# Towards a Transport-ICT ELSA

## Report of the Task Force of the eSafety Forum

## Requested by the European Commission DG INFSO Unit G4

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Brussels, 08 October 2010

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## SUMMARY

The European Commission (DGINFSO) requested a Task Force of the eSafety Forum to elaborate a proposal on a European Large Scale bridging Action (ELSA) on ICT in Transport. Objective of organizing an ELSA is to speed up innovation of the Road Transport sector by applying ICT through large scale implementation, testing and demonstration of the latest developments and to bring them to the market.
The objective of innovation in transport is to address the societal challenges of environmental impact, safety and efficiency of road transport, which means reducing CO2 output, fatalities and congestion. New developments in ICT, like Future Internet and IPv6 offer also possibilities to offer new services to transport users through European wide Service Platforms. To secure an ELSA to stay on track towards these societal goals, an important the demand side should be in the lead.
The Task Force organized a consultation with the demand side (authorities and users) and the supply side (industry) to assess the objectives of the demand side and the possible response of industry.
A number of basic principles of how to organize an ELSA emerged:

- Current developments in cooperative systems (V2V, V2I and I2V communication) offer a good starting point to develop connected vehicles and connected travellers.
- Developing the maturity of solutions by stepwise scaling up in a follow-up of activities, is an important prerequisite for authorities
- Innovative technologies should be brought to the market in a number of test-beds which are more or less permanent for the duration of the ELSA.
- In every test-bed a number of consecutive and parallel actions could take place to bring new developments to the market starting on a small scale, to demonstrate them, to test and evaluate them and to take decisions on next steps.
- Evaluations and go/no-go decisions should be performed in a time-efficient way to have maximum throughput in a given timeframe.
- Consortia should be founded per test-bed and should be more or less permanent to foster long term cooperation based on pre-commercial public procurement. Funding of these consortia could take place in a public-private partnership bringing funding together from a European and national level and from industry.
- An ELSA should run for 6 or 8 years with activities of 2 year duration.

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# 1 INTRODUCTION

**Sustainable transport** is a core prerequisite for sustainable economic development. Connecting very complex business processes and providing different physical sub-products to geographically dislocated sites is essential to a prosperous economy and for the well being of citizens. Sustainable transport has always been an integral part of the European Union's Sustainable Development Strategy, from the Lisbon strategy for growth and jobs of 2000 to this year's European strategy for smart, sustainable and inclusive growth "Europe 2020".

As the economy grows, transport demand grows. Despite significant improvements in vehicle and engine performance, energy consumption in transport continues to increase. Transport is a sector in which CO2 emissions are still on the rise, contributing 17% of total CO2 in 2007 and increasing at a rate of about 1% a year. Rising levels of congestion reduce the contribution of transport to economic and social well-being. Addressing these unsustainable trends to ensure sustainable transport represents one of the **most important socioeconomic challenges** we face in Europe today. **It is clear that further measures are necessary to reinforce transport's contribution to society.**

Other important societal goals with respect to road transport are within the area of **road safety** and the **efficient use** of the available infrastructure. One of the big opportunities to be exploited is also the optimal use of all modes of transport (road, rail, water and air): the development of co-modality. The key for this development is not only the lay-out of the various transport modes but the use by citizens and businesses.

Various Transport Information and Communication Technology (ICT) solutions have been developed but not brought to the market yet, due to various financial, entrepreneurial, organizational and other factors. **Cutting through the innovation cycle** and raising the investment in deployment are key actions in the present approach towards efficiently tackling the interdependent issues of reducing emissions and increasing safety.

A **European Large Scale bridging Action (ELSA)** would be the right initiative to address the interdependent issues involved in an integrated approach, with contributions from public and private partners in a coordinated pan-European programme.

**This proposal outlines the benefits and the approach of a Transport ICT ELSA.** The report focuses on the application of new ICT solutions in public and private road transport. The proposal consists of three parts:

1 Introduction and background including a description of societal challenges to be addressed and observations of what issues impede solving them

2 Inventory of the demand of authorities and user organisations, the offer of industry and the challenges of bringing these to the market.

3 A proposal for a European Large Scale bridging Action on Transport ICT.

## 1.1 Background

### 1.1.1 Societal challenges - A clear view for the future

Transport is key to the economic development of Europe and to the well-being of European citizens. Almost all businesses depend on transport and citizens need transport for a substantial share of their economic, social, cultural and recreational activities. With the increase in economic activities and the increase in population and its welfare, transport demand has risen markedly. At the same time transport has a number of negative impacts on both individuals and society in the area of environment and safety, whilst the efficiency of transport is affected by increased congestion. The road transport sector made significant progress in the area of improving pollution and fuel efficiency, but the environmental impact is still growing due to the increase of transport demand. Within the next 40 years, road transport needs to be largely decarbonised to decouple the effect on global warming (Commission communication on CARS21).

Improvements have been achieved in **road safety**, with a reduction of fatalities in road traffic in Europe of 40% in the last 10 years. Still 35000 citizens died last year on Europe's roads. More sophisticated measures are needed to achieve another 50% reduction in fatalities in the next 10 years (European Road Safety policy orientations) of which the application of Transport ICT is one of the crucial contributors.

