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First Intelligent Car Report"

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COMMISSION OF THE EUROPEAN COMMUNITIES

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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Towards Europe-wide Safer, Cleaner and Efficient Mobility:
The First Intelligent Car Report**

1. INTRODUCTION

Efficient transport services are crucial to the competitiveness of European industry. Although a major contributor to growth, transport does have environmental, economic and social costs. The environmental costs of transport, for example, are estimated to represent 1.1 % of Europe's GDP¹. Road congestion continues to grow and causes a further 1% loss of GDP. In the area of Road Safety, Europe's ambitious goal to reduce fatalities by 50% by 2010 from the 2001 level was introduced in the White Paper on Transport Policy². In the mean time, safety has improved considerably; however with 41,600 deaths, more than 4000 above the target set by the White Paper, and 1.7 million injured in 2005³, the situation is unacceptable.

In January 2007 the Commission proposed an integrated energy and climate package with targets on greenhouse gas emissions and renewable energy to cut emissions. On this basis, in the 2007 Spring European Council the EU heads of state and government set a firm target of cutting 20% of the EU's greenhouse gas emissions by 2020⁴, a goal supported by the G8 Summit, which in June 2007 under the German Presidency stressed the urgency of combating climate change. With respect to road transport the Commission's objective has been to reach average CO₂ emissions of 120g/km for new passenger cars and light-duty vehicles by 2012. This will be done through an integrated approach where CO₂ emissions of 130g/km are to be delivered through vehicle motor technology and the additional 10 grams through other technological measures and the increased use of bio- fuels⁵.

Intelligent transport Systems (ITS) adds information and communications technology to transport infrastructure and vehicles. It aims to manage factors that are typically at odds with each other such as vehicles, loads, and routes to improve safety and reduce vehicle congestion, transportation times and fuel consumption. The potential contribution of ICT's and Intelligent Transport Systems (ITS) is highlighted in the Mid-Term Review of the White Paper on Transport Policy and the Commission's Communication on Energy Policy⁶. ICT's are part of an Integrated Approach both in road safety and cleaner mobility, aimed at reaching the objectives with measures that complement and integrate the existing ones. In this context the 2006 review of the White Paper on Transport Policy "*Keep Europe Moving*" gave the following commitment for 2008:

'Launch of a major programme to bring intelligent road transport systems to market and to prepare infrastructure for cooperative systems.'

As earlier approaches to accelerate ITS deployment have been too limited in scope and did not lead to the expected results, a major EC led initiative based on a holistic policy approach has been initiated aiming at the publication of a Roadmap for major roll-out of ITS deployment integrating the intelligent vehicle and the intelligent infrastructure in summer 2008. A specific consultation with stakeholders is envisaged to start in autumn this year. This roadmap will draw on the work done in the i2010 Intelligent Car Initiative on intelligent vehicles.

¹ COM(2006) 314

² COM(2001) 370

³ COM(2006) 74

⁴ http://ec.europa.eu/energy/energy_policy/index_en.htm

⁵ COM(2007) 19 and, COM(2007) 22

⁶ COM(2007) 1

A number of elements in the domain of intelligent vehicles are being addressed by the Intelligent Car Initiative⁷, launched in 2006 as a policy framework for actions of the Commission and other stakeholders in this area. This initiative builds on advanced ICT to make our road transport safer, cleaner and smarter. The Intelligent Car Initiative is a flagship project within i2010⁸ which is the European Commission's strategic policy framework for the information society and the media in the years up to 2010.

The Commission Communication on Intelligent Car proposed twelve specific actions in three domains called pillars: Co-ordination and support of the work of the relevant stakeholders through the eSafety Forum, Research and Technological Development (R&D) and Awareness raising actions. These actions aim at accelerating the development and deployment of ICT based Intelligent Vehicle Systems in Europe.

Considerable progress has been achieved in all three areas, and the Intelligent Car Initiative is already the reference initiative in Europe and recognised internationally. This Communication reports on progress in these actions, proposes new measures, and seeks further support of the Member States and the Industry for their prompt implementation, complementing the other aspects of the integrated approach for achieving safety and environment objectives, notably measures linked to infrastructure and driver behaviour.

