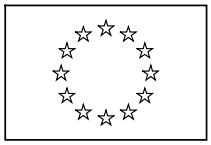

COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

Information and Communications Technologies for Safe and Intelligent Vehicles

(SEC(2003) 963)

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PREFACE

Modern society depends on mobility, which provides personal freedom and access to services for business and leisure. From society's point of view, an efficient transport system is the engine of our economy, and the transport sector is of huge economic importance employing more than 10 million people and with expenditure of more than 10% of the Gross Domestic Product (GDP) in Europe.

For a long time, **the demand for transport services has grown steadily** for both passengers and goods. The continuing growth of the economic activity and the Union's enlargement will increase needs for mobility and transport services. Most of this growth is expected to be taken up by the road sector at a time when tight public budgets restrict investments in the infrastructure. The rising volumes of traffic further deteriorate the situation regarding **the problems caused by the road transport**, which include congestion of the main roads network and in urban areas, harmful effects on the environment and public health, and above all, **accidents which cause fatalities, injuries and material damage**.

In the forefront in the drive for safer and more efficient transport is the automotive industry, together with its suppliers and the emerging telematics sector, which build on the strengths of two other industrial sectors, namely the Mobile Telecommunications and Information Technology sectors. As a result of the efforts of the industry, **vehicles today are inherently safer, cleaner and more recyclable than before**. But the societal costs of road transport are still by far too high. The 1.300.000 accidents per year in Europe cause 40.000 fatalities and 1.700.000 injuries, at an estimated cost of 160 Billion €, or 2 % of the GDP in Europe. Road transport is a necessity for our mobility, **but new measures are required to tackle this increasing problem.** The automotive industry is facing an increasing challenge to tackle this issue and to contribute to the main transport policy goal of the EC, which is to reduce by half the number of road fatalities by 2010.

Road safety cannot, however, be sufficiently improved by concentrating on the industry and the vehicles only. **The public sector has to work together with the private sector** both by investing in the required infrastructure and in taking measures, which enable the market introduction of new solutions. A lot can be achieved by simple measures like educating the drivers to be more responsible, enforcing the existing road safety rules e.g. related to safety belt use, drinking and driving and speed limits, and by improving the physical road infrastructure. The safety and efficiency of roads can be also substantially improved by the deployment of Intelligent Transport Systems (ITS) for Intelligent Infrastructure, such as adaptive traffic control and management systems in cities, and traffic control and incident detection systems on the motorways, the deployment of which is financially supported by the Trans-European Networks for Transport.

Information and Communications Technologies (ICT) are already widely in use in all areas of mobility, most notably in vehicles, which are becoming more and more intelligent. With the development of the more powerful processors, communication technologies, sensors

and actuators, more and more of the vehicle control, monitoring and comfort functions are based on ICT. **Information and Communications Technologies (ICT) are also seen as the most important set of tools enabling the industrial players to meet the above-mentioned challenge on road safety** and contributing to Europe's expectations for safer and more efficient mobility.

Recognising this potential, the European Commission in 2002, together with the automotive industry and other stakeholders established an **eSafety Working Group** consisting of some 40 experts, and mandated it to propose a strategy for accelerating the research, development, deployment and use of ICT-based intelligent safety systems for improving road safety in Europe. In November 2002, the Working Group published its **Final Report**, which a High-Level meeting of all stakeholders later endorsed as the basis for further actions in advancing the use of ICT for improving road safety in Europe.

The eSafety Working Group Final Report gives 28 detailed recommendations for action, directed to the European Commission, the Member States, road and safety authorities, automotive industry, service providers, user clubs, insurance industry and other stakeholders. These recommendations fall into three main categories: actions for the development of the building blocks for integrated safety, actions for adapting regulation and standardisation, and actions for removing the societal and business obstacles.

The report concludes that the greatest potential in the application of ICT in solving road transport safety problems is offered by the Intelligent Vehicle Safety Systems, which use advanced ICT for providing new, intelligent solutions which address together the involvement of and interaction between the driver, the vehicle and the road environment. In this integrated and global approach to safety, the autonomous on-board safety systems are complemented with co-operative technologies, which use vehicle-to vehicle and vehicle-to infrastructure communication to get information of the road environment for assessing the potential hazards and optimising the functioning of the on-board safety systems.

This Communication brings forward **the actions the Commission intends to take in order to accelerate the development, large-scale deployment and use of Intelligent Vehicle Safety Systems in Europe**, with the emphasis on the Intelligent Vehicle part of these systems. These actions are intended to facilitate the industry to develop these systems, to enable their rapid market introduction by removing the regulatory and standardisation obstacles, and to contribute to a joint public-private business case which is seen as a prerequisite for their large-scale take-up.

These actions, when complemented in a co-ordinated way with shared actions by the Member States on national, regional and local level, and by the industry itself, are expected to **make a major contribution to reducing the fatalities on European roads**, and provide for the basic need for Europe's citizens: safe mobility.

TABLE OF CONTENTS

1. INTRODUCTION

1.1. The transport sector: A key economic sector fulfilling a basic need

Mobility and transport is a concern for citizens throughout Europe: there are 375 million road users in the EU. Modern society depends on mobility, which provides personal freedom and access to services for business and leisure. From society's point of view, an efficient transport system is the engine of our economy, and the transport sector is of huge economic importance employing more than 10 million people and with expenditure of more than 10% of the Gross Domestic Product (GDP) in Europe.

A key industry in the transport sectors is the automotive sector, which manufactures about 17 million vehicles per year and employs with its suppliers close to 2 million people in Europe, with a turnover of 452 billion € world-wide[1]. The automotive telematics market, comprising of sales of telematics platforms and services is experiencing rapid growth in market penetration, and according to some market studies will reach an annual revenue as high as 8,5 billion € in Europe in 2007, up from 1 billion € in 2000. As the car parc of vehicles with telematics grows, the market will shift towards services[2], further integrating the automotive market with two other key industrial sectors in Europe: Mobile Communications and Information Technology. As a whole, **Information and Communications Technologies (ICT)** play a key role in the convergence of these sectors towards the Intelligent Vehicles of the future. The coming generation of mobile communication technology will further reinforce this trend.

1.2. Growth in demand of transport services causing increasing problems

For a long time, the demand for transport services has grown steadily for both passengers and goods. Most of this growth has taken place in road transport, which has been able to increase capacity and offer competitive services. It is estimated that some 80% of travel calculated in passenger-km is currently by car, and road makes up 44% of the goods transport market. Between 1970 and 2001, the number of vehicles in the Community grew from 62.5 million to over 205 million[3], and the vehicle parc is now increasing by more that 3 million every year.

The continuing growth of the economic activity in the Union, and its enlargement will increase needs for mobility and transport services, with estimated increase in demand of 38% for goods services and 24% for passengers by 2010 in the EU of 15. Most of this growth is expected to be taken up by the road sector, which further deteriorates the situation regarding the problems caused by the road transport, which include congestion at more points of the main roads network and in urban areas, harmful effects on the environment and public health, and above all accidents, causing fatalities, injuries and material damage.

At the same time, tight public budgets restrict investments in the infrastructure. These problems are not only socio-economic ones, but concern each and every citizen in their daily lives. The 1.300.000 accidents per year in Europe cause 40.000 fatalities and 1.700.000 injuries, at an estimated cost of 160 Billion €, or 2 % of the GDP. On a personal level, these accident figures translate to one third of us being injured in an accident at some point of their lives. The psychological damage to the victims and their families cannot even be estimated.

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1 Sources: ACEA and Eurostat, 2001

2 Source: European Automotive Telematics Market, Frost&Sullivan 2001

3 Source: ACEA, 2001. The total number of motor vehicles in use was 205,8 million, out of which 180,3 million were passenger cars.

1.3. Urgent actions required in meeting the societal challenges

Road transport is a necessity for our mobility, but new measures are required to tackle the increasing problems associated with it. In the forefront in the drive for safer and more efficient transport is the automotive industry, together with its suppliers and the emerging telematics sector. Both of these largely depending on the strengths of two other industrial sectors, namely the Mobile Communications and the Information Technology sectors.

Thanks largely to the efforts of the industry, vehicles today are inherently safer, cleaner and more recyclable than before. Thanks to improvements in the crash-worthiness of the vehicles, safety belts, ABS and other inventions, the vehicles are now four times safer than in 1970; this has largely contributed to the reducing by 50% of the number of deaths in EU 15 from 1970, while the traffic volumes have tripled during the same period.