Financial and political restrictions and environmental challenges demand the **existing networks** to be **used more efficiently**. The efficient use of the pan-European Network established with EU support must be increased through a seamless interconnection of ICT systems. Also, urban networks exposed to high traffic volumes need special attention regarding the exploitation of their capacity supported by ICT. Opportunities for introducing traffic management systems should be used in the planning of costly maintenance and operating processes of the traffic infrastructure. Further efficiency gains could be reached by exploiting the interconnection of the different transport modes for transport of goods and for private transport. Increasing efficiency demands and decreasing budgets have led transport network managers and operators to increasingly outsource and purchase network management, maintenance and operation services. The purchasing and related procurement processes must also accommodate innovative solutions enabling full utilisation of ICT.

### 1.1.2 Commission initiatives

With the recognition that the public sector can play an important role in driving research and innovation, create new opportunities for innovative products and services and to speed up **the achievement of specific societal goals**, the EC is currently considering how to support a set of **focused projects of significant scale and duration** cutting across the innovation cycle to develop modern pan-European service infrastructures. These initiatives, tentatively called European Large Scale bridging Actions (ELSA's) will mobilise a critical mass of resources, including grants for R&D, pre-commercial procurement and support for innovation and deployment. In the area of ICT, the proposal for ELSA's is contained in the 2009 Commission Communication "A Strategy for ICT R&D and Innovation in Europe: Raising the Game".

Subsequently, in its March 2010 Communication "Europe 2020 - A strategy for smart, sustainable and inclusive growth" the EC calls for the modernisation of the transport sector. The strategy requests Member States to develop smart, upgraded and fully interconnected transport and energy infrastructures, making full use of ICT and ensure a coordinated implementation of infrastructure projects, within the EU Core network, contributing to the effectiveness of the overall EU transport system. Furthermore, the Commission is putting forward seven flagship initiatives to catalyse progress, including three highly relevant to the building blocks of a Transport-ICT ELSA:

- "Innovation Union" to improve framework conditions and access to finance for research and innovation so as to ensure innovative ideas can be turned into products and services creating growth and jobs.
- "A digital agenda for Europe" to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and enterprises.
- "Resource efficient Europe" to help decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernise the transport sector and promote energy efficiency.

Notably, in the context of the "Innovation Union" flagship initiative, the Commission proposed the establishment of a new Research and Innovation Plan to help solve particular problems connected with major societal challenges. The Plan, an ELSA type of initiative, will describe a set of strategic initiatives, entitled European Innovation Partnerships (EIP), bringing together R&D programmes with demand-side measures such as public procurement, standardisation and regulation. An equivalent of a Transport-ICT ELSA in the frame of an EIP would be addressing its core research challenges and visions as zero emissions, zero accidents and "smart connected electro-mobility".

### 1.1.3 The area of Transport-ICT

Transport-ICT consists of **systems from a wide variety of knowledge fields, all bound together by communication technology**. Digital maps of high quality and technologies for interoperability are a key factor for service quality. Driver assistance systems and eCall improves safety, intelligent infrastructure supports traffic management tasks and intelligent logistics for optimised operation of heavy vehicles are a key issue for optimised traffic efficiency. With the interoperability and coordinated cooperation the contribution of all components will be maximised. With services built on Service Oriented Architectures (SOA), using Real Time Traffic Information (RTTI) provided on nomadic devices or on-board units featuring advanced Human-Machine Interfaces (HMIs), the broad public will thrive to gain access to those services under the precondition, that the security of information is understood as essential to Transport-ICT.

With the latest results of **cooperative systems** development at hand, demonstrations will be executed within field operational tests showing the systems' viability and benefits on a large scale for interurban and urban areas. The medium to long term implementation of cooperative systems, both on vehicle to vehicle basis and between vehicles and infrastructure with newly installed equipment capable of cooperative technologies and legacy systems being refitted over time, is supported by the experience gained in field operational tests. While the focus is currently placed on safety due to perception by customers and financial models for implementation, this focus will shift to more strongly consider efficiency and clean transport in the future.

The advent of future internet technologies (internet of things - every platform constitutes a node, internet of services, micro/nano-technology) will completely change the connected car paradigm if the relevant enabling technologies including mobile broadband access, communication protocols (including IPv6) and trust and security are mature enough to support the introduction of these advanced new concepts.

### 1.1.4 The landscape of research, development and innovation in Transport-ICT

In Europe, a multiplicity of initiatives and projects has been executed in recent years comprising research in intelligent and green cars, cooperative systems technologies, connected vehicles, the internet of the future and European service platforms. More general technologies are developed e.g. Galileo for improved positioning required by advanced services.

While Member States generally have their own agenda, national activities corresponding to the developments on EU level are widely implemented. TEN-T Projects and specifically Easyway support a harmonised approach towards the challenges and a strong tendency towards standardisation to improve technical harmonisation on European level is perceived.