2. PROGRESS TOWARDS SAFER, CLEANER AND SMARTER VEHICLES IN EUROPE

The Intelligent Vehicle Systems already available today can lead to further reductions in the number of fatalities, important relief of congestion in cities and inter-urban corridors as well as significant reductions in pollutant emissions and greenhouse gases. The Intelligent Car Initiative will continue to use its three pillars in order to support the deployment of intelligent mobility in Europe.

2.1. Towards Safer Vehicles

2.1.1 Full-scale roll-out of pan-European eCall by 2010

One of the main goals of the eSafety Forum is the full-scale roll-out of eCall⁹ (the pan-European in-vehicle emergency call) by 2010. In case of an accident, the eCall system will automatically call the emergency services and provide them with the exact location of the vehicle and other information about the accident and vehicle occupants. When fully deployed, eCall could save up to 2,500 lives every year in Europe.

The European Parliament has given its full support to eCall¹⁰, asking all stakeholders to take the necessary actions immediately for implementing eCall, including the signature of the eCall Memorandum of Understanding (MoU). Signing the MoU is voluntary and gives a clear commitment and support to the timely implementation of eCall. Nine Member States and three Associate States have signed the MoU¹¹, while several more are preparing to sign. Considering the Member States' commitment to eCall, the Commission will start negotiations

⁷ COM(2006) 59

⁸ COM(2007) 146

⁹ COM(2005)431 and COM(2006) 723

¹⁰ Report of the EP on Road safety: bringing eCall to citizens: ref. A6-0072/2006,

¹¹ Finland, Sweden, Greece, Italy, Lithuania, Cyprus, Slovenia, Germany, Austria, Switzerland, Norway, Iceland (situation end August 2007)

on the voluntary agreement on the inclusion of eCall as a standard option in all new vehicles from 2010 in the second semester of 2007. The Member States who have not yet signed the MoU should take immediate steps to do so. Depending on the progress, appropriate regulatory steps on the implementation of eCall may be envisaged in 2008.

The eCall Driving Group¹² adopted the final recommendations, which were endorsed in May 2006 by the eSafety Forum and included requirements for eCall standardisation. The progress in ETSI¹³ has, however, been very slow due to the proposal of a proprietary solution as an alternative to a European open standard.

The required accuracy of the location information and the needed coverage implies the use of Global Navigation Satellite Service (GNSS), using GPS and in the near future the European Satellite Navigation Systems Galileo¹⁴ which will offer even greater accuracy and availability.

2.1.2. Making ESC widely available in new cars

Electronic Stability Control (ESC) is a vehicle safety technology that can avoid crashes by reducing the danger of skidding, which is the principle cause of at least 40% of fatal road accidents. According to EuroNCAP¹⁵, 4,000 lives each year on Europe's roads could be saved if all cars had Electronic Stability Control, and 100,000 serious accidents could be avoided.¹⁶ The challenge currently in Europe is that availability of ESC in new cars is still low, 40% in EU-25 in 2005, and varies greatly from market to market due to the differing commercial strategies amongst manufacturers and varied support from authorities (85 % in Sweden, 31% in Italy). Where ESC is offered as an option for a new car, it is often bundled with additional and expensive options. This commercial practice used by many car producers tends to inhibit the take up of ESC in smaller cars.

In the US the National Highway Traffic Safety organisation proposed a regulation in September 2006 that would require all manufacturers to begin equipping passenger vehicles with ESC, starting with the 2009 model year. In the 2012 model year ESC will become mandatory on all new cars for the US market.