But the societal costs of road transport are still far too high, and new goals have been set. The automotive industry, with its suppliers and the related industrial sectors, are facing an increased challenge to comply with both tighter environmental controls expected by both the society and citizens, aiming at more sustainable transport[4], and demands to contribute to the main transport policy goal of the EC, which is to reduce by half the number of road fatalities by 2010[5]. Regarding road safety, the effect of the current measures appears to be reaching its limits, and new measures are urgently required.

In order to tackle the whole issue of road safety, including enforcement of current safety measures to be undertaken at Member State and regional level, the Commission has introduced an European Road Safety Action Programme[6].

1.4. Towards Intelligent Vehicles and safer, more efficient mobility

ICT holding the promise of safer and more efficient mobility

Looking forward, Information and Communications Technologies (ICT) should guarantee mobility and secure economic growth. The primary effects of ICT in transport and mobility are in enabling the development of more Intelligent Vehicles, more sophisticated telematics services, and for advanced Intelligent Transport Systems (ITS) to be applied to traffic control and management systems providing the intelligent road infrastructure. Telematics and innovative logistics based on ICT can help to make traffic flows more efficient and to avoid congestion, even on the existing road infrastructure.

Towards more intelligent vehicles

Increasingly, the competitiveness of the automotive sector depends on its ability to use and adopt the latest Information and Communications Technologies. An increasing number of vehicle functions are controlled by processors and software, and more and more of the added value of the vehicle comes from sophisticated electronic systems which can replace entire mechanical and hydraulic subsystems. Today, the electronics sensors, actuators and subsystems for vehicle control, monitoring, safety and comfort comprise some 30% of the vehicles' added value; this is expected to rise to some 40% in 2005.

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4 Gothenburg European Council, 2001

5 White Paper on European Transport Policy for 2010, adopted by the Commission in September 2001

6 European Road Safety Action Programme : Halving the number of road accident victims in the European Union by 2010 : A shared responsibility, COM 2003(311) final 2.6.2003

During the last decade, we have made in Europe a major investment in the use of ICT in in-vehicle safety technologies like Advanced Driver Assistance Systems (ADAS). While these technologies are introduced on the markets, there is a need to continue investment in future, advanced technologies. While these technologies have a wide scope of applications in Intelligent Vehicles, including on-board diagnostic systems[7], this Communication deals only with the application of these technologies for road safety. The EU's 6th Framework Programme for Research and Technological Development offers further possibilities for applying for funding in this area[8].

Towards more sophisticated telematics services

The automotive telematics industry is driven by Information and Communications Technologies. The key ICT technologies include mobile telecommunications, location/positioning technologies, intelligent sensors, actuators and interfaces, automotive-grade high-performance processors and high-performance in-vehicle communications networks. A key role in this rapidly growing sector is also played by services/contents industry, which drive towards higher quality personalised services and sustainable business models. The four principal markets for telematics services today are safety and security (including e-Call, vehicle tracking), vehicle oriented telematics (including remote diagnostics and proactive maintenance), navigation and routing (including dynamic navigation, Point of Interest, traffic and travel information), fleet management and infotainment (entertainment, internet access, information services, email).

Mobile Communications: a future pillar for telematics

With general packet radio service (GPRS) and universal mobile telecommunications system (UMTS) advancing into the automotive markets, the outlook for mobile, location related services is brightening up significantly. Thanks to the option of being permanently on-line and by offering much higher bandwidths, the scope of affordable services increases rapidly. In the future, the existing telematics services based on SMS or WAP messaging over GSM will be replaced by location-enhanced services using GPRS/UMTS and DAB/DVB, while RDS-TMC services using FM radio will be enhanced and are expected to co-exist on the markets. eEurope 2005[9], with its focus on providing mobile and broadband connectivity and mobile services will further facilitate this development.

Logistics depending on ICT

The combination of logistics and telematics based on Information and Communications Technologies is gaining importance in the whole transport sector, and especially in road haulage. ICT is increasingly used in route planning, tracking and tracing and usage-related invoicing. Road hauliers depend today on ICT for fleet management, with promises of greater

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7 Directive 2001/1/EC of the European Parliament and of the Council of 22 January 2001 amending Council Directive 70/220/EEC concerning measures to be taken against air pollution by emissions from motor vehicles; published in OJ L 035 of 6.2.2001

8 Decision No 1513/2002/EC of the European Parliament and of the Council of 27 June concerning the sixth framework programme of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002-2006); published in OJ L 232 of 29.8.2002; and 2002/834/EC: Council Decision of 30 September 2002 adopting a specific programme for research, technological development and demonstration: "Integrating and strengthening the European Research Area" (2002-2006); published in OJ L 294 of 29.10.2002.

9 eEurope 2005:An information society for all, COM(2002) 263 final, 28.5.2002

efficiency and reduction of equipment costs. The role of ICT in logistics will increase with e-Commerce and the trend towards just-on-time deliveries.

1.5. Towards more intelligent infrastructure

Intelligent infrastructure and co-operative systems

Many of our large and medium-sized cities are equipped with advanced computer-controlled, adaptive traffic control and information systems. More and more of the European motorway network is being equipped with traffic control, incident detection and traveller information systems, which increase safety and user comfort, e.g. by informing about traffic conditions and alternative routes in case of an accident.

The basis for an effective traffic management is the availability of real-time traffic information. Traffic data has been conventionally collected by sensors embedded in the pavement, installed at critical sections of the road network. Video-based sensors are increasingly being installed and their data analysed via image processing technologies. Next generation systems which use Floating Vehicle Data (FVD), for example based on anonymous polling of vehicle position and speed information, hold the promise of providing more complete traffic information for a fraction of the cost. Further advances in mobile communications technology, traffic control, information and location technologies will enable avoiding bottlenecks and offer new innovative ways for traffic management.

Co-operation between the intelligent infrastructure and the intelligent vehicle is valuable for both. Information on the network condition is necessary for the best performance of the systems included in the vehicle, and feedback information is of primary importance to improve the knowledge of the situation for operators. Intelligent Transport Systems (ITS) projects on the trans-European Transport Network are leading the way in introducing these services.

Galileo: Core positioning technology for telematics services

Location information, together with mobile communications, enables a large number of telematics services like location-enhanced emergency call (e-Call), in-vehicle navigation, Points of Interest (POI) services, vehicle tracking, stolen vehicle location etc. The current in-vehicle systems are based on satellite navigation (GPS), due to the need to operate also in rural areas where the alternative location technology (based on mobile communication network) does not offer sufficient performance.

The European satellite navigation infrastructure Galileo[10] will provide a set of navigation and positioning services that allow a wide range of innovative applications to be developed. Galileo together with the advent of new regulations in the mobile phone domain (E-112 legislation), in the road sector and others, will create new business opportunities and open doors for new applications. The enhanced accuracy and the guaranteed service provided by Galileo will improve the performance of the ITS services. Galileo will start operations in 2008, and in the meantime the European Geostationary Navigation Overlay Systems (EGNOS[11]) will provide similar enhanced services from 2004 onwards.

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[10] Council Conclusions on GALILEO, 25/25 March 2002, europa.eu.int/comm/dgs/energy_transport/galileo/index_en.htm

[11] Communication from the Commission to the European Parliament and the Council "Integration of the EGNOS programme in the GALILEO Programme", COM(2003) 123 final, 19.3. 2003

2. REAPING THE BENEFITS OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES FOR ROAD SAFETY

2.1. From passive safety to active safety and accident prevention

The 1.300.000 road accidents per year in Europe cause 40.000 fatalities and 1.700.000 injuries. During the last decade, the European Union, Member States and the automotive industry have been actively involved in improving road safety through both accident prevention and injury reduction. Most of the accident prevention measures have focused on the driver, while the measures to reduce the consequences of an accident have primarily focused on the vehicle, through improved passive safety such as crashworthiness, seatbelts airbags and conventional active safety systems such as braking and lighting.

Passive Safety measures have been proven to be a very effective method for the reduction of the car accident trauma. This can be illustrated with German accident data, for instance. In the period from 1970-1987 the number of accidents on German roads increased by about 40 %, as the traffic measured as kilometres travelled increased by 72%. In this same period however the number or traffic injuries decreased by 20% and the number of fatalities even by about 50%. It was concluded that this decrease to a large extent was due to injury prevention measures like significant improvements of the vehicle crashworthiness and the introduction of the seat belt[12].

These combined actions have contributed to the continuous reduction of the number of fatalities on European roads. The number of deaths in EU 15 has halved from 1970, while the traffic volumes have tripled during the same period[13]. Nevertheless, the number of road accidents and the number of road victims are still unacceptably high in the European Union. Furthermore, the contribution of many of these "conventional" safety measures is reaching its limits, and further improvements in safety by these measures are becoming more and more difficult to achieve at a reasonable cost. This is why the in-vehicle passive safety has to be complemented **by introducing on the markets more advanced in-vehicle and co-operative active safety systems**.