With Transport-ICT being part of a worldwide system providing opportunities but also competition for European solutions, other regions in the world already implemented these kinds of systems such as Smartway in Japan and Intellidrive in the US. The ELSA approach offers an ecosystem where new technologies can thrive in combination and coordination with each other.

## 1.2 The need for a Transport-ICT ELSA

ICT will contribute to solutions in a very significant way by tackling the different challenges at hand.

Despite large investments, deployment lags. Today, ICT in transport actors are proposing and realising solutions to the various technological challenges (e.g. cooperative systems) through field operational tests (FOTs) involving comprehensive evaluations and assessments of developed systems to arrive at standardisation and deployment. Due to the systems' interrelationships with a multitude of other socio-economic factors (systems interoperability, technology procurement barriers, etc.) their eventual deployment becomes a long, laborious and occasionally prohibitive (time wise) process.

The **fragmentation of the transport sector** perceived today is to be managed efficiently and as a whole. Today's different supplier groups include road operators, automotive industries, ICT and service providers differing in business objectives as well as in technological background.

Technological developments originating from recent research initiatives on European and national level may offer **standardised and cost efficient solutions** for the requirements of those actor groups. While Transport-ICT adopts the general technology trends and follows commonly established procedures, the **very long time-to-market and thus return-on-invest** is hindering a highly dynamic implementation of services and solutions, especially as the solutions need to span different groups of actors.

These issues lead to fragmentation in the process of going from R&D through to deployment. Cooperation in European projects, no matter how successful, comes to an end before deployment has been achieved. Even the FOTs have not yet resulted large-scale deployment. FOTs are not an end in themselves, but a means to an end: deployment.

An instrument is needed to cover all essential phases in the innovation cycle of Transport-ICT, namely R&D, transition into product or service level and support for short time-to-market and return-on-invest fostering innovation and deployment of systems. This tool needs to bring all relevant actors of the heterogeneous ICT network together with the goal to develop individual R&D results into deployable solutions.

This instrument needs to function as a financial and organisational tool to issue harmonised grants for the fields of R&D, pre-commercial procurement, innovative commercial procurement and support for deployment. Under sound financial conditions, the cooperation of different stakeholders can be fostered and, with large scale field trials, the maturity of solutions can be raised. The trials are also set to demonstrate the business potential and thus to increase the willingness of all actors to invest, since they provide the grounds to prove the positive effects in a convincing and impressive way.

This proposed instrument is a Transport-ICT ELSA. A Transport-ICT ELSA is set to tackle the societal challenges by stimulating innovation in ICT applications, generating increased investment in R&D and the "happiness to invest" in ICT development on private side by increasing return-on-investment based on stable and commonly agreed political conditions and fortifying the "will for deployment" on public side, linking the stages of research, development, testing, deployment and acceptance in a more direct way, thus leading to more timely deployment. A Transport-ICT ELSA will constitute a broader framework for innovation (in terms of areas of application and in terms of technologies) compared to research programmes, linking various developments on shared elements. Overall, a Transport-ICT ELSA is set to increase the competitiveness of Europe in transport technologies.

A Transport-ICT ELSA should result in a common European strategy and plan for deployment of ITS infrastructure and services, containing specifications for an open platform and for the communication from vehicles to vehicles and from vehicles to road infrastructure, as well as a service platform facilitating easy service deployment.

# 2 INVENTORY

## 2.1 Drafting a proposal for a Transport-ICT ELSA

The ELSA approach was first proposed by the European Commission within their communication "A new ICT R&D and innovation strategy: Raising the Game" COM (2009) 116 asking for large scale actions for deployment of ICT.

In August of the same year, first consultations began involving representatives from the demand side (public sector and users) and supply side (major industrial players) leading to a report provided to the VISBY conference on 10th/11th November 2009

Based on these preliminary findings, the eSafety Forum Steering Group installed an ELSA Task Force on 16 December 2009 with the goal to deliver a more concrete proposal to the Commission on what an ELSA in Transport should look like and how the defined goals can be addressed. Representatives of the demand side (authorities and user organizations) and representatives from the supply side willing to contribute to an ELSA proposal participated in the Task Force.

Two workshops in early 2010 elaborated on the requirements and expectations of public (31st of March) and private stakeholders (28th of April) and made concrete proposals for the design of an ELSA. The ELSA Task Force was set to provide its output by September 2010. The following figure shows the process in an overview. Sections 2.2 and 2.3 summarise the fndings from the workshops.