In Europe the target is to achieve 100% availability of ESC as well for the model year 2012. Europe has so far advocated a voluntary approach, addressing specifically user demand as a faster way to market. An international agreement on Global Technical Regulation, including the technical requirements of ESC, is being negotiated along with the US as a preparation phase for the installation of ESC into new passenger cars. Concerning heavy vehicles, there is a proposal for provisions for ESC to be implemented into the UNECE¹⁷ Regulation 13 that will most probably enter into force in autumn 2008. eSafetyAware!¹⁸ is a communication platform seeking to accelerate the market introduction of intelligent car technologies by organising information campaigns and end-user events. It is an independent members' forum, chaired by FIA Foundation¹⁹ and co-sponsored by the European Commission. The first

¹² http://ec.europa.eu/information_society/activities/esafety/forum/ecall/index_en.htm

¹³ European Telecommunications Standards Institute

¹⁴ http://ec.europa.eu/dgs/energy_transport/galileo/index_en.htm

¹⁵ European New Car Assessment Programme, <http://www.euroncap.com>

¹⁶ http://www.chooseesc.eu/en/media/information_about_the_campaign/

¹⁷ United Nations Economic Commission for Europe Transport Division, Working Party 29

¹⁸ www.esafetyaware.eu/

¹⁹ www.fiafoundation.com

campaign of eSafetyAware!, currently in progress, is on ESC. The official opening of the campaign took place in May 2007.

Finally, the Commission will launch in 2007 an internet consultation on how to speed up the availability of ESC on a wide range of vehicles, including its mandatory equipment.

2.1.3 Accelerating the take-up of systems for accident avoidance (ADAS)

ICTs are the core components of preventative and active safety systems, which provide real time assistance to the driver so that accidents can be avoided and their consequences mitigated.

For example, a recent study suggested that if passenger car drivers have an additional 0.5-second warning time, about 60% of rear-end collisions can be prevented. An extra second of warning time could prevent about 90% of rear-end collisions. A simulator-based study from the same manufacturer²⁰ reported that rear-end crashes at 80 km/h could be reduced by 75% with brake assist²¹ and crash avoidance technology. The Commission will consult on proposals for the mandatory fitting of systems combining brake assist and crash avoidance technology in 2007. Vision enhancement systems²² that include adaptive headlights have the potential to reduce 30% of pedestrian fatalities and 15% of cyclist fatalities according to a study in Sweden²³.

Despite this great potential, the results of the eSafety Forum Road Maps Working Group²⁴ and the preliminary results of the eIMPACT²⁵ project indicate that if nothing is done, the penetration rates for intelligent car systems and applications will be very low in relation to their life-saving potential. The eSafety Forum has adopted recommendations to all stakeholders for accelerating the take-up of these accident avoidance technologies and should actively promote the development of these recommendations into a realistic roll-out plan by the end of 2008.

2.1.4 Removing market implementation bottlenecks

A key event of the first pillar of Intelligent Car in 2007 was *the eSafety Workshop organised by the German Presidency* in Berlin on 5-6 June. The conclusions of this Workshop give valuable guidance in the implementation of European-level Real-time Traffic and Travel Information (RTTI) and eCall services, and in tackling the Human Machine Interaction (HMI) and legal issues²⁶.

The eSafety Forum endorsed *the European Code of Practice* for the development and testing of Advanced Driver Assistance Systems (ADAS) produced by RESPONSE²⁷. ADAS support drivers and can help in avoiding accidents or mitigating their consequences. Unfortunately several legal barriers like liability are slowing down the take-up of these systems. The

²⁰ Daimler-Chrysler Hightech Report issue 2/2005

²¹ Maximise the braking potential of the vehicle, reducing stopping distances

²² Provides an improved view of the vehicles path by projecting a better view of the visual field during poor visibility conditions

²³ Short description of ITS safety application and their potential safety benefits, Lind et al. (2003)

²⁴ www.esafetysupport.org/en/esafety_activities/esafety_working_groups/implementation_road_map.htm

²⁵ www.eimpact.info

²⁶ www.esafetysupport.org

²⁷ www.prevent-ip.org

RESPONSE project produced a Code of Practice for an accelerated market introduction of ADAS. This will help manufacturers to introduce new safety applications through an integrated perspective on human, system and legal aspects. The Code of Practice is in the process of being adopted by the automotive industry.

Data privacy has to be properly addressed to ensure users trust and confidence in in-vehicle telematics systems. The Commission organised a workshop with European data protection officers in February 2007. On the basis of the Workshop, the eSafety Forum will prepare a code of practice in 2007.