2.2. Towards a new generation of intelligent safety systems through research

During the last decade in Europe both the industry and the public sector have invested heavily in Research and Development (RTD) in the use of Information and Communications Technologies (ICT) in in-vehicle safety technologies and subsystems. While the bulk of the work has been done by the industry, the EU's Research Programmes have contributed in realising leading edge technologies, systems and applications.

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[12] Verletzungsfolgekosten nach Strassenverkehrsunfallen". Schriftenreihe des Hauptverbandes der gewerblichen Berufsgenossenschaften e.V. A. Sutter Druckerei GmbH, Essen

[13] http://europa.eu.int/comm/transport/home/care/index_en.htm

The EU has played a role in this research since the DRIVE Programme in 1988. Under the EU's Fourth Framework Programme for Research, Technological Development and Demonstration (1994 -1998), the Telematics Applications Programme, helped in realising leading-edge systems and applications. The Information Society Technologies (IST) programme[14] continues research in technologies and applications systems aiming at safer, cleaner and more efficient transport, with specific focus on intelligent safety and Advanced Driver Assistance Systems and supporting technologies. The Intelligent Vehicle cluster of the IST Programme has over 40 projects, with total budget of over 150 million € and Community contribution of over 80 million €. Research into safer vehicles and infrastructures as well as accident databases and human behaviour in road transport is also undertaken in the Competitive and Sustainable Growth programme (5th Framework Programme)[15].

The development of appropriate sensors, actuators and processors, has already permitted wide spread implementation of systems, which help the driver to maintain control of the vehicle even when he has exceeded its 'normal' limits of handling. Examples of such systems are Anti-lock Braking Systems (ABS) and Electronic Stability Programme (ESP). These systems are already making a major contribution to road safety. Together with improvements in passive safety, the vehicles are now four times safer than in 1970.

Many accidents are avoidable if the driver was to take evasive action. This is possible provided that the driver has retained directional control of the vehicle. However, if the wheels lock-up under braking the driver no longer has that directional control. **Anti-lock Braking Systems** (ABS) detect when any of the wheels of a vehicle are about to lock-up, and release the brakes slightly on that wheel, ensuring that it maintains its grip on the road. Therefore, in emergency braking situations or in slippery conditions, it is possible for the driver of a vehicle equipped with ABS to avoid an accident by steering round it and to retain control of the vehicle.

It is far more difficult to offer protection to the occupants from lateral impacts than frontal impacts, especially if the struck object is narrow like a pole or tree, which is a typical scenario when a vehicle slides or spins off the road. Therefore, vehicle and braking system manufacturers have developed systems commonly known as **Electronic Stability Programmes** (ESP) which detect the onset of a slide and automatically apply the brakes to individual wheels to correct the slide and prevent spinning. ESP will be beneficial even under the most pessimistic assumption that it does not avoid any accidents but simply transforms them from lateral to frontal. ESP is now optional or even standard on many current passenger cars. Statistics from one car manufacturer shows that in 2001 there was a 4% reduction of accidents, compared to the year before, that could be directly attributed to ESP. The reduction of roll-over accidents thanks to ESP have also been estimated to be 12%.

The further development of intelligent active safety systems will require substantial RTD efforts. The current Sixth Framework Programme for Research and Technological Development (2002-2006)[8] will offer new funding opportunities for RTD in intelligent integrated safety systems including accidentology and Advanced Driver Assistance Systems and technologies. The new instrument, ***Integrated Project,*** which is designed to generate the

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[14] The Information Society Technologies Programme is part of the European Union's Fifth Framework Programme for research and technological development (RTD), covering the period 1998-2002

[15] See www.europa.eu.int/comm/research/growth/gcc/menu-researchthemes.html

knowledge required to address major societal challenges, will be especially suitable for research in this area. Integrated Projects are intended to build a critical mass of activities and resources needed for achieving ambitious, clearly defined scientific and technological objectives. These projects are of substantial size, with the duration of typically three to five years.

2.3. Intelligent Vehicle Safety Systems

We know that almost 95% of the accidents are at least partly due to the human factor. In almost three-quarters of the cases the human behaviour is solely to blame. This apparent mismatch between driver skills and situation complexity can be addressed by improvements in three factors: the driver (education and training); the environment (intelligent infrastructure) and the vehicle (in-vehicle safety systems).

Intelligent Vehicle Safety Systems use Information and Communications Technologies for providing solutions for improving road safety in particular in the pre-crash phase when the accident can still be avoided or at least its severity significantly reduced. With these systems, which can operate either autonomously on-board the vehicle, or be based on vehicle-to-vehicle or vehicle-to-infrastructure communication (co-operative systems), the number of accidents and their severity can be reduced, leading equally to a reduction of the number of fatalities and injuries.

Collisions during **lane changes and involuntary lane departure** are two of the most important causes of accidents. This problem requires in-vehicle technology to help detect and warn drivers of vehicles in adjacent lanes or when the vehicle is about to unintentionally depart from the lane. According to the National Highway Traffic Safety Agency (NHTSA) in the US, lane change and merge collisions could be cut in half by new technologies. In Europe, a Dutch study expects a reduction of 37% in all side impact collisions and a reduction of 24% of the single vehicle accidents due to lane departure crash avoidance.

Location-enhanced emergency calls like **in-vehicle e-Call** have their primary benefit to society of saving lives and in offering an increased sense of security. This is achieved by improved call routing obtaining faster and improved information for dispatching relevant resources, and most importantly improved information to locate the caller. What is of paramount importance here is that the relevant resources are delivered to the person in need as soon as possible, this can save up to 10% of the fatalities. An increased sense of security is particularly relevant for European citizens travelling abroad. The secondary benefits may be varied and include increased confidence in emergency service provision, reduced stress, decreased reliance on verbal communication and reduced traffic congestion[16].

In the development and deployment of **Intelligent Vehicle Safety Systems**, priority should be given to the systems with the best prospects. The eSafety Working Group[17] identified a number of such systems, e.g. safe speed, lane support, safe following, pedestrian protection,

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[16] Caller Location in Telecommunication Networks in view of enhancing 112 Emergency Services: Recommendations towards a European policy and implementation plan. 30 April 2002, Helios Technology Ltd

[17] The Final Report of the eSafety Working Group on Road Safety, November 2002

improved vision, driver monitoring and intersection safety systems. Each one of these systems depend on a number of sensors, subsystems and technologies with varying degree of maturity, some being still in the RTD phase and some already partially introduced to the market.

The potential contribution of the introduction of Intelligent Vehicle Safety Systems for enhancing road safety and security has already been demonstrated by the industry in a number of European research and technological development (RTD) projects. However, to realise the potential benefits, the new systems have to be widely deployed in the marketplace. It is therefore of paramount importance that the public and private sectors work together in accelerating the development and deployment of these Intelligent Vehicle Safety Systems in Europe. This collaborative approach is expected to result the quickest market penetration of these systems. In compliance with the data protection legislation and the right to mobility, other technologies such as increased monitoring of the driver condition and performance, accident data recorders and electronic vehicle identification should also be examined, as described in the European Road Safety Action Programme.

2.4. A prerequisite: a positive business case

From the manufacturers' point of view, the introduction of Intelligent Vehicle Safety Systems based on costly sensors, actuators, electronic components and subsystems increases the manufacturing cost, power consumption and weight, making it also more difficult to meet the environmental requirements imposed to new vehicle production. Furthermore, problems associated with the reliability of embedded electronics and especially of the software have to be solved. Market introduction of new functionality requires tackling liability, type-approval and Human-Machine Interaction (HMI) issues as well as investments to the infrastructure.

The industry has demonstrated its capability to innovate and bring active safety systems to the markets, as has been the case with ABS and ESP. The introduction of these technologies is a very good example of the two main problems the industry is facing in bringing new systems on the market.

First, if the pace of market introduction is dictated solely by the market economies and competition, it can take a very long time. ABS was first introduced in the 1970's, and now 30 years later still only 91% of new vehicles are equipped with ABS, with a 66% penetration on the whole vehicle parc in Europe. The introduction of ESP has advanced a bit faster, achieving 38% penetration of new vehicles sold and 16% of the whole vehicle parc in five years after its introduction[18].

Secondly, relying solely on the automotive manufacturers' business case leads to introduction of the new safety features in the high-end range of vehicles first, then into the mid-range vehicles and finally to the small and compact cars. This can be easily understood by comparing the price of the advanced safety systems, for example 2000 € for a collision mitigation or adaptive cruise control system, with the selling price of the vehicles. As a consequence the drivers most at risk, i.e. the young, are the last to benefit, as they tend to drive the older and smaller cars.