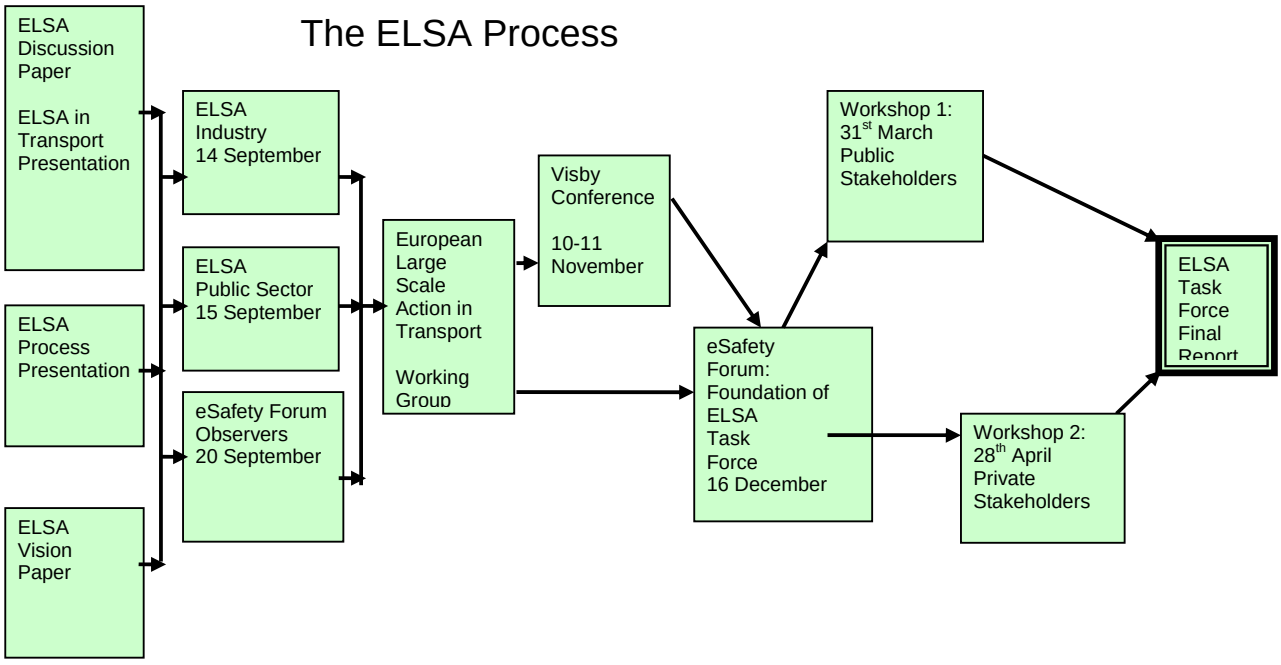


Figure: ELSA in Transport activities in 2009 and 2010

## 2.2 The demand from authorities and user organizations

Member States, user organizations and other authorities' representatives were asked for their priority goals in transport to be addressed in a Transport-ICT ELSA . Future ways of addressing these goals were also discussed.

**Traffic safety**, **traffic efficiency** and **environmental sustainability** are the key aspects to be addressed in the European transport system.

**Traffic safety** has long played a prominent role in the EU. Progress was made in this area, but the goal of halving the death toll by 2010 was not achieved. Further measures required to achieve these goals include advanced in-car systems for impaired driving, alcolocks and speed alert services. Others include the avoidance of accidents by cooperation between vehicles and infrastructure providing timely warnings, active emergency breaking systems, lane keeping systems and eCall.

Concerning **traffic efficiency**, a lower number of frequent (e.g. peak hour congestions) and spontaneous (e.g. accidents) congestion events will improve the reliability of trip planning in general with specific city logistics systems providing optimised planning of goods delivery in urban areas. Both cases are based on real time traffic information of high quality, accessible when and where needed. Advanced traffic management measures help to avoid traffic disruptions and can alleviate their effects. A reliable prognosis for trip planning can help to reduce frequent disruptions, both supporting a better exploitation of the available road capacity. The use of multimodal services for people and goods traffic will add to the goal of smoother traffic flows as all available capacities in all transport networks are used best. At the same time rewarding mechanisms will be analysed via the novel concept of driver training on the move.

Decarbonisation of transport is key to **environmental sustainability** of the European transport system. Despite good progress in the efficiency of traffic and better energy efficiency of the vehicles themselves, the growth rates of people and goods traffic more than outweighed these improvements making traffic still a large contributor to CO2 and other emissions, such as particulate matter and noise. The high impact of traffic on biodiversity is another aspect to be considered in this frame. Better accessibility, due to multimodal services and infrastructure, to alternative transport networks can support a greater use of more environmentally-sound modes of transport, more efficient transport routes would positively impact the environmental balance and, overall, the required land for transport networks. Also, less demand for travelling in motorized vehicles without impairing economy (e.g. by e-solutions like e-meetings etc.) can significantly contribute to less energy consumption by avoiding trips at all.

All three aspects play together to realise the goals set forth by the demand side. For instance, improved safety will, apart of the obvious reduction in fatalities and injury severity, also result in fewer disruptions and thereby reduced congestion, increasing the efficiency of the traffic system, while the resulting better planning reliability improves the uptake of intermodal services For that reason, the three aspects must be tackled in coordination.

Two specific issues were recognised:

- The **maturity of solutions** is a key prerequisite of authorities for the developed technologies to be accepted and thus for those effects to be witnessed. An ELSA has

to improve the maturity of solutions in technical and organisational aspects making them truly deployable.

- A **common European strategy** and plan for deployment of ITS infrastructure and services, containing specifications for an open platform and for the communication from vehicles to all other nodes and devices, as well as specifications for an interoperable and scalable service platform facilitating easy service deployment and capable of collecting, processing, exchanging and using information, is necessary.