To investigate the security needs of in-vehicle controls systems and communications, the eSafety Forum established a new *Working Group on eSecurity* in January 2007. Its goal is to provide recommendations regarding the research needs in networks, architecture, systems & components and their interaction, and to investigate legal provisions and standardisation needs.

The Intelligent Car Communication referred to *incentives* as a possible means for speeding up the deployment of intelligent vehicle systems. In their report on the Mid Term Review of the European Road Safety Action Programme²⁸, the European Parliament calls on Member States to ensure that incentives are not just confined to reducing emissions but also cover vehicles safety features. The eSafety Forum has investigated the possibility of introducing incentive schemes at national level to support the purchase of vehicles equipped with advanced safety functions. This work shows that the introduction of tax incentives at national level is possible, in line with community state aid legislation, and that it could speed up market implementation of these life-saving technologies. Considering the great potential of such schemes, concrete proposals for their implementation will be investigated by the Commission, in the framework of the ITS deployment roadmap.

So far, demonstrations have been used to test the technical and functional behaviour of ICT based systems, but they have often been restricted and limited in scale. What is needed is an analysis and assessment in a real environment with everyday drivers for a period of time that allows for the collection and processing of data in a statistically sound way. This is the idea of *Field Operational Tests, FOTs*. Work on FOTs has started with FP7 first call for the ramping up of FOTs, and will be continued in further calls.

One of the main reasons for the slow take-up of Intelligent Vehicle Systems is considered to be the consumer's lack of demand. This is why the Commission intends to strengthen *the Intelligent Car awareness pillar* by working with eSafetyAware! on further campaigns, by setting up a dedicated web portal and by promoting the production of targeted documentaries and other awareness raising actions through appropriate support instruments in FP7.

ACTIONS FOR SAFER VEHICLES:

- (1) The Member States who have not yet signed the Memorandum of Understanding for eCall should complete the signature process by the end of 2007.
- (2) The Member States should carry out pilot tests of eCall in the 2007-2008 timeframe, and upgrade their emergency rescue infrastructures to handle eCalls by 2010.

²⁸ http://ec.europa.eu/transport/transport_policy_review/index_en.htm

- (3) The European standardisation organisations ETSI and CEN²⁹ should complete the standards needed for the roll-out of the pan-European eCall by mid-2008. The Member States and industry should work jointly in achieving these standards in this time frame.
- (4) The European Commission will, as foreseen, start negotiations with ACEA³⁰, JAMA³¹ and KAMA³² on the voluntary inclusion of the eCall device as a standard option in all new vehicles starting from 2010, and will report on the outcome by mid-2008.
- (5) Depending on the progress of the above-mentioned measures, new regulatory actions on the implementation of eCall may be envisaged in 2008.

- (6) The Commission will launch a consultation in 2007 on further steps to speed up the wide availability of ESC on a wide range of vehicles including as mandatory equipment.
- (7) As part of the ITS deployment roadmap, the Commission will produce a set of guidelines on incentives for intelligent vehicle systems by mid-2008, which will explore the possibility for Member States to introduce such tax schemes and set up a road map for the implementation of incentive schemes in line with community legislation on taxes and on state aid.
- (8) The Commission will launch Field Operational Tests (FOT's) within FP7 by mid-2008. The Commission will ensure an integrated approach to the building up, running and evaluation of FOT's in Europe and the co-ordination with the Member States.
- (9) The Commission will work together with the eSafetyAware! platform in setting up further campaigns after ChooseESC!, set up an Intelligent Car web portal and promote the production of targeted documentaries on Intelligent Car systems.

2.2. Towards Cleaner Vehicles

2.2.1 *Assessing the role of ICT in relation to the Community's climate change objectives*

The growing demand for mobility represents a challenge for the environmental policies of the European Union.

Some important progress has, however, been made. For instance, harmful emissions from road transport have declined significantly in the last few years. Car usage is, however, still a significant source of greenhouse gases, representing around 12% of the overall EU emissions of CO₂³³. Concerning energy consumption, transport is responsible for 30% of total energy consumption and 71% of all oil consumption in the EU, with road transport accounting for 60%³⁴.