Furthermore, more sophisticated software and electronic assistance systems tends to lead to more complexity in repairing and maintaining the vehicles. As the cost of repair and

[18] Source: Volkswagen Group research, 2001, German market

maintenance typically accounts for 40% of the total life-time cost of the vehicle, equalling the purchase price, this is an important issue for the consumers.

Based on the above, it is clear that the wide-spread take-up of Intelligent Vehicle Safety Systems cannot depend on the private business case only, and needs the full support of the public sector, contributing to a positive public/private business case. This business case has to be developed jointly with all actors involved, the automobile manufacturers, equipment suppliers, motorway operators, telecommunication operators, service providers, automotive after-sales players, insurance industry, road safety and user organisations, road authorities, emergency service providers, Member States and the European Commission. The public and private sectors must agree to co-operate, to decide on the role and responsibilities of each partner, and take the appropriate actions.

The main mechanisms for the public sector intervention, in contributing to this business case, are: promoting standardisation - leading to market harmonisation, larger volumes and lower manufacturing costs; promoting awareness and information - leading to an increased demand of safety systems and consumers' willingness to pay for advanced safety features; and working together with appropriate partners (public and private sectors) in introducing financial incentives for the buyers of vehicles equipped with advanced safety systems. The vehicle type approval legislation should be adapted, when necessary, to permit these systems, or even mandate them, if appropriate.

Introduction of Intelligent Vehicle Safety Systems requires a well-functioning, competitive maintenance and repair system that guarantees their good functionality over time. The consumers should be able to choose between alternative providers of repair and maintenance services. To this effect, the automotive industry and equipment suppliers should respect the Commission Regulation with provisions for independent operators to have access to technical information, training, tools and equipment[19].

Finally, in addition to standardisation public authorities have a particular role in steering the implementation of the appropriate infrastructures, including intelligent features, and putting forward legislation enabling the wider deployment of ITS.

2.5. Contributing to pedestrian safety

In 2001 the European automotive industry (represented by ACEA) committed itself to reducing the risk of pedestrians being killed and injured when struck by a vehicle. The Commitment was an innovative approach to road safety, as it contained both passive and active safety elements, as well as a commitment by the industry to progressively install additional active safety devices, including ICT elements. Even though it has subsequently been agreed that the passive safety elements should be supported by a directive[20], the additional active safety devices and ICT elements remain subject to the industry Commitment.

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19 Commission Regulation EC 1400/2002 of 31 July 2002

20 Proposal for a Directive of the European Parliament and of the Council relating to the protection of pedestrians and other vulnerable road users in the event of a collision with a motor vehicle and amending Directive 70/156/EEC, COM(2003) 67 final, 19.02.2003

3. RATIONALE FOR COMMUNITY ACTIONS

3.1. Introduction

Information and Communications Technologies (ICT) which enable the building of Intelligent Vehicles for intelligent roads will help Europe to meet its expectations for mobility and economic growth. ICT offer a set of tools which gives the industrial players an opportunity to meet the challenges related to road safety. First generation Intelligent Vehicle Safety Systems, such as ABS (Anti-lock Braking System) and ESP (Electronic Stability Programme) are already contributing to reducing the number of accidents and fatalities.

A major responsibility for introducing new generation Intelligent Vehicle Safety Systems in vehicles remains with the automotive industry, which is developing them in collaboration with its suppliers, the telematics industry and supported by two other main industrial sectors, the telecommunications and IT industries.

However, the industry cannot act on its own. The public sector has to work together with the private sector in a concerted way. The European Commission has to act especially in relation to its competencies such as Community RTD, vehicle type-approval procedures, telecommunications and transport regulation, and in solving liability, standardisation and other obstacles in the introduction of Intelligent Vehicle Safety Systems.

Europe's citizens should be able to expect the same level of safety and support from the road infrastructure for their mobility all over Europe, just as they can with regard to the safety features of the vehicles. Further European level actions are required for defining and harmonising the Member States' technical requirements and investments to road and communications infrastructure, especially those required by the future collaborative road safety systems.

In many cases a positive private business case for the introduction of safety systems does not exist, and further public sector intervention in the form of tax and insurance incentives is required for speeding up the deployment of these systems.

3.2. European Commission taking the responsibility for European level public sector actions

This Commission Communication brings forward the measures the Commission is proposing to undertake to promote the development and deployment of Intelligent Vehicle Safety Systems, and to remove barriers which prevent their large-scale introduction and take-up in Europe.

The proposed Community actions fall into the following three categories:

(1) Promoting Intelligent Vehicle Safety Systems

(2) Adapting the regulatory and standardisation provisions

(3) Removing the societal and business obstacles

With these actions, the Commission intends to facilitate the development and large-scale deployment of Intelligent Vehicle Safety Systems in Europe, in a way which allows the European automotive industry to maintain and even increase its world-wide competitiveness, at the same time benefiting society by reducing the number of road accidents and fatalities.

These systems, when deployed in sufficiently large scale, are expected to make a major contribution to reducing the fatalities on European roads, and provide for the basic need for Europe's citizens: safe mobility.

Concerted efforts using techniques noted in this Communication will also help in gaining the best value for Europe from the deployment of infrastructure management to achieve the three goals of the White Paper on European Transport Policy of sustainable development, reducing congestion and ensuring a more efficient use of the available modes of transport and especially facilitating greater intermodality between transport modes.

3.3. Acting together at EU, national and regional level

Although the EU has a broad scope to act on road safety, achieving the targets set in the White Paper on European Transport Policy cannot be the sole responsibility of the European Union. Shared action encompassing all types of safety measures and all players at the EU, national and regional level is needed. The European Strategy for a partnership approach and proposed measures for improving road safety are brought forward in the European Road Safety Action Programme: Halving the number of road accident victims in the European Union by 2010: A shared responsibility.

A number of measures introduced in this plan contribute also to the goals of this Communication. Examples of such measures are support to EuroNCAP in progressing towards new methods and information to the consumers, further development of the CARE accident database and complementing it with Accident Causation Data, elaboration of common specifications for accident registration and improving methods for collecting accident statistics in the Member States, and the study with the Member States on the need to include new electronic systems in the framework of technical vehicle inspection and controls.

Shared action of the European Commission, Member States, industry and other public and private stakeholders is also a pre-requisite in promoting the development, deployment and use of Intelligent Vehicle Safety Systems. The Final Report of the eSafety Working Group identified in all 28 actions, on most of which the Member States are expected to contribute. Further to the actions that constitute this Communication, these include the following:

- Consolidate analyses from the existing EU, Member State and industry road accident data which give information on the cause and circumstances of the accidents.
- Define a common format and structure for recording accident data in the EU countries. Develop jointly an European Accident Causation Database.
- Set up a coordinated validation framework for operational tests for active safety systems in the Member States.
- Develop public sector Road Maps which indicate the investments required for improvements in the road networks and information infrastructure based on the industrial Road Maps, and identify the steps needed for removing regulatory barriers.
- Identify existing specifications, and where necessary develop new specifications for pan-European, standardised interoperable interfaces and communications protocols for vehicle-vehicle and vehicle-infrastructure communications which will support interactive, co-operative safety systems and services.

- Establish national liaison groups to co-ordinate the implementation and building up of the E-112 service chain.

- Stimulate and support road users and fleet owners to buy vehicles with intelligent road safety functions and to use safety-related services by incentives such as tax reductions, lowering insurance premiums, and preferential treatment.

- Design and execute awareness campaigns that explain the benefits, functioning and use of the Intelligent Vehicle Safety Systems to the consumers.

4. EUROPEAN COMMISSION ACTIONS

The Commission, in close collaboration with other stakeholders is proposing to undertake the following actions to promote the development, deployment and use of Intelligent Integrated Safety Systems in Europe, and to remove barriers which prevent their large-scale introduction and take-up.

4.1. Promoting Intelligent Vehicle Safety Systems

Road safety requires concerted actions by all the safety stakeholders: the European Commission, automotive and telecommunications industry and operators, equipment and service suppliers, motorway operators, road authorities, insurance companies, road safety and user organisations and others. In order to facilitate co-operation, the Commission will continue to support a joint platform for all the road safety stakeholders, **the eSafety Forum**. The objective of the Forum is to promote and monitor the implementation of the recommendations identified by the eSafety Working Group, and to support the development, deployment and use of Intelligent Vehicle Safety Systems. The Forum will provide for a platform to encourage and review progress of the actions of all stakeholders, including industry and the Member States, reporting to the Commission.