## 2.3 Current offer from industry and state of development

Industry representatives were asked what the current offer is responding to the needs of authorities and users, and how a Transport-ICT ELSA could bring these to the market.

The industrial sector has developed advanced technologies over the recent years within the framework of national and international research initiatives.

First cooperative applications were developed and demonstrated within research projects such as CVIS, SAFESPOT and COOPERS and some will be assessed within Field Operational Tests in the near future. Several applications are focussing on **traffic safety** featuring timely warnings based on the communication between vehicles among each other and with the infrastructure. Also, advanced **traffic management functionalities** are demonstrated based on the cooperative systems technologies.

Assisted driving and numerous other technologies are available for safety improvement in different stages of development. As examples, the eCall system is set for implementation, head up displays for less distraction of drivers from traffic and adaptive headlights are available for high class vehicles. Systems like radar based assisted cruise control, breaking assistants and lane keeping systems (or lane-change warning), infrared vision for improved safety when driving at night and under adverse weather conditions and environmentally friendly driving assistance (e.g. gear change etc.) are other examples. In time it can be anticipated that those systems will also be implemented in lower class cars. Emerging nomadic solutions enable advanced services to all travellers, including pedestrians, bicyclists and the users of public transport.

Solutions for **improved traffic efficiency** comprise networks of traffic management centres established across geographical and institutional borders which use an increased variety of data sources (vehicles, sensors etc.) to produce more reliable services for the TERN and beyond. Other applications include intelligent and efficient maintenance planning for road and winter services and the prediction of the impact of traffic management measures for decision support. Related to logistics efficiency, services and applications related to providing timely information to drivers on national/regional traffic regulations, eco-routing and dispatching are currently available as research results. Also, multimodal services for goods traffic are important aspects for efficient goods traffic in Europe.

Concerning the reduction of the environmental impact and improving the **environmental sustainability of traffic**, several approaches like eco routing and eco driving were developed. Other solutions include ecologically oriented traffic management and control systems, eco-demand and access management systems and eco-navigation. First field tests involving fully electric vehicles and supply systems are currently executed. Together with sophisticated multimodal information services based on real-time information from all concerned transport modes already in place. These technologies have the capability to support decarbonisation of the European transport system.

One specific issue was recognised:

- Most solutions are **still in the stage of research and development** and neither the technical nor the organisational prerequisites are met for a full scale implementation on the European road network.

# 3 PROPOSAL FOR A TRANSPORT-ICT ELSA

## 3.1 Challenges to be addressed in a Transport-ICT ELSA

The challenges in ELSA-T are both technological and organisational.
Within the **technology** sector, most of the technologies mentioned are still in research stage with their impact and benefits not yet clearly visible to stakeholders who did not participate in the very R&D projects. As the transition from R&D results to mature solutions requires positive business cases, currently no (or limited) market opportunities are perceived. ELSA is set to overcome this issue.

On the **organisational** side, sophisticated organisational cooperation models, including business models, are required as numerous actors from different public and private fields (communications, traffic technology, automotive, service providers, operators of road and rail infrastructure...) have to work together within Transport-ICT. Clear and well defined models for the cooperation between the required actors have not yet been defined and risk and liability questions not yet fully clarified, a co-operational model is seen as a challenge to be solved by ELSA. ELSAs should develop new performance oriented procurement processes promoting innovation and thereby also full utilisation of ICT in the transport sector including transport infrastructure management and operation, possibly leading to a major paradigm shift in transport infrastructure service industries.

ELSA's also support a **shorter return-on-investment** by the creation of prerequisites for larger markets for similar applications making them more useful due to larger proliferation and higher coverage of the European area, by making them interoperable due to higher demand for interoperability by operators and users and affordable due to a larger rollout level and thus a lower price for a single copy. These efforts can be expected to attract more competition due to better business opportunities enlarging the choice for operators during procurement.
As ELSA's also focus on joint procurement, sharing knowledge on experiences in joint public procurement and new pre-commercial public procurement is a key issue for ELSA's.

## 3.2 Transport-ICT Test-beds

A large scale bridging action, cutting across the innovation cycle should develop modern pan-European service infrastructures in order to address the unsustainable trends in transport on emissions and safety. An all-inclusive Field Operational Test (FOT) of a significant scale should entail addressing societal challenges by modernising public services, defragmenting European markets for ICT innovation, speeding-up time-to-market/return-on-investment for innovative ICT-based solutions, increasing private and public investments in research and innovation and finally, accelerating the uptake of ICT innovations in public services. Such large scale FOTs should include comprehensive socio-economic evaluations (including social cost-benefit analyses, viability and effect evaluations and impact assessments of system components) of the transport system. This context is given precisely by **cooperative mobility** defined as the interconnection of vehicles and infrastructure, to create and share information, leading to a better

cooperation amongst transport system users including drivers, vehicles and roadside systems, encompassing all areas of socio-economic activity.