²⁹ European Committee for Standardisation

³⁰ European Automobile Manufacturers Association

³¹ Japan Automobile Manufacturers Association

³² Korean Automobile Manufacturers Association

³³ COM(2007) 22 and COM(2007)19

³⁴ COM(2006) 314

In February 2007³⁵, the Commission adopted a revised strategy in order to deliver the long-standing EU objective of 120 g CO₂/km through an Integrated Approach. The proposed legislative framework³⁶ focuses on mandatory reductions of emissions of CO₂ to reach the objective of 130 g/km for the average new car fleet, by means of improvements in vehicle motor technology, and a further reduction of 10 g/km of CO₂ or equivalent if technically necessary, by other technological improvements (low resistance tyres and tyre pressure monitoring, air conditioning, gear shift indicators, light commercial vans), and by an increased use of bio-fuels.

In addition to the EU strategy focusing on improvements in vehicles, the Intelligent Car Initiative, through the eSafety Forum, is proposing a new way to contribute to improving energy efficiency and reducing emissions. This approach not only addresses the vehicle, but the road transport system as a whole. In the framework of the eSafety Forum, a new Working Group on "ICT for clean and efficient mobility" was created in 2006. Its main aim is to contribute to the Commission work on the methodology to quantify the impact of ICT's on CO₂ reduction in the road transport sector. If appropriate, this could be followed by an assessment of the role of ICT and intelligent cars in relation to the Community's climate change objectives.

2.2.2 Plans for most efficient technologies for clean vehicles

As several research projects have already demonstrated, ICT based systems have a considerable potential impact on cleaner and more efficient mobility and can potentially be offered as an additional tool to reduce CO₂ in the EU. For example, Adaptive Cruise Control (ACC) leads to overall fuel reduction of 3%³⁷. Another study found that the fuel consumption was reduced by 8.5% and pollution by 8 to 18% when only 10% of the vehicles were equipped with ACC, without harmful effects on the traffic flow³⁸. The modern Urban Traffic Control systems can lead to up to 30% less delays and up to 13% increase of vehicles mean speed, by better traffic management, resulting in less fuel consumption and emissions.³⁹

After the development of the methodology for measuring the impact of ICTs on CO₂, the European Commission in consultation with the stakeholders will develop an implementation plan for the most effective ICT technologies, for both the vehicles, the road and the IT infrastructure.

ACTIONS FOR CLEANER VEHICLES:

- (10) The ICT for clean mobility Working Group should contribute to the work of the Commission by identifying the potential benefits of ICT systems in the area of cleaner and more energy-efficient mobility of people and goods in Europe and by proposing a methodology for measuring the impact of ICT in reducing CO₂ emissions by 2008.
- (11) Based on this input, the Commission will address, with the help of the other stakeholders, the best way forward to roll-out the most effective ICT low-CO₂

³⁵ COM(2007) 22

³⁶ COM(2007)19

³⁷ G. Bootsma; L. Dekker, Rijkswaterstraat, NL, Road to the Future, April 2007

³⁸ <http://repositories.cdlib.org/its/path/reports/UCB-ITS-PRR-2001-13/>

³⁹ http://www.smart-nets.napier.ac.uk/finalbrochure_120804.pdf

technologies for both the vehicles and the infrastructure. This input will be reflected in the 2008 ITS deployment roadmap.

2.3. Towards Smarter Vehicles

2.3.1 *Assuring safer use and standardised interfaces for nomadic devices*⁴⁰

Vehicle information and communication systems must be reliable, easy to use and safe. They must also respect data privacy. One key area of the intelligent Car has been improving the *Human-Machine Interaction, HMI*. In December 2006, the Commission adopted an update of the European Statement of Principles on in-vehicle information and communication systems⁴¹. In the time-frame 2006-2008, the Commission will closely monitor its implementation.