The future development of the above-mentioned safety functions requires **further RTD** in a number of technologies. The overall target of Europe, as agreed by the Research Council Barcelona in 2002 is to invest 3% of GDP on research by the year 2010. These increased efforts with two thirds of the funding coming from the private sector should cover Intelligent Vehicle Safety Systems as one of the priority areas. The Commission intends to use its 6th Framework Programme for Research and Technological Development (2002-2006) for supporting research in this area, co-ordinated with national research programmes and benefiting from the European Research Area (ERA) and international collaboration. The critical task, in which the eSafety Forum can play a role, is determining the priorities for further research based on analysis of accident causation data and the impact of potential countermeasures. The international co-operation is expected to cover especially Human-Machine Interaction, certification and testing methodology and procedures, harmonisation and standardisation, legal issues, impact and socio-economic benefit analysis and benchmarking/best practise.

Human-Machine Interaction with increasingly more complex in-vehicle systems is a major concern. To tackle this important issue, the Commission published in 2000 a Recommendation on Safe and Efficient In-vehicle Information and Communication

Systems[21], which has been largely adopted by the industry. The Commission proposes now to assess the situation in the light of technical progress, including the effects of the introduction of nomadic devices in the vehicles, in collaboration with the industry and the Member States. Further measures will be then proposed if deemed necessary. An important part of this work is the development of workload assessment, testing and certification methodology and procedures for complex in-vehicle working environments that involve interfacing with in-vehicle devices for vehicle control, driver assistance and infotainment.

In cases where a vehicle is involved in an accident, an **Emergency Call (e-Call)** can be initiated automatically, and accurate vehicle location and additional safety-related information can be passed to the Public Service Answering Point (PSAP). Such information cuts dramatically down the emergency response times, saving lives and reducing the consequences of serious injuries, and also has the potential to allow correct response in case of accidents involving hazardous goods. Building on the provision of the so-called E-112 legislation, which is contained in the new electronic communications directive[22], the Commission is proposing an integrated strategy for Pan-European emergency services. These services will build on the location-enhanced emergency services being implemented in the Member States on the basis of deliberations in the joint industry–public sector CGALIES[23] group, and the recently adopted Recommendation on the implementation of E-112[24], but will include provisions for more accurate location information and additional safety information. This requires defining the interfaces between the vehicles and the telecommunications network, and between the telecommunications network and the PSAPs, and solving the related liability and responsibility issues.

Real-time traffic and travel information (RTTI) contributes greatly to safety. In order to facilitate the access to the public sector data, and to enable the private and public sectors to co-operate in the service provision, the Commission published in 2001 a Recommendation on the deployment of Traffic and Travel services in Europe[25]. The Commission proposes now further analysis and recommendations for accelerating the take-up of the measures for accessing the public sector data, enabling the establishment of public-private partnerships, and the provision of reliable, high-quality RTTI services in Europe. Furthermore, the Commission may draw up in its TENs ITS Working Group recommendations or legislation

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21 Commission Recommendation of 21 December 1999 on safe and efficient in-vehicle information and communication systems: A European statement of principles on human machine interface Text with EEA relevance (notified under document number C(1999) 4786) , published in the OJ L 19 of 25.1.2000

22 Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive) ; published in OJ L 108 of 24.4.2002; Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive); published in OJ L 108 of 24.4.2002; Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications); published in OJ L 201of 31.7.2002.

23 See the Final Report of CGALIES (Co-ordination Group for Access to Location Information by Emergency Services), http://www.telematica.de/cgalies/

24 Commission Recommendation of 25/07/03 on the processing of caller location information in electronic communication networks for the purpose of location-enhanced emergency call services, C(2003) 2657 final

25 Commission Recommendation on the development of a legal and business framework for participation of the private sector in deploying telematics-based Traffic and Travel Information (TTI) services in Europe, OJ L 199/20 24.7.2001

aimed at accelerating the deployment of Real-time Traffic and Travel Information services in Europe.

Commission actions:

- To facilitate co-operation of all stakeholders, the Commission will continue to support the eSafety Forum, aiming at a self-sustained platform.

  The eSafety Forum will promote and review progress of the implementation of the recommendations of the eSafety Working Group, and support the development, deployment and use of Intelligent Vehicle Safety Systems. The Forum will also promote the development of open platforms, open system architecture and user awareness of Intelligent Vehicle Safety Systems. Where appropriate the Forum will set up specific Working Groups[26].

  During an initial period of two years, the Commission will provide the necessary support for the Forum. During this period the model for a self-sustained platform will be established by the industry and the Member States, with the aim to shift the responsibility to industrial partners at the end of 2004.

- The Commission will determine clear goals and priorities for further RTD under its 6th Framework Programme, and pursue co-ordination with national programmes.

  The Commission will invite the Forum to analyse existing accident causation data and to identify clear goals and priorities for further RTD in Intelligent Vehicle Safety Systems in industrial research, Community Research (Integrated Projects in the 6th FP) and national research programmes.

  Furthermore, the Commission will pursue international co-operation in the development of intelligent integrated road safety technologies.

- The Commission will determine what further actions are required on Human Machine Interaction.

  The Commission will invite the eSafety Forum to create a Working Group that will, taking into account the reports by the Member States and the rapid development in this area, develop further recommendations on HMI. The Commission will, on the basis of these recommendations, examine if further actions are deemed necessary.

  Furthermore, the Commission will promote through its RTD funding and co-operation the development of workload assessment, testing and certification methodology and procedures for complex in-vehicle working environments.

- The Commission will promote harmonised, pan-European in-vehicle emergency call (e-Call) service that builds on the location-enhanced emergency call E-112.

  For this purpose the eSafety Forum is invited to set up a Working Group to establish consensus on the implementation of the pan-European in-vehicle emergency call (e-Call), based on the recently published Recommendation and the results of ongoing RTD actions.

[26] These are new eSafety ***Forum*** Working Groups, operating under the Forum. They should not to be mixed up with the eSafety Working Group which was established in April 2002 and published its Final Report with 28 Recommendations in November 2002.

Furthermore, the Commission encourages the industry in establishing data requirements, data transfer protocols, interface specifications and routing and handling procedures for the enhanced in-vehicle e-Calls, and standardisation in ETSI and CEN.

- The Commission will analyse the progress on the provision of Real-Time Traffic and Travel Information (RTTI) in Europe, and propose further actions.

  The Commission will invite the eSafety Forumto analyse the implications of the RTTI services in road safety including emerging new services based on broadcasting and mobile communications, taking into account the Member States' responses to the TTI Recommendation. Special attention is given to pan-European services and sustainable business models.

On the basis of this analysis and the recommendations, the Commissionmay consider the need presenting a progress report to the Council and the European Parliament in view of keeping focus on the issues and proposing further measures when necessary.

4.2. Adapting the regulatory and standardisation provisions

Ultra wide band (UWB) automotive radar (SRR) operating at 24 GHz is considered to be a key technology for the rapid and cost-effective introduction of many Intelligent Vehicle Safety Systems. SRR systems of this type could validate relatively quickly active safety concepts, while giving other technologies the time to mature. However, regulatory barriers to the market-led introduction of this technology remain, in particular concerning access to appropriate harmonised radio spectrum in the EU. Such obstacles will affect timely achievement of Community road safety goals if not solved co-operatively with the EU Member States within the pan-European Electronic Communication Committee (ECC) of CEPT[27]. The Commission now proposes to take the necessary actions to support the removal of regulatory barriers to a time-limited legal use of the 24 GHz spectrum for automotive short-range radar, and to support the standardisation of SRR systems in ETSI.

Before new passenger cars and motorcycles can be placed on the market within the European Union they must have obtained **EC Whole Vehicle Type–Approval**, indicating compliance with the requirements of a number of separate EC Directives. Other types of vehicles, e.g. trucks and buses, etc. may also use these Directives as the basis for gaining access to the European market. Nonetheless, the Commission also acknowledges that non-legislative market initiatives should be pursued in order to bring forward improvements in vehicles. The Commission intends to review the existing situation regarding the introduction of Intelligent Vehicle Safety Systems, determine what legislative and non-legislative actions may be required, and wherever necessary adjust requirements to accommodate new technologies.

While the vehicles are equipped with an increasing number of electronic subsystems, telematics platforms and/or portable terminals, the need for a **responsive standardisation process** becomes extremely important. Standardised solutions guarantee wide market acceptance, higher volumes and lower costs, benefiting both the manufacturers and the consumers. The Commission proposes further measures, through a standardisation mandate and in collaboration with industry, to initiate a process in the European Standardisation Organisations to analyse the specific needs and priorities of the Intelligent Vehicle Safety

[27] Conference Européenne des Administrations des postes et des télécommunications

Systems for accelerated standardisation in ISO, CEN and ETSI of emerging communications protocols for the vehicle-vehicle and vehicle-infrastructure communications, and for promotion of the development of open platforms, open system architecture, and standard software, communication protocols, services and human-machine interactions.

