidate and refine methodologies for an integrated approach to assess the potential impact of ICT for safe, smart and clean mobility. b)Consolidate and refine a coordinated validation framework for operational tests in the Member States addressing ICT for safe, smart and clean mobility c) Promote and carry out large scale evaluation and validation of priority safe, smart and clean mobility systems through Fields Operations Tests FOT, or reuse of data from previous FOTS in order to define future deployment	European Commission FOTNET iMobility Forum Probe data WG	Need of a project independent and consistent on impact assessment tests on safe smart and clean mobility systems. AMITRAN Need of EU data sharing framework and fair coordinated validation framework for operational tests in the member states FESTA revision. AMITRAN SATIE project (develop guidelines / evaluation for large scale pilot. More work is required on impact assessment and automation of the mobility system and services and vulnerable road users. HeERO project impact assessment	Humanist VCE, DecoMobil iCarsNetwork CIP TELEFOT, EuroFOT HAVEit FP6 projects DRIVE C2X, FOTsis, FP7 project FREILOT, COSMO, HeERO pilots FOT-Net and FOT-Net 2 projects and FESTA Methodology	a)  b)  c) 	Safe, smart and clean,	Deployment

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3. Human-Machine Interaction	a) Development should be monitored such that the ESoP can be re-visited periodically (at least every 3 years) providing a balance between current relevance and stability b) Develop robust assessment procedures and safety-relevant criteria where practicable starting with safe fixing (including field of view) for Nomadic Devices	EC (DG CNECT, DG MOVE), MS iMobility Forum HMI WG DECOMOBIL EC (DG CNECT, DG MOVE), MS Nomadic Device WG	Need for a clear statement from the EC on the future implementation of the recommendation. a) and b) ITS Action Plan Meeting among EC (DG CNECT and DG MOVE to discuss the next steps. The recommendations of the HMI WG should be adopted by the MS through the ITS Action Plan iMobility Forum HMI workshop on NHTSA guidelines relevant to EU (DECOMOBIL project) DECOMOBIL project / eCodriver	HUMANIST VCE, AIDE (ESoP), DRIVE C2X FP7DECOMOBIL iMobility Forum WG HMI iMobility Forum NDF final report, CE4AEU-US Task force on Driver Distraction established by EC DG CNECT and USA DOT RITA. ITS Action plan (Benchmarking Study on HMI)	a) and b) 	safe	deployment

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4. Implementation Road Maps	a) Continuously identify the priority systems, their potential to improve safe, smart and clean road mobility, and update regularly Road Maps (including the monitoring of implementation of intelligent integrated systems) with technical steps and economic implications for the introduction of safe, smart and clean systems in Europe. b) Set up and maintain a good-quality quantitative process for monitoring the vehicle penetration and road infrastructure coverage of priority systems.	DG CNECT, IRM WG ASECAP, road directorate, Police Conveyor of Mayors	Direct link with ITS Action Plan and Directive roadmap / Connecting Europe / future TNT policy / structural funds (ITS focus)	iMobility Forum WGs IRM, II, International EasyWay (COSY WG) roadmap for cooperative systems	a)  b) 	All	deployment

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5. Cooperative Mobility systems and services	a) Move forward international co-operation in the development and deployment of cooperative mobility systems and services. b) Establish mechanism and processes to agree pathways towards deployment of cooperative systems to achieve sufficient market penetration to start the services as well as to achieve maximum	EC (ITS Action plan, 4.3), European Standardisation Organisations International Cooperation WG, EU-US Task force, EU-Japan Task force, ITS Associations EC (DG CONNECT, DG MOVE) ERTICO – ITS EUROPE Car2 car consortium (Amsterdam group)	iMobility Support , COMeSafety2, eCoStand FP7 project , euTRAIN (transport) project Cooperation with China, Russia, Korea,	MOBINET, COMPASS4D, ETSI – CEN Standardisation Mandate 453, Car2Car Consortium, NEARCTIS project, eCoMove, eCostand DRIVE C2X, FOTsis FP7 projects EC DG CNECT - USA DOT RITA - JAPAN MLIT memorandum of co operations SATIE FP7 project	a)  The traffic light is green taking into account that the recommendation focuses on US and Japan b) 	All sectors	Deployment

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6. Digital Map Database	a) Based on existing research results, define requirements for European digital road map data. This which should contain, in addition to road network data, agreed road attributes for private and professional driver-support for information and warning purposes, such as speed information, eco driving, road configuration data. b) Create suitable partnerships and mechanisms to produce, update, maintain, certify and distribute this digital road map data. c) Dynamic location referencing should be given more attention in terms of reliability,	DG MOVE TN-ITS deployment platform, EU member states (e.g. France, Germany, UK etc) – Champion are Scandinavian countries Map makers ELF (European Location framework) driven by Joint Research Centre.	TN-ITS deployment platform (5th June meeting) iMobility Forum Digital Maps WG Memorandum of Understandings with Public authorities DG MOVE (specification of the ITS Directive)	ROSATTE and INSPIRE projects INSPIRE Directive DG MOVE study on access to public data for Digital Road Maps ITS Action plan directive	 a, b, c	Mainly safety but also covers smart and clean.	Deployment