The ELSA Test-beds operate over the full duration of an ELSA framework and are available to all activities within an ELSA. The Test-beds are equipped with state of the art technologies, e.g. cooperative components, and allows the feed back based refinement of new services and technologies originating from current R&D activities or, at a later ELSA stage, from innovations generated in the ELSA. The Test-beds provide the opportunity to operate the applications in a live environment and under participation of all stakeholder groups (e.g. road operators, end user groups) with appropriate evaluation and assessment processes to guarantee that the adoption by stakeholders is very likely. Test-beds are open to accept new applications during the framework's duration in its role as innovation kernel of an ELSA.

As the ELSA Test-beds will be of large scale and equipped with a sound technological backbone, only a limited number shall be implemented in Europe to focus and safeguard the efficiency of the investments. Thus, the Test-Beds must comprise different European traffic environments such as urban, rural and interurban (TEN-T motorways) road networks.

## 3.3 Subject matter for a Transport-ICT ELSA

The ELSA-T is an umbrella for specific activities with clear implementation oriented focal points. Test-beds will be targeted towards well defined technological areas, which are:

- Connected cars and connected travellers
- Cooperative vehicle infrastructure systems in combination with smart and ecological traffic management
- Proactive network operation and mobility management
- Co-modal information services for travellers and goods
- European wide service platform for advanced traffic information services
- Internet of the future
- Green freight and intelligent freight transport on corridors and in urban areas
- Electric vehicles

As key part, the ELSA will not focus solely on the traffic world but will explicitly embrace useful developments from other areas such as internet technology to provide modern, accepted and low cost solutions.

The ELSA is strongly linked and compatible to the directives laid out by the ITS action plan. Those are currently:

- Optimal use of road, traffic and travel data
- Continuity of traffic and freight management ITS services
- ITS road safety and security applications
- Linking the vehicle with the transport infrastructure

The ELSA Test-bed can support the implementation of new directives over time when the ITS action plan will be amended in the future. New priority actions can be tested within the ELSA Test-bed and their results estimated. On this basis, the decision on the

inclusion of new priority actions in directives within the ITS action plan can be supported by ELSA.

## 3.4 Estimated impact on societal goals

The impact on societal goals laid out in chapters 1.1 and 1.3, to which all applications are committed, are roughly defined by every test-bed and translated to specific goals within every activity. The assessment of the societal impact will be executed in parallel to the different activities under the Transport-ICT ELSA itself. It should be noted, that the ELSA Test-bed will be utilized by different activities at the same time thus enabling the ELSA to assess specific applications in interaction with other activities.

The impact of improved procurement principles and procedures will have a major positive impact on the European service industries in the transport sector. The ELSA will also provide major socio-economic benefits to Europe via accelerating the deployment of advanced ICT based services and applications by lowering or even removing various barriers of European deployment.

## 3.5 Models of funding

A Transport-ICT ELSA activities will run for a number of years and would draw on support from R&D programmes for technology and platform development, systems integration and validation, from innovation programmes for field-testing, demonstration and spreading of best practice, and from deployment actions to roll-out final solutions.

Work on the majority of the building blocks of a Transport-ICT ELSA is already under way through many initiatives and programmes at the National and European level, while the Commission points (in several documents) to the necessity in building upon these existing initiatives and integrate them where relevant.

### 3.5.1 EU funding resources

In the Communication "Europe 2020 - A strategy for smart, sustainable and inclusive growth" the EC flagship initiative "Innovation Union" stresses the need to strengthen and further develop the role of EU instruments to support innovation (e.g. structural funds, rural development funds, R&D framework programme, CIP, SET plan), including through closer work with the EIB and streamline administrative procedures to facilitate access to funding. The flagship initiative "A digital agenda for Europe" stresses the need to facilitate the use of the EU's structural funds in pursuit of this agenda.

In the flagship initiative "Resource efficient Europe" the Commission pledges to work towards three important areas: a. mobilising EU financial instruments (e.g. rural development, structural funds, R&D framework programme, TENs, EIB) as part of a consistent funding strategy, that pulls together EU and national public and private funding; b. to enhance a framework for the use of market-based instruments (e.g. emissions trading, revision of energy taxation, state-aid framework, encouraging wider use of green public procurement); and c. to present proposals to modernise and decarbonise the transport sector thereby contributing to increased competitiveness.

### 3.5.2 Bringing together national funding

In the above context it is of fundamental importance to recognise that significant public (MS) funds have been and continue to be allocated to safe, secure and sustainable transport systems (i.e. the core objective of a Transport-ICT ELSA) as part of state budgets. Consequently, the above targets set in Europe 2020, aiming at integrating and streamlining various sources of funding towards achieving significant societal goals through e.g. an ELSA, are consistent with MS funding goals.

National/regional-level programmes and instruments could include: research and innovation programmes, structural funds, public procurements, infrastructure budgets etc. The coupling of instruments is also possible, e.g., R&D through PPP based on demand-driven roadmap, including use of new features such as support to pre-commercial procurement, joint programming actions, nominated beneficiaries and reserved budgets. Such efforts would be reinforced by the European Investment Bank and its venture capital wing, the European Investment Fund with a more enhanced role for the private sector that will also help the European Union reach the 3 per cent target of GDP funding for R&D, a target within the Europe 2020 strategy.