The last few years have seen a proliferation of navigation devices in Europe. The market for embedded in-car navigation devices is growing steadily, while there has been a real explosion in Personal Navigation Devices (PNDs) and Smart Phones with navigation, where the market grew from 3.8 million devices in 2005 to over 9 million in 2006. Underpinning this take-up is the RTD funding of the EU's Framework Programmes.

This development is in principle positive, but it brings with it two challenges:

- Safe use and safe fixing of retro fitted devices in the in-vehicle environment
- Interface with the in-vehicle systems

The Commission will work closely with relevant stakeholders to address those challenges and to improve the road safety performance of these devices in line with the transport policy targets.

2.3.2 *Cooperative Systems for safer and more efficient transport*

Co-operative Systems are based on Vehicle-to-Vehicle and Vehicle to Infrastructure communications for the real time transfer of information. They hold the promise of major improvements in the efficiency of the transport system, in the safety of all road users and in making mobility more comfortable. The work on the Co-operative Systems was started in Europe under the 5th and 6th Framework Programmes. The industry has established the Car2Car consortia⁴², promoting a common industry-wide approach. The key prerequisites and major Commission objectives are the development of harmonised and interoperable system architecture, a common Communications Architecture serving both public sector and private sector needs, and the availability of adequate spectrum. To this purpose, the FP6 funded support action COMeSafety⁴³ has established a Communications Architecture Task Force. This Task Force co-ordinates and consolidates the work of European and national projects along with other key initiatives, and acts as an interface to the standardisation ongoing in ISO and other standardisation bodies.

⁴⁰ Portable devices used in the car by a driver for support, assistance, communication or entertainment,

⁴¹ Recommendation of 22 December 2006 2007/78/EC

⁴² www.car-to-car.org

⁴³ www.comesafety.org

Co-operative Systems require further investments in R&D. In line with the ERTRAC Strategic Agenda⁴⁴, the eSafety Forum adopted a Strategic Research Agenda in December 2006 in the area of ICT for mobility, which highlights these R&D needs and sets the basis for future research in this field.

Co-operative Systems require spectrum for short-range, low-latency communications. The industry has requested a band in the 5.9 GHz range, which is being discussed in the Radio Spectrum Committee⁴⁵. The Commission is supporting the industry's requirements, due to the socio-economic benefits of Co-Operative Systems.

ACTIONS FOR SMARTER VEHICLES:

- (12) The Commission encourages the relevant stakeholders to work together in developing proposals for safe use and fixing of nomadic devices, and to establish a standardised interface between the in-vehicle systems and the brought-in devices. The European Commission will use this input to come forward with the appropriate actions in the 2008 ITS deployment roadmap.
- (13) The stakeholders should work towards an open, pan-European, standardised and interoperable Communications Architecture for Co-operative Systems in Europe.
- (14) The Commission will continue to support further R&D under the ICT priority on Co-operative Systems in the time frame 2009-2010.
- (15) The Commission will continue to work with the Radio Spectrum Committee in solving the remaining issues for the harmonisation and the allocations of ITS spectrum for Co-operative Systems in the frequency range 5.9 GHz.

3. CONCLUSIONS AND NEXT STEPS

The Intelligent Car Initiative builds on three pillars for promoting Intelligent Vehicle Systems: the eSafety Forum, R&D and User Awareness. During the course of the first year of the Intelligent Car Initiative, considerable progress has been made in all three areas. This Communication reinforces the i2010 Intelligent Car Flagship Initiative by revisiting the steps that stakeholders, Member States and the Commission are taking in order to achieve safer, cleaner and smarter vehicles and mobility in Europe. The Commission will continue to follow the deployment of these actions and produce regular reports on the state of implementation.

The development of the ITS deployment roadmap integrating vehicles and infrastructures, will be a major EC led initiative to develop consensus amongst the stakeholders for roll-out of ITS as announced in the 2006 review of the White Paper on European Transport Policy. This will be published in summer 2008 following a consultation with stakeholders that is envisaged to start in autumn this year.

⁴⁴ www.ertrac.org

⁴⁵ http://ec.europa.eu/information_society/policy/radio_spectrum/activities/rsc_work/index_en.htm