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7. In vehicle 112 emergency call (eCall)	a) Further support measures needed to have EU wide 112 eCall service deployment, e.g. through the EeIP deployment Platform b) Explore the potential of retrofit devices for eCall for existing and future vehicle fleet c) Need for wide public awareness campaign focused on wide public media (TV and Web2.0).	EC (DG CNECT, DG MOVE, DG ENTR) EU member states EeIP platform HeERO I and II	ITS Directive (deployment 2015) HeERO project. PT1502 EC task force EeIP platform TF RETRO (1st report on 25 April 2013) HeERO 2 project	HeERO pilot project TeleFOT project (eCall test) European eCall Implementation platform	a)  b)  c) 	Safe,	deployment
8. Real-Time Traffic and Travel Information	a) Support the wider use of the pan-European RDS/TMC network and further development and deployment of TPEG services. b) Support the development of probe data services to improve the data quality of traffic and travel information	TISA forum, MS, EasyWay	ITS Action Plan and ITS Directive (15th April 2013, meeting on DATEX 2) Update from TISA regarding Datex II/TPEG status	Past projects on RTII TISA forum (Pan European TPEG commercial services) TISA – EasyWay memorandum of understanding to develop larger message sets and translations	a) and b) 	Smart, safe	deployment

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9. Legal issues (privacy by design, security, liability) related to ICT for transport	a) Assess the need of evaluating the relevant legal frameworks to deal with the road mobility improvements obtainable with some safe, smart and clean systems in vehicles and infrastructure, b) Privacy by design, Develop a privacy by design methodology c) Security, Integrate the security subsystem to FOTs apps d) Liability, Develop a methodology for risk benefit assessment, achieve an industrial and societal consensus on a European Code of Practice, and establish guidelines	EC (DG CNECT, DG MOVE, DG ENTR)	iMobility Forum Legal Issues WG DG MOVE studies on data protection and liability issues ongoing A new project ''Response X' on liability and cooperative systems will be required in the future. Need for clear actions from the EC on the future implementation of the recommendation.	iMobility Forum eSecurity WG DG CNECT Study on Automation (legal issues section) OVERSSE PRECIOSA, EVITA, PRESERVE FP7 projects. RESPONSE 3 project (Code of practice) HAVEit project ITS Action plan 5.2	a), b), c), d) 	Safe	Deployment

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Number / Topic	**Recommendation**	**Whom (stakeholder)** (iMobility WGs, EC, Member state, other)	**How** (Actions towards implementation of recommendations)	**Related Initiatives**	**Traffic Light**	**Safety / Smart / Clean**	**Research / Deployment**
10. Standardi-sation and interoper-ability	a) Analyse the specific needs and priorities for standardisation in European Standardisation Organisations for ICT for mobility systems and services. b) Follow-up, liaise and contribute to the standardisation work in this area in CEN, ETSI and ISO, in particular regarding the activities carried out in the framework of the Mandate /453 to support the interoperability of co-operative systems for intelligent transport, and promote global harmonisation when appropriate c) Propose a common necessary framework to ensure the interoperability, compliance and conformance and performance of ITS. d) Need for an organisation to deal with pan European wide security and authentication issues	European Commission, European Standardisation bodies ERTICO	iCar Support Questionnaire on standardisation. How to proceed with the results from the standardisation questionnaire?? ComeSafety 2 project iCar Support follows up on standardisation covering CEN, ISO, ETSI, IEEE (handbook on annual basis) Open up recommendation to include standardisation to all areas of ITS applications. PSI Directive	European Standardisation bodies - CEN, ETSI mandate / 453 EC ITS standardisation coordination group Support action projects (ComeSafety and iCar support projects) ROSATTE forum and TISA forum ITS action Plan,4.4 EU-US Task force	a)  b)  c)  d) 	All sectors	Deployment

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Number / Topic	**Recommendation**	**Whom (stakeholder)** (iMobility WGs, EC, Member state, other)	**How** (Actions towards implementation of recommendations)	**Related Initiatives**	**Traffic Light**	**Safety / Smart / Clean**	**Research / Deployment**
11. European large scale actions	a) Work towards ICT deployment in transport through partnerships on European large scale actions by organizing large scale test-beds in cooperation with demand and supply stakeholders and in line with the ITS Directive, in which solutions to existing societal challenges are taken through the innovation chain in a continuous programmatic approach of a sufficient scale and duration	SATIE FP7 project, EC	Need for clear actions and statement from the EC on the future implementation of the recommendation. SATIE project guidelines	iMobility Forum (ELSA Task force)		All sectors	Deployment

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12. Spectrum allocations	a)Identify spectrum allocation needs and take necessary actions for a sufficient spectrum allocation for safe, smart and clean systems and services b) Support the worldwide harmonisation of spectrum allocations. Increase active participation in worldwide fora in order to support multi-modal transport related interests and requirements in spectrum allocation	79GHz Project ACEA, IARREG (chairs: TRW)	a) 79GHz Project (create a spectrum allocation forum defending the interest of automotive industry on spectrum allocation) 5,9 GHz. b) EC is participating to World Radio Communication conferences.	Decisions by EC and CEPT/ECC on the timely unlimited use of the frequency band 77-82 GHz for automotive SR radars. US is sharing the 5,9 GhZ for WIFI usage SARA GROUP (Strategic Automotive radar Frequency Allocation Group)	a) and b) 	All sectors	Deployment