Utilisation of such funding models under the principle of subsidiarity will necessitate the risk assessments and strategies that will form part of the impact assessment for potential subsequent legislative acts.

## 3.6 The instrument of a PPP

Furthermore, a Transport-ICT ELSA could be implemented through a carefully engineered Public Private Partnership (PPP), with various activities linked through evaluations and go/nogo decisions which will facilitate an appropriate balance between technology push and application pull.

Such PPP's will build on effort and results from other programmes having similar objectives to the various ELSA-T building blocks. In its 2009 Communication – "Mobilising private and public investment for recovery and long term structural change: developing Public Private Partnerships", the Commission stresses that:
a. PPPs can provide effective ways to deliver infrastructure projects, to provide public services and to innovate more widely in the context of these recovery efforts. At the same time, PPPs are interesting vehicles for the long term structural development of infrastructure and services, bringing together distinct advantages of the private sector and the public sector,
b. At the EU level, PPPs can offer extra leverage to key projects to deliver shared policy objectives such as combating climate change; promoting alternative energy sources as well as energy and resource efficiency; supporting sustainable transport; ensuring high level, affordable health care; and delivering major research projects such as the Joint Technology Initiatives, which are designed to establish European leadership in strategic technologies. They can also boost Europe's innovation capacity and drive the competitiveness of European industry in sectors with significant growth and employment potential. As such, pilot PPP projects serving as models of best practices, good governance and solutions should be developed and replicated on a wider scale with the use of technical assistance elements of relevant funding programmes.

The future Transport-ICT PPP will build on existing initiatives like the Green Car PPP and the Future Internet PPP. Both programmes' objectives are forming an integral part of Transport-ICT targets. In particular, the newly launched DG Infso FI-PPP shall attempt to effectively address the ELSA research challenges on the connected car through tackling the elements of cooperative mobility. This PPP also programmes to launch Test-beds entitled Use Case Trials. It is of particular interest to note that these Trials shall run to 2015 and will pave the way for an FP8 extension. Such an extension may well be along the programming lines of a Transport-ICT ELSA.

## 3.7 Involvement of stakeholders

An ELSA follows the political and organisational duties and interests of the public bodies as public involvement is mandatory for an ELSA since public authorities represent the stakeholder group pursuing the societal goals and are usually responsible for infrastructure. As stated above, the ELSA is built upon a PPP model which binds both public and private partners to the common goals and safeguards their commitment.

Users are involved on two different levels: on the one hand, individual users are involved in assessment, on the other hand user organisations such as automobile clubs are to be involved as partners to safeguard the interests of the user groups they represent. The user group feedback is required for the sound elaboration of mature solutions since the uptake of solutions by end users is essential to build realistic business cases and for their positive impact on safety, efficiency and environment

Industrial partners share a strong interest in demonstrating their solutions in coordination with the other relevant stakeholders to understand their feedback and develop strong products pushing the competitiveness of the European ITS industry.

As an ELSA will develop a cooperation scheme, it is essential for the successful deployment that all stakeholders will be able to participate to overcome the organisational heterogeneous (and thus inaccessible) market environment for complex innovative applications covered by an ELSA.

The initiative would involve all pertinent stakeholders:
a. From the Public Sector
European Commission, Member States (Ministry of Transport, Ministry of Public Works, Telecommunications, Economy, Environment), European Investment Bank, Road authorities and administrations, Road operators and Emergency Authorities, Cities, Regions (political leaders, planning authorities, public transport, operational departments), Associations of cities and regions and User Associations of private and commercial transport.
b. From the Private Sector
Automotive industry, Telecommunications industry and Operators, Automotive suppliers, Digital Map producers and developers, Nomadic devices industry, Internet Service providers and associations, Infrastructure providers of road networks, telecommunications and energy;
c. Research and development industry
All of these sectors have already shown their interest and have been involved in drafting the present proposal.

## 3.8 Governance

As a key structure, the ELSA provides an eight year framework composed of two-year activities linked with evaluations and go/no-go decision points. With the ELSA framework set up upon a PPP model to ensure strong commitment of public and private actors, clearly defined political, organisational and technical goals brought forward by the public partners will govern the focus of the framework. The activities covering two years will allow clearly defined and well assessed (socio-economic impacts, technical performance) applications to be rolled out in test beds. Assisted by an independent accompanying assessment scheme executed directly by the ELSA, not the activity, and enriched by the feedback of the stakeholders the sub projects are clearly implementation oriented and shall transfer applications from R&D stage to implementation roll out.

The Board of Governance should be based on the present Transport-ICT ELSA Task Force, linked to the eSafety Steering Group, chaired by the Commission, where a variety of stakeholders contributing to the deployment of ICT for safer, cleaner and smarter transport are represented. The actual structure and responsibilities should be allocated dependent on the stage of development of the Transport-ICT ELSA PPP. It will focus on the identification and formulation of priorities for further research, development and testing and coordinating the efforts and funding of different partners and projects. Work on deployment and market penetration of mature technologies will evolve in line with the ITS Action Plan of the European Commission.