Commission Actions:

- The Commission will take the necessary steps to support the removal of legal barriers to a time-limited use of 24 GHz UWB short-range radar, in particular concerning harmonised access to the radio spectrum in the EU.

  The Commission will co-ordinate, via the appropriate Community mechanisms (Radio Spectrum Committee and Telecommunications Conformity Assessment Mechanism[28]) and with the CEPT, the investigation of possible regulatory solutions which will enable short-range radars to be rapidly implemented at 24 GHz for an initial period, while providing adequate protection to other potentially affected radio services. A long-term transition of radar operation to 77 GHz is expected.

  Furthermore, the Commission has recently addressed a standardisation mandate (M329) to the European Standardisation Organisations inviting them to prepare harmonised standards to be recognised under Directive 1999/5/EC (the R&TTE Directive). ETSI will execute the mandated work.

  The mandate foresees, in a first phase, the development of a work programme to be further discussed with Member States in the standing committee established by the Directive. Subsequently the European standardisation organisations will develop standards in accordance with priorities identified by the Member States.

- The Commission will review the existing EC vehicle type-approval legislation.

  The Commission will determine what actions (legislative and non-legislative) may be required to bring forward road safety improvements obtainable with Intelligent Vehicle Safety Systems in vehicles.

- The Commission will invite the European Standardisation Organisations to identify priorities and prepare a standardisation programme.

  The Commission will invite the European Standardisation Organisations, through a standardisation mandate, to identify the actual status of standardisation work at European and international level in support of Intelligent Vehicle Safety Systems, to identify specific additional needs and priorities for standardisation and subsequently to prepare for a common standardisation work programme, taking into account the need to maintain coherence with activities such as standardisation in support of eEurope and standardisation in support of the technologies proposed Directive on interoperability for Electronic Fee Collection on European roads.

[28] Respectively the standing regulatory committee for the Radio Spectrum Decision (676/2002/EC) and for the RTT&E Directive (1999/5/EC)

4.3. Removing the societal and business obstacles

The costs of road fatalities, injuries and accidents have been estimated in the Commission White paper. Also, the societal benefits of specific safety applications/functions have been estimated in a number of reviews, but not recently in a comprehensive manner. The data on societal benefits and cost/benefit ratio are incomplete and not kept up-to-date with latest technological developments. Therefore, the Commission proposes **measures to estimate societal benefits** obtainable through the reduction in accidents, serious injuries and material damage, including an analysis of the reduction in medical care and other expenses in the Member States and enlargement states, and benefits like improved journey times, reduced congestion and environmental impact.

The legal and liability issues of the market introduction of Intelligent Vehicle Safety Systems are very complex, involving new risks to the customers, the society and above all the manufacturers in the terms of product liability and increased financial risks such as call-back campaigns. The risks regarding product liability are not only technological, but also include human factors such as dependability, controllability, comprehensibility, predictability and misuse robustness. The Commission proposes measures for developing a methodology for risk benefit assessment, achieving an industrial and societal consensus on a European Code of Practice, and for establishing guidelines for the market introduction of Intelligent Vehicle Safety Systems.

The market introduction of Intelligent Vehicle Safety Systems involves policy, technological, societal, business, legal and consumer aspects. The automotive industry undertakes market introductions based on their own assessment of the technological readiness, the market situation and competition and the availability of supporting infrastructure and incentives. From the public sector point of view, it has to be possible to estimate the market introduction time-table and to use this information to plan for investments and to determine what other measures (incentives, removing regulatory barriers) are required for enabling take-up. Furthermore, these measures have to guarantee the same level of safety and support from the road infrastructure in all European countries. The Commission proposes to promote the development of Industry Road Maps, and based on them, elaborate with the Member States **Public Sector Road Maps**, which predict product development and deployment, and indicate the investments required for improvements in the road networks and information infrastructure base, and identify the steps needed for removing regulatory barriers.

Commission Actions:

- The Commission will estimate the socio-economic benefits.

  The Commission will undertake a study to estimate the socio-economic benefits which can be obtained through the introduction of Intelligent Vehicle Safety Systems. This study will involve all mobility actors.

- The Commission will support the development of an European Code of Practice.

  The Commission will promote through its RTD funding and co-operation the development of a methodology for risk benefit assessment of Intelligent Vehicle Safety Systems.

  Furthermore, the Commission will invite an eSafety Forum Working Group to pursue an industrial and societal consensus on a European Code of Practice, applicable to

both system design specifications and validation procedures, and to formulate practical guidelines which facilitate the market introduction of Intelligent Vehicle Safety Systems.

- The Commission will promote the elaboration of Industrial Road Maps and the corresponding Public Sector Road Maps.

  The Commission will invite the eSafety Forum to elaborate Road Maps for the development and deployment of Intelligent Vehicle Safety Systems. Furthermore, the Commission will launch consultations of Member States and all other public sector actors on these Industry Road Maps, and based on the results of these consultations, elaborates with the Member States regularly updated Public Sector Road Maps which define and indicate the time-table for the required investments and other public sector measures.

  Furthermore, the Commission will review the progress regularly, and propose further measures when necessary, in particular in cases where the market take-up is reluctant..

4.4. Other actions

The European Commission will also contribute towards the following actions undertaken by the industry.

- The industry will develop a methodology to assess the potential impact of the introduction of the Intelligent Vehicle Safety Systems and technologies in Europe, based on the accident causation data and including the analysis of combined systems (fusion of sensors, integration and use of multiple active safety systems together).

  The Commission will support this development through RTD funding, and by encouraging the establishment of a Working Group on impact assessment.

- The industry will develop a validation methodology and procedures for vehicles equipped with Intelligent Vehicle Safety Systems.

  First steps towards the development of validation methodology has been taken in the ongoing RTD projects. The Commission will support the further development of validation methodology and standards of the design and use of Intelligent Vehicle Safety Systems, based on the Code of Practice (see 4.3) through follow-up actions.

- The industry will define, produce, maintain and certify a European digital map database with road safety attributes.

  The Commission offers for use by industry the results of existing Community supported research, which define preliminary requirements for a European digital road map database. Based on these results, the public sector and industry will jointly decide on the needs for additional road safety attributes for driver-support for information and warning purposes, such as speed limits information and road configuration data.

  The Commission will also support, through the eSafety Forum, the industry-led efforts for the creation of a public-private partnership to produce, maintain, certify and distribute this digital road map data base.

5. REPORTING

Monitoring of the progress of the recommendations of the eSafety Working Group will be an important part of the activity. The eSafety Forum with its wide membership will be best placed to perform this important function.

- The eSafety Forum will, as an important part of its activity, monitor and report to the Commission on the implementation of the actions and recommendations of the eSafety Working Group.
- The Commission will support this activity through RTD funding (Specific Support Actions).

The Commission will examine the recommendations of the eSafety Forum and, if needed, report to Council and European Parliament on the progress achieved and further actions needed to support the development and deployment of Intelligent Vehicle Safety Systems.

ANNEX 1: GLOSSARY OF TERMS

ABS	Anti lock brake system: Electronically controlled braking system, which avoids wheel lock, when braking under slippery road conditions
ACEA	Association des Constructeurs Européens d' Automobiles (European car manufacturers association)
ADAS	Advanced Driver Assistant Systems
CARE	Community Road Accident Database
CEN	Comité Européen de Standardisation (European Committee for Standardisation)
CEPT	Conférence Européenne des Postes et des Télécommunications
CGALIES	Co-ordination Group on Access to Location Information by Emergency Services
DAB	Digital Audio Broadcast
DVB	Digital Video Broadcast
E-112	Location enhancement of all emergency call. It is a new legislation that requires all mobile and fixed telephone operators to make available location information for every emergency call from July 2003
e-Call	In-vehicle emergency call. e-calls originating from vehicles, based on E-112 structure with an accurate location and other safety-related information to be routed to the Public Service Answering Points
ECC	Electronic Communication Committee
EGNOS	European Geo-stationary Navigation Overlay System
ERA	European Research Area
ESP	Electronic Stability Programme
ETSI	European Telecommunication Standard Institute
EU	European Union
EuroNCAP	European New Car Assessment Programme
FVD	Floating Vehicle Data
GALILEO	European Satellite radio navigation infrastructure providing navigation and positioning services from 2008 onwards

GDP	Gross Domestic Product
GPS	Global Positioning System
GPRS	General Packet Radio Service
GSM	Global System for Mobile telecommunications
HMI	Human Machine Interaction
ICT	Information and Communications Technologies
ISO	International Organisation for Standardisation
IST	Information Society Technologies
ITS	Intelligent Transport Systems
NHTSA	National Highway Traffic Safety Agency
PSAP	Public Service Answering Point (service for emergency calls, fixed and wireless)
RDS-TMC	Traffic Message Channel (TMC) is a specific application of the FM Radio Data System (RDS) used for broadcasting real-time traffic and weather information
RTD	Research and Technological Development
RTTI	Real-Time Traffic and Travel Information
SMS	Short Message Text
SRR	Short Range Radar
TEN	Trans European Networks
UMTS	Universal mobile Telecommunication Systems
UWB	Ultra Wide Band
WAP	Wireless Application

ANNEX 2: SUMMARY OF CONSULTATIONS

All major road safety stakeholders have been consulted. The consultation process, with an emphasis on industrial issues, consisted of two eSafety High-Level Meetings and an eSafety Working Group of some 40 experts. The Member States were consulted through the High-Level Group on Road Safety, in collaboration with DG TREN.