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13. Stimulate demand and use	a) Design and execute awareness campaigns which explain the benefits, functioning and use of safe, smart and clean mobility systems and services to the stakeholders. b) Need for wide public awareness campaign focusing on wide public media (TV and Web 2.) c) Investigate instruments as well as fiscal/financial incentives to stimulate and support consumers' demand of intelligent road applications and use of safe, smart and clean mobility services.	iMobility Support, iMobility Challenge, FOTNET, EC (DG CNECT, DG MOVE, DG COMM)	a) EUROFOT, TELEFOT events FIA events, ITS congress demos Independent Awareness campaigns (TV etc) by automotive manufacturers, automobile and motoring clubs WG on user outreach re-launch Training programme in driving schools INFO days on pre-commercial procurement	ITS World Congress, iMobility Challenge iMobility Support iCar Support FOTNET	a)  b)  red traffic light is for eCall, need to start an eCall awareness campaign coordinated by the EC with similar start dates in all European Countries involved. c) 	All sectors	deployment

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14. Nomadic / After market devices	a) Understand and analyse the potential impact and implications of the usage of aftermarket/nomadic devices for large scale deployment of safe, smart and clean mobility applications and services	TeleFOT project in the loop of the discussion iMF Safe Apps EC (DG CNECT)	A new EC support action addressing the specifications for safety criteria ISO TC 204 WG 17 status. Reactivate WG 11 (Navigation)	iMobility Forum WG HMI TELEFOT, DRIVE C2X, HeERO and FREILOT.		Safety	deployment

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15. Preparation and updating of the Strategic Research Agenda on ICT for Safe, Smart and Clean Mobility	a) With the support of the major stakeholders, analyse the specific needs and define the priorities for RTD actions on ICT for Intelligent Mobility in particular on: Sustainable Road Transport; Sustainable Urban Mobility: Road Transport Safety (including the VRU); ICT and the Decarbonisation of Transport; Deployment; and the Horizontal Issues.	iMobility Research and Innovation WG PROS project (DG RTD) FOSTERoad (ERTRAC)	iMobility Research and Innovation WG report Take into account all activities and initiatives of PROS project (DG RTD) and FOSTERoad (ERTRAC) The recommendations are evolving into only deployment related focus There is a need to identify specific research needs / topics to be included in the recommendations.	iMobility Research and Innovation WG paper SATIE project PROS project (DG RTD) European large scale actions **elsa** HUMANIST VCE NEARCTIS HYCON 2 (transport)		All sectors Except safety? PROS has covered all safety research topics	research

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16. ICT for EE in transport	a) Follow-up and promote the deployment of ICT and ITS measures for clean and efficient mobility) b) Identify the current state of mobility, provide a vision of eco-friendly and sustainable mobility using ICT and a roadmap to achieve efficient transition. This will be achieved by suggesting and implementing technical, management and political measures.	iMobility Forum WG ICT for Clean and efficient mobility This WG is finishing soon its report. Need to identify what is the next steps of this WG	The project ICT for emissions and AMITRAN (impact assessment methodology on energy efficiency and ITS) is starting on 11/2011. CARBOTRAF project: A Decision Support System for Reducing CO2 and Black Carbon Emissions by Adaptive Traffic Management eCoMove, eCostand, COSMO, FREILOT, ELVIRE, EcoGem FP7 projects (see progress note for full list) CIP results on electromobilty (SMARTCEM, ICT4EVU, molecules, MOBieurope)	Intelligent Europe Green car Initiative Transport White paper 2011 - DG MOVE Communication on Clean electric vehicle by DG MOVE eCoMove, eCostand, COSMO, FREILOT, ELVIRE, EcoGem FP7 projects (see progress note for full list) Cars 21	 a) and b)	Smart , clean,	Research and deployment

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17. Vulnerable Road Users	a) Investigate the most suitable safe, services and applications for the VRU	VRU – ITS, PROS, DG MOVE	iMobility Forum WG VRU, PROS Link PROS project safe research priorities with VRU WG	SAVECAP, SAFERIDER, SAFEWAY2SCHOOL, INTERSAFE 2 HeERO 2 commencing will be looking at P2W as a vulnerable sector of Road users		Safe	Research deployment
18. Automation in Road Transport	a) Develop a roadmap for automation on future research needs and legal action and identify milestones and stakeholders. b) Develop priority systems for automated vehicles. c) Support the trilateral cooperation between EU-US-Japan Task force on automation.	iMobility Forum Automation WG This WG is finishing soon its report. Need to identify what is the next steps of this WG	iMobility Forum Automation WG	Have-it project SARTRE project CityMobil (public transport and automation). NEARCTIS Humanist VCE	a), b), c), 	safe	Research