# Annexe 1

Matrix showing the societal goals and prioritized systems presented by the demand side and with response from the supply side

Summary from workshops with ELSA Task Force.

| | ***Societal goals*** | | | |
|---|---|---|---|---|
| ***Demand side goals and prioritized systems*** | ***Road safety and security*** | ***Environment and energy efficiency*** | ***Efficiency & mobility*** | ***Supply side priority system/actions with solutions provided by the market or in co-operation with road operators/public authorities.*** |
| Systems for Clean & Efficient travel and transport | | ◇ | ◇ | **Systems that have impact on the environment**<br>• Eco-Routing, Platooning (HGV), Road charging (emission toll), Eco-driving strategies on guidance level (e.g. adapted acceleration / deceleration)<br>**Clean and efficient mobility**<br>• Eco-driving and eco-navigation<br>• Eco-HMI for driver behavioural change<br>• Eco-travel information systems<br>• Eco-traffic management and control systems<br>• Eco-demand and access management systems<br>• Interoperable systems requested |
| Systems for Safety and security | ◇ | | | **Systems having impact on Traffic Safety.**<br>•ACC, LDW , Curve speed warning, Intelligent Speed Adaptation (ISA), Traffic Risk Monitoring, Near miss Detection, Alcolock, Virtual lanes separation (dedicated lanes), Cooperative systems (Recommended speed profiles, Recommended lane use), eCall, |
| Passenger Transport Urban Mobility | | | ◇ | **Systems having impact on mobility.**<br>•Real-time traffic condition information, Dynamic route guidance,<br>•Dedicated lanes/dedicated infrastructure,<br>•Multimodal traffic information,<br>•Cooperative systems (recommended speed profiles, recommended lane use |

| | ***Societal goals*** | | | |
|---|---|---|---|---|
| ***Demand side goals and prioritized systems*** | ***Road safety and security*** | ***Environment and energy efficiency*** | ***Efficiency & mobility*** | ***Supply side priority systems with solutions provided by the market or in co-operation with road operators/public authorities.*** |
| Urban Mobility | | ◇ | | **Fully electric vehicles**<br>*Electric mobility – research, development and innovation;*<br>• Architectures, (power) electronics and smart systems for energy storage including energy management, drive train<br>• On-board systems, safety aspects of new vehicle concepts: passive, preventive safety and crash mitigation, safety of high-voltage systems<br>• Vehicle-infrastructure aspects: information systems, energy measuring systems<br>• Vehicle-charging system: interoperability and integration of the electric vehicles in the transport system<br>• Extensive trials: from public transport to fleets |
| Freight Transport<br>Green freight corridors | ◇ | ◇ | ◇ | **Freight transport**<br>• Safe and secure parking areas<br>• ICT equipped freight vehicles, containers etc<br>• Increased penetration of Cooperative Systems – costs of technology, multiple suppliers, open for new solutions – yet stable<br>• Open secure and robust environment for Services development and operation<br>• Need for standardisation and harmonisation of regulations globally<br>• Customers needs for cost-efficient integrated solutions<br>• Harmonised city zone regulation<br>• Harmonised access control for Environmental city zones and congestion charging<br>• Parking zones for distribution vehicles<br>• Competitor neutral procurement<br>• Open ITS architecture for common ITS services |

| | ***Societal goals*** | | | |
|---|---|---|---|---|
| ***Demand side goals and prioritized systems*** | ***Road safety and sequrity*** | ***Environment and energy efficiency*** | ***Efficiency & mobility*** | ***Supply side priority systems with solutions provided by the market or in co-operation with road operators/public authorities.*** |
| Green freight corridors | | ◇ | ◇ | **Borders and Transurban**<br>• ICT equipped infrastructure.<br>• Trans-European and international transport information management (the is lack of standards).<br>• Open platform for ITS services.<br>• Cost for connectivity (roaming issues) and availability of alternative connectivity.<br>• Availability of low-cost high-quality real-time data.<br>• Harmonized regulation and global standards. |
| Co-operating systems | ◇ | ◇ | ◇ | **Co-operating systems**<br>• Integration of all ICT-equipped elements into the transport infrastructure for efficient and clean freight transportation.<br>• Towards automated driving – the research and development and a harmonized view on the Vienna Convention. |
| Systems for Safe, Clean & Efficient travel and transport | ◇ | ◇ | ◇ | **Connected car and future internet**<br>• Eco services, customer services (calendar & contact management, communities & blogging, contents & media, traffic & driving preferences).<br>• Safety services (eCall, pedestrian, road departure, accident & collision warning, parking & merge assistance, pre-crash sensing).<br>• Vehicle services, remote & maintenance diagnosis.<br>• Theft immobilizer, service & repair invitations.<br>• Commercial services (weather & road condition, news & popular media, secure payment, etc).<br>• European wide service platforms – pilots, implementation and pan-European harmonization.<br>• The connected car – maximum efficiency with low penetration. |

# Annexe 2

Contributors to the report of the ELSA Task Force

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