The eSafety High-Level Meetings and the eSafety Working Group

In April 2002, the Commission organised, together with the automotive industry and other stakeholders, a High-Level Meeting on eSafety.

The HL Meeting had representatives from the following stakeholders: automobile manufacturers, equipment suppliers, motorway operators, telecommunication operators, service providers, insurance industry, road safety and user organisations, road authorities, emergency service providers, Member States and the European Commission.

As a result of this meeting, the partners decided to establish **an eSafety Working Group** consisting of some 40 experts, and mandated it to propose a strategy for accelerating the research, development, deployment and use of ICT-based intelligent active safety systems for improving road safety in Europe. This Working Group had a limited membership, but nevertheless had participants from all important stakeholders.

The eSafety Working Group concluded its work in November 2002 and published its Final Report, with 28 Recommendations. This Final Report was discussed by the Second eSafety High-Level Group in November 2002, with the following conclusions:

This 2nd High-Level meeting, gathering some 60 representatives from industries, European Commission and other public authorities discussed the Final Report of the *e*Safety Working Group made the following conclusions:

(1) Approved the Final Report as a basis for the next steps in the public-private eSafety initiative

(2) Decided to establish an *e*Safety Forum as a more permanent body for promoting *e*Safety and monitoring progress

(3) Made the *e*-Call the 1st priority in eSafety

(4) Acknowledged the Commission's plans to bring forward a Communication with community actions in 2003

(5) The 2nd High-Level Meeting made also conclusions related to acting together on *e*Safety, role of the Member States, the *e*-Call, Human-Machine Interaction, eSafety user Demand, the *e*Safety Forum and the next steps

The High-Level Group on Road Safety

The High-Level Group on Road Safety, consisting of representatives from the Member States, was given a full briefing on the eSafety initiative in November 2002. Furthermore, the Road Platform Meeting, consisting mainly of Member States road authorities and motorway operators, were briefed of the initiative in March 2003. In both meetings the Member States

have welcomed the eSafety Initiative, and expressed the wish for the Commission to come up with further policy measures regarding eSafety (the Commission Communication).

SUMMARY OF THE RESULTS OF THE CONSULTATION

- The second eSafety High-Level Meeting endorsed the Final Report as the basis for further actions in advancing the use of ICT for improving road safety in Europe and welcomed the Commission's plan to draft a further policy measures.

- The Member States welcomed the eSafety Initiative, and expressed the wish for the Commission to come up with further policy measures regarding eSafety.

LEGISLATIVE FINANCIAL STATEMENT

Policy area(s): Information Society Technologies

Activit(y/ies): Research

Title of action: Communication from the Commission to the Council and the European Parliament on Information and Communications Technologies for Safe and Intelligent Vehicles

1. BUDGET LINE(S) + HEADING(S)

B6-6120 Operational credits (ABB 09 04 01)

2. OVERALL FIGURES

2.1. Total allocation for action (Part B):

8.162 € million for commitment

2.2. Period of application:

2004-2006

2.3. Overall multiannual estimate of expenditure:

(a) Schedule of commitment appropriations/payment appropriations (financial intervention) *(see point 6.1.1)*

€ million (*to three decimal places)*

	Year 2004	Year 2005	Year 2006	Year 2007			Total
Commitments	0.573	5.872	0.372				6.818
Payments	0.573	2.722	2.722	0.800			6.818

(b) Technical and administrative assistance and support expenditure *(see point 6.1.2)*

Commitments	0.016	0.016	0.016				0.048
Payments	0.016	0.016	0.016				0.048

Subtotal a+b							
Commitments	0.589	5.888	0.388				6.866
Payments	0.589	2.738	2.738	0.800			6.866

(c) Overall financial impact of human resources and other administrative expenditure *(see points 7.2 and 7.3)*

Commitments/ payments	0.432	0.432	0.432				1.296

TOTAL a+b+c							
Commitments	1.021	6.320	0.820				8.162
Payments	1.021	3.170	3.170	0.800			8.162

2.4. Compatibility with financial programming and financial perspective

Proposal is compatible with existing financial programming.

2.5. Financial impact on revenue:[29]

Proposal has no financial implications (involves technical aspects regarding implementation of a measure)

3. BUDGET CHARACTERISTICS

Type of expenditure		**New**	**EFTA contribution**	**Contributions form applicant countries**	**Heading in financial perspective**
Non-comp	Diff	NO	YES	YES	3

4. LEGAL BASIS

Art. 71 of the EC Treaty

Decision No 1513/2002/EC of the European Parliament and of the Council of 27 June concerning the sixth framework programme of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002-2006); published in OJ L 232 of 29.8.2002; and 2002/834/EC: Council Decision of 30 September 2002 adopting a specific programme for research, technological development and demonstration: "Integrating and strengthening the European Research Area" (2002-2006); published in OJ L 294 of of 29.10.2002.

[29] For further information, see separate explanatory note.

5. DESCRIPTION AND GROUNDS

5.1. Need for Community intervention[30]

For a long time, the demand for transport services has grown steadily for both passengers and goods. The continuing growth of the economic activity and the Union's enlargement will almost automatically generate greater needs for mobility and transport services. Most of this growth is expected to be taken up by the road sector at a time when tight public budgets restrict investments to the infrastructure. The rising volumes of traffic further deteriorate the situation regarding the well-known problems caused by the road transport:

- congestion of the main roads network and urban areas

- harmful effects on the environment and public health

- accidents, causing fatalities, injuries and material damage

Congestion is becoming a major problem not only on the main roads and in major cities. Transport sector is to blame for 28% of the emissions of CO2, the leading greenhouse gas. The 1,300,000 accidents per year in Europe cause 40.000 fatalities and 1,700,000 injuries, at an estimated cost of 160,000 million €, or 2 % of the GDP in Europe. Especially the high number of fatalities has become socially unacceptable.

Road transport is a necessity for our mobility, but drastic measures are required to tackle these increasing problems.

As a result of the efforts of the industry, the vehicles today are inherently safer, cleaner and more recyclable than before. But the societal costs of road transport are still by far too high, and new goals have been set.

5.1.1. Objectives pursued

Information and Communications Technologies (ICT) which enable building intelligent vehicles on intelligent roads will help Europe to meet its expectations for mobility and economic growth. ICT offer a set of tools which gives the industrial players an opportunity to meet the above-mentioned challenges, especially those related to road safety.

As the number of vehicles with telematics grows, the market will shift towards services, further integrating the automotive markets with two other key industrial sectors in Europe: Mobile Communications and Information Technology.

The greatest potential in the application of Information and Communication Technologies in solving transport problems is offered by the Intelligent Vehicle Safety Systems, which use advance ICT for providing new, intelligent solutions for improving road safety. With these systems the number of accidents and their severity can be reduced, leading equally to the reduction of fatalities. The challenge is in getting these systems deployed to the marketplace in sufficient quantities.

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30 For further information, see separate explanatory note.

5.1.2. Measures taken in connection with ex ante *evaluation*

In 2001, the European Commission together with the automotive industry and other stakeholders established an eSafety Working Group consisting of some 40 experts, and mandated it to propose a European strategy for accelerating the research and development, deployment and use of Intelligent Vehicle Safety Systems including Advanced Driver Assistance Systems (ADAS).

In November 2001, the Working Group published in its Final the basis for further actions in advancing the use of ICT for improving road safety in Europe. The report gives 28 detailed recommendations for action, directed to the European Commission, the Member States, road and safety authorities, automotive industry, service providers, user clubs, insurance industry and other stakeholders.

Although the EU has a broad scope to act on road safety, achieving the targets set in the White Paper cannot be the sole responsibility of the European Union. Shared action encompassing all types of safety measures and all players at the EU, national and regional level is needed. The European Strategy for a partnership approach and proposed measures for improving road safety are brought forward in the Road Safety Action Plan 2002-2010.

A number of measures introduced in this plan contribute also to the goals of this Communication. Examples of such measures are support to EuroNCAP in progressing towards new methods and information to the consumers, further development of the CARE database and complementing it with Accident Causation Data, elaboration of common specifications for accident registration and improving methods for collecting accident statistics in the Member States, and the study with the Member States on the need to include new electrical systems in the framework of technical controls.

5.2. Action envisaged and budget intervention arrangements

5.2.1 Promoting Intelligent Vehicle Safety Systems:

– The Commission will establish an eSafety Forum, determine its objectives, work programme, membership and organisation.

– The Commission will determine clear goals and priorities for further RTD under its 6th Framework Programme, and pursue co-operation with national programmes as well as international co-operation.

– The Commission will determine what further actions are required on Human Machine Interaction, and develop assessment, testing and certification methods for complex working environments.

– The Commission will promote harmonised, pan-European in-vehicle emergency call (e-Call) service, compliant with the location-enhanced emergency call E-112.

– The Commission will analyse the progress on the provision of Real-time Traffic and Travel Information (RTTI) in Europe, and propose further actions. On the basis of this analysis and the recommendations, the Commission actions

will make a progress report to the Council and the European Parliament, proposing further measures when necessary.

5.2.2 Adapting the regulatory and standardisation provisions:

– The Commission will take the necessary steps to remove legal barriers in the use of 24 GHz UWB short-range radar.

– The Commission will review the relevant parts of the whole vehicle type approval legislation and will determine what actions (legislative and non-legislative) may be required for rapidly bringing forwards road safety improvements obtainable with Intelligent Vehicle Safety Systems in vehicles.

– The Commission will analyse the needs and priorities in standardisation in ISO, CEN and ETSI and will undertake a study on the specific needs and priorities on the basis of the eSafety Working Group Report and the current work programmes of the standardisation organisations.

5.2.3 Removing the societal and business obstacles:

– The Commission will estimate the socio-economic benefits and will undertake an study to estimate the socio-economic benefits which can be obtained through the reduction of fatalities, injuries and material damage by the introduction of Intelligent Vehicle Safety Systems.

– The Commission will support the development of an European Code of Practice.

– The Commission will develop Public Sector Roadmaps for the necessary infrastructure investments and other public sector measures. The Commission will develop with the Member States regulatory updated public sector Roadmaps. Furthermore, the Commission will review the progress regularly, and seek the support of the other institutions and propose further measures when necessary.

5.2.4 Other actions:

– The industry will develop a methodology to assess the potential impact of the introduction of the Intelligent Vehicle Safety Systems and technologies in Europe, based on the accident causation data and including the analysis of combined systems (fusion of sensors, integration and use of multiple active safety systems together).

– The Commission will support this action through RTD funding, studies and by establishing an industry-led eSafety Forum Working Group on impact assessment

– The industry will develop a validation methodology and procedures for vehicles equipped with Intelligent Vehicle Safety Systems. The Commission will support this action through follow-up actions.

– The industry will define, produce, maintain and certify a European digital map database with road safety attributes. The Commission offers to the use by industry the results of existing Community supported research, which define preliminary requirements for a European digital road map database. The Commission will support this action through the eSafety Forum.

5.3. Methods of implementation

The Commission proposes to provide joint platform for all road safety stakeholders by establishing an eSafety Forum. The objective of the Forum is to promote and monitor the implementation of the recommendations identified by the eSafety Working Group, and to support the development, deployment and use of Intelligent Vehicle Safety Systems. The Forum will provide for a platform to encourage and monitor the actions of all stakeholders, including the Commission, industry and the Member States.

The future development of the above-mentioned safety functions requires further RTD in a number of technologies. The Commission intends to use its 6th Framework Programme for supporting research in this area, co-ordinated with national research programmes and benefiting from ERA and international collaboration. The critical task, in which the eSafety Forum can play a role, is determining the priorities for further research based on analysis of accident causation data and the impact of potential countermeasures.

6. FINANCIAL IMPACT

6.1. Total financial impact on Part B - (over the entire programming period)

(The method of calculating the total amounts set out in the table below must be explained by the breakdown in Table 6.2.)

6.1.1. Financial intervention

Commitments (in € million to three decimal places)

Breakdown		2004	2005	2006	Total
Study on standardisation		0.200	0.000	0.000	0.200
Study on socio-economic benefits of IIRSS		0.000	1.500	0.000	1.500
Development of an European Code of Practice		0.334	0.333	0.333	1.000
RTD funding (related to the implementation of the actions planned in this communication)		0.000	4.000	0.000	4.000
Conferences + other dissemination activities		0.039	0.039	0.039	0.118
TOTAL		0.573	5.872	0.372	6.818

6.1.2. Technical and administrative assistance, support expenditure and IT expenditure (commitment appropriations)

		2004	2005	2006	Total
Missions (20 missions per year x 800€ each)		0.016	0.016	0.016	0.048
TOTAL		0.016	0.016	0.016	0.048

6.2. Calculation of costs by measure envisaged in Part B (over the entire programming period)[31]

(Where there is more than one action, give sufficient detail of the specific measures to be taken for each one to allow the volume and costs of the outputs to be estimated.)

Commitments (in € million to three decimal places)

Breakdown	Type of outputs (projects, files)	Number of outputs (total for years 1…n)	Average unit cost	Total cost (total for years 1…n)
Promoting Intelligent Vehicle Safety Systems	Missions (20 missions per year x 800€ each)	60 (20 x 3 years)	0.0008	0.048
	Conferences + other dissemination activities			0.118
	RTD funding (related to the implementation of the actions planned in this communication)		4.000	4.000
Adapting the regulatory and standardisation provisions	Study on standardisation	1	0.200	0.200
Removing the societal and business obstacles	Study on socio-economic benefits of IIRSS	1	1.500	1.500
	Development of an European Code of Practice	1	1.000	1.000
TOTAL COST				6.866

If necessary explain the method of calculation

[31] For further information, see separate explanatory note.

7. IMPACT ON STAFF AND ADMINISTRATIVE EXPENDITURE

7.1. Impact on human resources

Types of post		Staff to be assigned to management of the action using existing and/or additional resources		Total	Description of tasks deriving from the action
		Number of permanent posts	Number of temporary posts		
Permanent officials or Temporary staff	A	1 (2A grades part-time)	2A grades (full time)	3A	** 2 (part-time) A posts shall be taken from existing resources in the Unit,* *2 additional A posts are necessary as Commission will need:* *- to set up the Working Groups and Forum;* *- be an active member of the group;* *- provide the secretariat of the group;* *- prepare the annual report to EP and Council;* *- manage the studies;* *- attend the various working groups;* *- consult with industry;* *- co-ordinate actions with relevant external bodies;* *-co-ordinate actions with other services in the EC* *- write legal documents* *The C grade will provide support to A staff.*
	B	0	0	0	
	C	0	1C grade (full time)	1C	
Other human resources					
Total		1	3	4	

* The need for human and administrative resources shall be covered within the allocation granted to the managing DG in the framework of the allocation procedure.

7.2. Overall financial impact of human resources

Type of human resources	Amount €	Method of calculation *
Officials…….2 part time A grade	108,000	1 x 108,000€
Temporary staff.....2A grades and 1 C grade	324,000	3 x 108,000€
Other human resources.....(give budget line)		
Total	432,000	

The amounts are total expenditure for twelve months.

7.3. Other administrative expenditure deriving from the action

[1] Specify the type of committee and the group to which it belongs.

I.	Annual total (7.2 + 7.3)	€ 432,000
II.	Duration of action years 2004-2006	3 Years
III.	Total cost of action (I x II)	€ 1,296,000

8. FOLLOW-UP AND EVALUATION

8.1. Follow-up arrangements

In order to ensure that Community funds are used efficiently, the Commission shall ensure that activities under this communication are only engaged upon following strictly the current financial and contractual procedures, and that the activities are properly monitored and evaluated.

8.2. Arrangements and schedule for the planned evaluation

Each year, a report will be produced by the Commission to the European Parliament and to the Council on the progress achieved in the implementation of these actions, including proposals for any actions deemed to be necessary.

9. ANTI-FRAUD MEASURES

The control of payments for any service, contract or study requested is carried out by the Commission's services prior to payment, taking into account any contractual obligation, economic principles and good financial or management practice. Anti-fraud provisions (supervision, reporting requirements, etc.) will be included in all contracts made between the Commission and recipients of any payments.

In addition, internal audits or external audits may be carried out by the Commission services or the Court of Auditors in accordance with the Treaty establishing the European Community.